The Impact of IT Governance Capabilities on Firm Performance: A Case Study

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Abstract

Using the resource based view of the firm theory, a research model is proposed that explains how IT governance capability results in improved firm performance by improving a firm's IT Infrastructure capabilities and business processes. The research model is explored by means of case study where a survey is undertaken with the key stakeholders of a global Corporate and Investment Bank. Data was collected and analysed from 140 respondents using an online survey. The model hypotheses were not tested. The respondents' characteristics (role, region, business area and length of experience) were explored providing greater insight and confirmation of the general relationship between the variables. The case study confirmed the general relationships of the model except the training capability - firm performance relationship. The IT governance process formality moderator provided results that were in contradiction to expectations. The IT intensity moderator confirmed the general relationship. The strength or weaknesses of the relationships when analysing the respondent characteristics are insightful and would not normally have been available if a multi-site survey had been performed.

(Keywords: Capability, IT governance, IT infrastructure capability, business process improvement, firm performance, IT governance process formality, IT intensity, and resource based view of the firm)

Declaration

I declare that this research report is my own unaided work, except to the extent indicated in the text, acknowledgements and reference matter. It is being submitted for the 50% research component of a Masters in Commerce (Information Systems - by Research and Coursework) degree.

It has not been submitted before any other degree or examination in this or any other institution.

R.J. Pritz

21 May 2013

Dedication

This research report is dedicated to my mother and my wife, who have always encouraged me in my studies.

Acknowledgements

To my supervisor Professor Judy Backhouse, thank you for your patience and advice provided during the compilation of this research report.

To Professor Jason Cohen, thank you for statistical advice in compiling the research results.

To my wife Terry, thank you for the support and encouragement in completing my research report.

To my children, Jake, Luke and Olivia, thank you for your patience and understanding when Dad could not always be around when you wanted to play.

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CHAPTER 1

1 Introduction and Background

1.1 Context of the Study

Research has demonstrated that better corporate governance results in improved operating firm performance and market value (Klapper and Love, 2004) and that IT management capability improvement affects a firm's performance (Mithas, Ramasubbu and Sambamurthy, 2011; Bharadwaj, 2000). This study extends previous research by exploring whether IT governance capability results in improved operating and market-based firm performance through an improvement in a firm's IT infrastructure capabilities and business processes. This exploration is based specifically on evidence gathered from various business areas within a global corporate and investment bank.

1.2 Research Problem

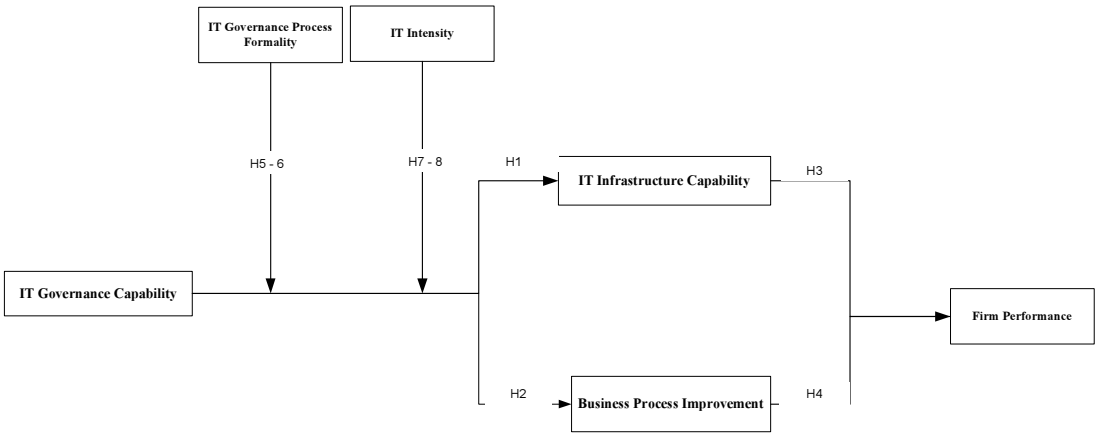
The use of Information Technology (IT) in most firms today involves significant investment and expenditure, where IT is not only an integral part of the firm's processes and associated data but is a critical enabler for the firm in meeting its strategic objectives. IT forms part of the core business operations of firms where understanding of technology, speed of delivery and its potential application is critical to business success. IT governance should ensure that IT investments are properly managed so that the firm's strategic objectives are achieved. The ultimate goal of IT governance is to bring out the business value of IT Investment (Gu, Xue and Ray, 2008). However, it is the view of the author that even though research supports the view that effective IT governance results in superior firm performance (Weill and Ross, 2004) there is still not enough appreciation as to the impact IT governance can have on firm performance. 72 percent of information system projects fail (Kendra and Taplin, 2004). This is because few boards of directors understand the

importance of the role that IT plays in determining the firm's strategy as well as the extent of the firm's dependence on information systems (Nolan and McFarlan, 2005). Sambamburthy and Zmud (2000) state that there is a considerable gap between practice and research where other mechanisms are used besides the traditional governance logic in the orchestrating of an organisation's IT architecture. There is a lack of recognition in practice of the impact that properly functioning IT governance mechanisms can improve firm performance through its impact on IT management capabilities and improvement in business processes. IT governance regulatory requirements (Sarbannes-Oxley Act, The King Report on Governance, 2009) are seen more as compliance requirements than requirements that can add value to an organisation.

1.3 Objectives of this Study

This study has three main objectives. Firstly, to develop a model that demonstrates the relationships between IT governance capability on IT infrastructure capabilities and the extent of improvement in business processes; that demonstrates the relationships between IT management capabilities and business process improvement on firm performance. The theory underpinning the model is based on the resource based view of the firm. Four moderating effects are included in the model, namely: the moderating effect of IT governance process formality on the relationship between a firm's IT governance capability and IT management capabilities; the moderating effect of IT governance process formality on the relationship between a firm's IT governance capability and business process improvement; the moderating effect of IT intensity on the relationship between a firm's IT management capabilities and firm performance; the moderating effect of IT intensity on the relationship between a firm's business process improvement and firm performance. The generic research model and main hypotheses are presented in the diagram below.

Figure 1.1. Generic Research Model and Hypotheses



H1. There is a positive relationship between a firm's IT Governance Capability and IT Infrastructure Capability
H2. There is a positive relationship between a firm's IT Governance Capability and Business Process Improvement
H3. There is a positive relationship between a firm's IT Infrastructure Capability and Firm Performance
H4. There is a positive relationship between a firm's Business Process Improvement and Firm Performance
H5. IT Governance Process Formality will moderate the relationship between a firm's IT Governance Capability and IT Infrastructure Capability
H6 IT Governance Process Formality will moderate the relationship between a firm's IT Governance Capability and Business Process Improvement
H7. IT Intensity will moderate the relationship between a firm's IT Governance Capability and IT Infrastructure Capability
H8. IT Intensity will moderate the relationship between a firm's IT Governance Capability and Business Process Improvement

Secondly, to explore the model's relationships by way of a case study. The case study is based on a global Corporate and Investment Bank where a quantitative survey is performed in respect to the perceptions of key internal stakeholders using a sample collected from executive, senior and specialist managers. The case study; 1) examines the effect of IT governance capability on IT management capabilities and business process improvement respectively and their consequent impact on firm performance; 2) explores the perceptions of various leadership categories within the bank in relationship to each other as to the impact of IT governance capability on IT management capabilities and business process improvement and their consequent impact on firm performance; 3) explores the perceptions of business and IT representatives within the bank in relationship to each other as to the impact of IT governance capability on IT management capabilities and business process improvement and their consequent impact on firm performance; 4) explores the perceptions of experience in current positions in relationship to each other as to the impact of IT governance capability on IT management capabilities and business process improvement and their consequent impact on firm performance; 5) explores the perceptions of

revenue generating business and support business areas within the bank in relationship to each other as to the impact of IT governance capability on IT management capabilities and business process improvement and their consequent impact on firm performance; 6) explores the perceptions of three regions within the bank as to the impact of IT governance capability on IT management capabilities and business process improvement and their consequent impact on firm performance; 7) explores the area of focus (locus versus global) perceptions within the bank as to the impact of IT governance capability on IT management capabilities and business process improvement and their consequent impact on firm performance.

The broader objectives of the study are as follows:

- To review the relevant IS literature in the context of IT governance so as to model and explore the interrelationships between IT governance capability, IT management capability, business process improvement and firm performance.
- To make use of the resource based view of the firm theory to develop a theoretical framework that models how superior IT governance capability influences IT management capabilities and business process improvement respectively, this consequently influences firm performance.

1.4 Importance of this Research

Greater understanding of "IT governance capability" and its impact on "business process improvement" and "IT management capabilities", which in turn influences firm performance. This understanding strengthens the need to improve IT governance practice if positive evidence is provided reflecting how IT governance capability affects the firm performance. The research explores via a case study whether IT Governance capabilities are a resource that has value, rarity, low inimitability and low substitutability. The relationships and trust developed between IT and business areas

takes time to develop and are not easily replaceable. The research highlights the importance of IT governance capability especially in organisations whose business success is highly dependent on the IT function.

The King III Report issued in September 2009 in its principles has included the governance of IT a responsibility of the board of directors. The board of directors now have a real need to come to grips with IT governance to ensure it is complying with corporate governance recommendations. The research should highlight to boards of directors that embedding proper governance mechanisms in a firm should not be seen as a compliance requirement but as good business practice that can improve the firm's performance. The case study provides insight as to the various stakeholders' perceptions in respect to the model and helps guide future business practice. Weill and Ross (2004) assert that IT governance is the single most important indicator in predicting the value that an organisation obtains from IT. Institutional investors pay up to 28% more for shares of well governed companies in emerging markets (Newell & Wilson, 2002). Good corporate governance results in a premium for a firm's shares (Klapper & Love, 2004). It is the purpose of this research to explore via a case study whether there is a basis for similar conclusions in respect to an organisation's IT governance, thus making it easier for boards and senior management to accept and promote IT governance mechanisms. The research strengthens the need for properly functioning IT governance mechanisms.

The research supports Peterson's (2000) call for additional IS governance capability research targeted at organisations that are usually critically dependent upon IT-enabled processes, products and services.

1.5 Summary and Structure of the Research Report

The rest of the research report continues as follows. Chapter 2 is a review

of the IS literature with particular focus on the following concepts: IT governance, IT governance capability, IT management capabilities, business process improvement and firm performance. Chapter 3 introduces the resource based view of the firm, the theory that underpins the research model. The generic research model introduced in this chapter is developed further by leveraging off already developed research constructs from the literature that represents IT governance capability and IT management capabilities. Chapter 4 discusses the research methodology applied in examining the research model's hypotheses using a questionnaire survey issued to the senior executives, senior managers and IT specialists within a global Corporate and Investment bank. This chapter describes the instruments used in measuring IT governance capability, IT management capabilities, business process improvement and firm performance. Chapter 5 introduces the results of the survey. Factor analysis and cronbach alphas are performed and determined for each construct to measure the validity and reliability of each construct. Chapter 6 summarises the research study reflecting the unique findings of the case study survey in respect to IT Governance capability effects on IT management capabilities and business process improvement respectively and their consequent effect on firm performance within a global Corporate and Investment bank. Recommendations for future research are also provided.

CHAPTER 2

2 LITERATURE REVIEW

2.1 Introduction

In this chapter a literature review is performed in respect to IT governance and the mechanisms that underpin IT governance capability. The literature review includes IT infrastructure capabilities and business process improvements as these concepts can be influenced through the embedding of an IT governance capability. The concepts discussed in this chapter form the basis of the constructs that are detailed in the research model chapter.

2.2 Capability

2.2.1 Introduction

Organisational capabilities can be sources of competitive advantage for a firm (Collis, 1994). Capabilities can be classified into three categories, firstly, capabilities that perform basic firm functional activities (E.g. marketing campaigns); secondly, capabilities that provide dynamic improvement to the firm's activities (E.g. manufacturing flexibility) and thirdly, capabilities that comprises the more metaphysical strategic insights that enables firms to recognise the intrinsic value of other resources to develop novel strategies before competitors (Collis, 1994). The building of core capabilities allows a firm to meet future environmental challenges (Van Der Heijden, 2001).

2.2.2 Definition and background

There are many definitions in the IS literature that defines capabilities. The definitions all appear to have the same underlying themes. Willcocks, Feeny and Olson (2006) define a capability as a distinctive set of human

resource-based skills, orientations, attitudes, motivations and behaviours that have the potential, in suitable contexts, to contribute to achieving specific activities and influencing business performance. Each capability has its own distinctive mix of interpersonal, technical and business skills (Willcocks et al, 2006). Capabilities include skills, such as tactical or managerial ability, or processes such as systems development or integration (Wade and Hulland, 2004). Ravichandran and Lertwongsatien (2005) define capabilities as the firm's capacity to deploy combinations of firm's resources (physical, human and technological) in the performance of tasks or activities as part of a functional area.

Collis (1994) defines a capability as the socially complex routines that determine the efficiency with which firms physically transform inputs into outputs. This definition denotes two main elements, firstly that capabilities are embedded in firm routines and that those routines are a product of the organisation as a whole; capabilities are not only expressed as corporate structures and processes but form part of the corporate culture and network of internal relationships (Collis, 1994). Secondly, a capability allows the transformation of physical inputs into outputs where better capabilities allows firms to more efficiently choose and implement the activities necessary to produce a product to a customer(Collis, 1994).

2.3 IT Governance

2.3.1 Introduction

IT governance is an integral part of corporate governance and is the responsibility of the executives and board of directors (Burtscher, Manwani and Remenyi, 2009). There is a real motivation for boards and executives to ensure that IT governance practices are appropriate, proactive and effective since the market penalises firms when unforeseen operating or implementation-related IT failures occur (Bharadwaj, Keil and

Mahring, 2009l, 2009). IT governance structures to manage the firms IT investment are necessary since there is an increasing business dependency on IT and the costs associated with IT investments are becoming substantial (Doughty and Grieco, 2005). Firms with superior IT governance achieved 25% higher profits compared to firms with meager IT governance but the same strategic objectives (Ali and Green, 2009). The drivers in building an IT governance capability is to add value to the business, address the high concern for the acceptance and exploitation of IT and to ensure continuous business and personal development (Feeny and Willcocks, 1998).

Van Grembergen (2004) mentions that the IT executives are not the primary stakeholder for IT governance and that IT governance accountability needs to be shared with business management. IT governance effectiveness in providing sustainable IT business value is a shared responsibility between corporate executives, business managers and IT managers (Van Grembergen, 2004). IT governance cannot be treated as a black box but requires a system of contribution where all stakeholders (board, internal customers, departments etc.) must provide input in the decision making process (Prasad, Heals and Green, 2010).

IT governance relies on the capability of business and IT executives in setting the strategic business objectives, understanding the business capabilities of IT and ensuring the appropriate business value from IT (Van Grembergen, 2004). Bowen, Cheung and Rohde (2007) indicated that more effective IT Governance performance outcomes can occur when business and IT had a shared understanding of business and IT objectives.

2.3.2 Definition

There are a number of definitions for IT governance. The IT governance Institute (2003, pg. 10) defines IT governance as:

"IT Governance is the responsibility of Board of Directors and executive management. IT is an integral part of enterprise governance and consists of the leadership and organisational structures and processes that ensure that the organisation's IT sustains and extends the organisation's strategy and objective"

Doughty and Grieco (2005, pg. 1) define IT Governance as:

"IT governance is a framework that supports the effective and efficient management of information resources (e.g., people, funding and information) to facilitate the achievement of corporate objectives. The focus is on the measurement and management of IT performance to ensure that the risks and costs associated with IT are appropriately controlled"

IT Governance is defined by Weill and Ross (2004, pg. 8) as:

"Specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT"

The decision rights are applicable to the five major decision areas that encompass IT governance, namely, IT principles, IT architecture, IT infrastructure strategies, business application needs and IT investment (Weill and Ross, 2004).

For the purpose of this study the IT Governance Institute definition is utilised.

2.3.3 IT governance forms and frameworks

Information Technology (IT) governance research has mainly been focused on the various governance forms in respect to the locus of IT governance decision making authority or the variety of contingency

factors that determine the form of the locus of IT governance decision making (Brown and Grant, 2005).

Brown and Grant (2005) propose an IT governance conceptual framework for IT governance research containing two main streams, namely, IT governance forms and IT governance contingency analysis.

The IT governance forms stream is based on the locus of IT decision making; be it on a decentralised, centralised or federated basis. Each form has its advantages and disadvantages. Centralisation provides economies of scale and knowledge, the control of standards and company wide planning, resource location and purchasing, however business units do not have system ownership which can result in perceptions at a business unit level that systems are sub-optimal (Sohal and Fitzpatrick, 2002). Decentralised IT decision making allows business units to have ownership of their IT systems where their business needs are better met, however decentralisation can increase overall IT costs where there are duplicate systems, which limits integration synergies between different business units (Sohal and Fitzpatrick, 2002). The governance mode is usually determined by the locus of decision making for core IT activities (Sambamurthy and Zmud, 2000).

Under the IT governance contingency analysis stream, research is focused in understanding which form option is best suited for the organisation based on an analysis of contingency factors. Contingency factors used in research ranged from organisational structure, business strategy, competitive strategy, decision-making structure, business unit autonomy, industry and firm size.

Brown and Grant (2005) contend that Ross and Weill's (2005) contemporary framework, which caters for both IT governance forms and

IT governance contingency analysis, represents a convergence of two previously separate research streams.

An Integrated IT Governance Framework was proposed by Dahlberg and Kivijarvi (2006), which describes a system model where IT governance is viewed as an organisational and managerial coordination process where business and IT are aligned and IT governance processes and structures are integrated.

2.4 IT Governance Capability

2.4.1 Introduction

Feeny and Willcocks (1998) detail nine capabilities required for a "high performance" IT function. Of these nine capabilities, the first capability required is IT governance. Effective IT governance ensures alignment between IT and business goals, whereas firms with ineffective IT governance suffer due to poor performance of IT resources (Ali and Green, 2009).

2.4.2 Definition and background

Feeny and Willcocks (1998) definition of IT Governance Capability is to integrate IT effort with business purpose and activity.

The exhibited behaviors of the IT governance capability requires the establishment and maintenance of executive relationships, striving to achieve a shared and challenging vision of the role of IT in the business, developing the culture of the IT function and the search for and promotion of best practice in information management (Feeny and Willcocks, 1998). Van der Heijden (2001) refers to the IT governance capability as the executive relationship between IT management and business management. Van der Heijden's (2001) IT governance capability is an

aggregation of two capabilities, namely "Business IT strategic thinking" and "IT management". The "Business IT strategic thinking" capability is focused on "outward managerial skills", whilst the "IT management capability" is focused on "inward management skills.

The outward management skills refer to the building of executive relationships, shared objectives and strategy involvement (Van der Heijden, 2001). The inward management skills consists of two elements, firstly, the development of cultural alignment between business areas and IT areas and secondly, the application of best practice relating to the association of strong IT governance capability with the continuous improvement of management processes (Van der Heijden, 2001). It is important to foster an appropriate culture between IT areas and business areas to ensure strong IT governance capabilities. Cultural alignment results in improved relationships between IT and business (Ward and Peppard, 1996). Corporate culture can have a significant effect on an organisation's performance (Ward and Peppard, 1996).

Peterson (2000) mentions that IT governance capability includes the capability to integrate IT decision making between key stakeholders. Peterson (2000) further states that IT governance capabilities are an enduring quality within an organisation which can be distinguishable from other organisations as a result of stakeholders' policies and behaviours being embedded in a particular organisation's structure and processes. Two IT governance structures that integrate IT effort with business purpose and activity and that exhibit their own policies and behaviours are the "IT strategy committee" and the "IT steering committee".

2.4.3 IT strategy committee

In order to establish effective governance of IT, it is important that the board is involved. This involvement is performed via an IT strategy

committee (Ali and Green, 2007). An IT strategy committee is a subcommittee of board members with responsibility to provide insight and advice to the board on such topics such as alignment of IT with business direction and the achievement of strategic IT objectives, and also to provide direction to management relating to IT strategy (Ali and Green, 2009).

The involvement of the board in IT governance implies that the firm is committed to establishing effective IT governance (Ali and Green, 2007). Ali and Green (2005) established that the IT strategy committee had a significant positive relationship with the overall effectiveness of IT governance.

2.4.4 IT steering committee

The IT steering committee consists of business executives (including the CIO) from various business functions within the firm with the main function of linking the firms IT strategy with the firm's business strategy (Ali & Green, 2009).

With globalisation, multidivisional and multinational firms need to be capable in coordinating operational and strategic activities across functional areas, business units and national borders (Karimi, Bhattacherjee, Gupta and Somers, 2000). A formal structure that provides this coordinating capability is the IT steering committee where lateral organisational coordination, collaboration and decision making can be take place in respect to the firm's IT resources (Karimi et al, 2000). It has been found that the presence an IT steering committee within a firm is significantly related to the level of IT management sophistication within the firm (Karimi et al, 2000).

An IT steering committee is synonymous with a senior management

committee. It is important that the IT steering committee has an appropriate mix of business and IT executives to ensure strategic alignment (Prasad et al, 2010). An effective IT steering committee help in developing and sustaining a firm's IT-related management and infrastructure capabilities and promotes overall harmony in IT usage (Prasad et al, 2010). Prasad et al (2010) established that firms with highly effective IT steering committees had better IT related capabilities, which resulted in better improvements in internal process level performance thus enhancing customer service and overall improvement in firm performance.

2.5 IT Infrastructure Capabilities

IT infrastructure has been identified in some firms as having a critical impact on the firm's ability in using IT competitively (Duncan, 1995). IT infrastructure refers to the enabling technologies, sourcing arrangements, and policies which form an intricate system of information-related activities (Mitchell and Zmud, 1999). The scope, sophistication, and flexibility of a firm's IT infrastructure determines how a firm acquires and deploys needed IT resources (Mitchell and Zmud, 1999).

Law and Ngai (2007) define IT infrastructure capabilities as

> *"a multidimensional concept that includes many aspects of IT, ranging from the network infrastructure that allows communications across and within organisational boundaries, a portfolio of hardware and system software that supports transaction processing and information analysis, documentation that clearly defines the policies and procedures of IT management, expertise in managing the IT platforms and various stakeholders and training of IT staff and users."*

From the above definition, IT infrastructure capabilities have a far wider scope than just physical infrastructure. The broader definition of IT

infrastructure has been accepted by many authors in IT (Law and Ngai, 2007). Although the individual components of IT infrastructure are commodity-like, the process of integrating each component in developing an infrastructure to meet the firm's strategic environment is complex and not well understood (Bharadwaj, 2000). Building integrated infrastructure takes time and effort and requires experienced learning (Law and Ngai, 2007). There have been no previous studies that explore the impact IT governance has on IT infrastructure capabilities when changes are made to the way IT components are integrated.

Firms that already had experience in implementing similar infrastructure were the most successful implementers (Neo, 1988). IT infrastructure, the set of resources, that make feasible both innovation and continuous improvement is a source of sustainable competitive advantage (Duncan, 1995).

2.6 Business Process Improvement

Business process changes can either be made on a radical or incremental basis. Radical change involves business process reengineering which is "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service and speed" (Hammer and Champy, 1993). The incremental business process change adopted by firms is a less radical approach, which involves less drastic changes to processes and is known as business process improvement (Law and Ngai, 2007).

New technologies enable the improvement in business processes or practices, which previously would not be feasible (Law and Ngai, 2007). The involvement of IT in business process change is critical to ensure efforts are not destined to failure (Wu, 2000). IT governance would be important in mitigating possibilities of failure. There have been no previous studies that explore the impact IT governance has on business

process improvements when new technologies or reconfigured current technologies are deployed.

2.7 Summary

In this chapter an overview is provided as to the concept of an organisational capability so as to provided contextual understanding when positioning the concepts of IT governance capability and IT infrastructure capabilities. In addition background information was provided as to the concept of IT governance, its forms and frameworks. Any business process improvement is usually dependent on IT where failure should be mitigated through proper embedded IT governance capabilities.

CHAPTER 3

3 MODEL DEVELOPMENT

3.1 Introduction

This study is based on the theory of the resource based view (RBV) of the firm. In the research model the organisational capabilities mentioned in the literature review chapter are proposed as resources that provide a sustainable competitive advantage to the firm.

3.2 Theory of Resource Based View of the Firm

The RBV theory postulates that strategic heterogeneous resources under the control of a firm provide a firm with a sustained competitive advantage. This is on the basis that these resources have value, rarity, inimitability and low substitutability (Barney, 1991). Barney (1991) defines a sustained competitive advantage when the firm is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of this strategy. Empirical studies using the resource based view of the firm have strongly supported the theory (Wade and Hulland, 2004).

Resources are internal factors of production that are under the control of the firm, whilst capabilities refer to the firm's capacity to deploy resources, usually in combination with organisation processes, to affect a desired end (Amit and Shoemaker, 1993). Barney (1991) viewed capabilities as falling within the classification of firm resources.

Wade and Hulland (2004) mention that IS (information system) resources can be divided into two categories, namely IS assets (technology-based) and IS capabilities (systems based). IS assets (I.e. infrastructure that

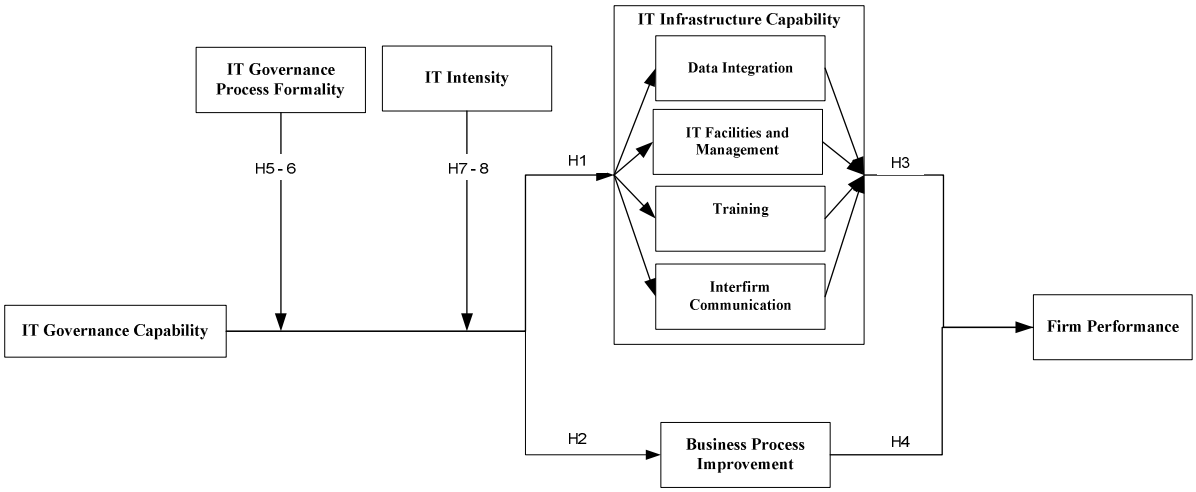
includes networks, software, databases etc.) are the most fragile source of sustainable competitive advantage as they are the easiest for a competitor to copy (Wade and Hulland, 2004). However, the combination of hardware and software assets can create a flexible and sophisticated IT infrastructure that can be inimitable (Ravichandran and Lertwongsatien, 2005), thus providing a sustainable competitive advantage. Time compression diseconomies (Deirickx and Cool, 1989; Bharadwaj, 2000) make it very difficult for a competitor to copy a firm's infrastructure capability by simply purchasing the various components. One firm's infrastructure may allow strategic innovations in business processes, whilst a competitor firm's infrastructure characteristics may make it difficult to imitate the innovation (Duncan, 1995). This is known as infrastructure flexibility. A firm's competitive advantage can originate from the firm's superior deployment of its capabilities, which became embedded in a firm over an extended period of time (Wade and Hulland, 2004) and are very difficult to trade.

3.3 Research Model

3.3.1 Introduction

Using the RBV theory of the firm, the research model outlined in the figure below is proposed.

Figure 3.1. Research Model



A firm's IT governance capability is recognised as an resource that influences the firm's IT infrastructure capability as well as improves the firm's business processes, which in turn influences the firm's performance. IT governance capability and IT infrastructure capability are resources viewed in the model as having value, rarity, inimitability and low substitutability. Business process improvement is included as an additional link to reflect how IT governance capability impacts firm performance through improvements in business processes.

Two control variables are included in the research model, namely IT governance process formality and IT intensity. Control variables are used to account for causes other than the theoretical constructs of interest that help explain the variance in the dependent variables (Ravichandran and Lertwongsatien, 2005).

In the remaining sections of this chapter the key constructs and hypotheses underlying the relationships in the above research model are discussed.

3.3.2 IT infrastructure capability

The IT infrastructure capability construct in the model is based on Law and Ngai's (2007) "Dimensions of IT Infrastructure Capabilities" construct. Law and Ngai's (2007) "Dimensions of IT Infrastructure Capabilities" construct includes the following dimensions: data integration, IT management and support, training and network communications. The "dimensions of IT infrastructure capabilities" concept is referred to as IT infrastructure capability, as this concept is synonymous with the construct defined by Law and Ngai (2007).

Hypothesis 1: The perceived level of IT governance capability is positively associated with the perceived level of the individual infrastructure capabilities of a firm

3.3.3 Business process improvement

The "Extent of Business Process Improvements" construct is defined by Law and Ngai (2007) as "the perceived degree to which changes in processes have been implemented to improve the efficiency and effectiveness of a company".

It is expected that effective IT governance reduces the prospect of IT investment failure associated to business process improvement initiatives. There is evidence that IT investments result in business processes improvements. For example Mukhopadhyay, Rajiv and Srinivasan's study (1997) demonstrated how IT had a significant positive impact on the mail sorting process.

Hypothesis 2: The perceived level of IT governance capability is positively associated with the perceived level of business process improvements of a firm.

3.3.4 Firm performance

Ngyuyen, Seror and Devinney (1990) define a firm's performance as the firm's future opportunities and profitability. The concept of firm performance can be multi-dimensional where firm performance can be ascertained from the perspective of either accounting measures or market perceptions of firm value (Ngyuyen et al, 1990). Empirical research using the RBV theory either use accounting measures or perception measures as a basis for firm performance measurement. Rivard, Raymond and Verreault (2006) used accounting measures such as profit margin and return on investments", whilst Lertwongsatien (2005) used perception measures in respect to "market-based performance" and "operating performance".

Hypothesis 3: There is a positive relationship between IT infrastructure capabilities and firm performance.

Hypothesis 4: There is a positive relationship between business process improvements and firm performance.

3.3.5 IT governance process formality

IT governance formality refers to the formality of IT governance processes. In the marketing literature "formality" research has been performed in respect to "product elimination decision making" (Avlonitis, 1985). Leveraging off this research it would be useful to explore the extent to which IT governance formality impacts a firm's IT infrastructure capability and business process improvements.

Hypothesis 5: Perceived IT governance process formality moderate the relationship between IT governance capability and IT infrastructure capability.

Hypothesis 6: Perceived IT governance process formality moderate the relationship between IT governance capability and business process improvement.

3.3.6 IT intensity

Different industries are more IT intensive than others. For example the telecom and financial services industries are more IT intensive as compared to the mining industry (Bharadwaj et al, 2009). IT plays a more strategic role in industries that have high information intensity (Neo, 1988). There have been mixed results as to the impact IT intensity has on IT governance effectiveness. Ali and Green (2009) found no support that IT intensity has a positive impact on IT governance effectiveness, whilst Sohal and Fitzpatrick (2002) found that IT intensity has a positive impact. Firms with high IT usage had more board executive and director

involvement in its IT governing decisions process, whilst firms with low IT usage had lower director involvement and a greater proportion of senior management involvement (Sohal and Fitzpatrick, 2002). The IT intensity of firms needs to be explored as to how IT intensity moderates the relationship per the relationships below.

Hypothesis 7: Perceived IT intensity moderate the relationship between IT governance capability and IT infrastructure capability.

Hypothesis 8: Perceived IT intensity moderate the relationship between IT governance capability and business process improvement.

3.4 Summary

In this chapter a research model is developed based on the resource based view of the firm theory where a number of hypotheses are presented.

CHAPTER 4

4 Research Methodology

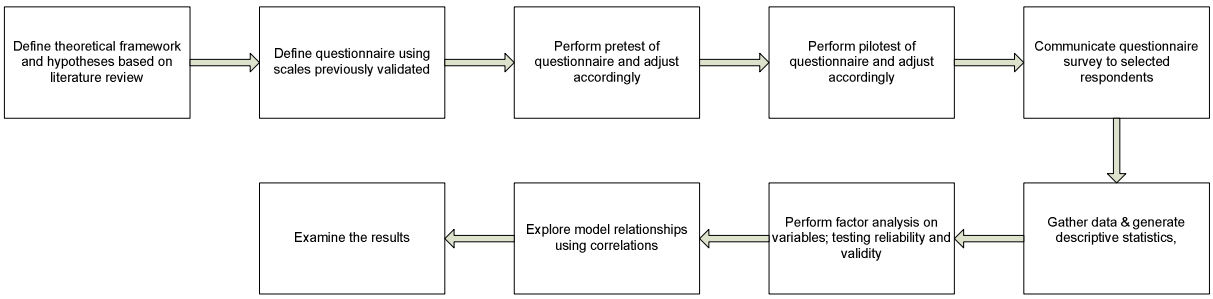
4.1 Introduction

The purpose of the research is to explore the model relationships presented in the previous chapter from the perspective of a number of individuals with a global Corporate and Investment Bank. The case study explores whether there is a perception that IT governance capabilities results in a perceived competitive advantage to a firm through superior firm performance. The case study observes from a number of perspectives the impact of IT governance capability on IT infrastructure capabilities and business process improvement and their consequent impact on firm performance.

This chapter describes the methodology chosen in achieving the purpose of this study. The questionnaire design, testing, respondent selection, data collection and analysis procedures are described below.

The figure below reflects the research methodology steps followed in this study.

Figure 4.1. Flow Chart representing the Research Methodology



4.2 Study Design and Methodology

4.2.1 Approach

Two main epistemological positions exist, namely positivism and interpretivism. Positivism focuses on a theoretical framework to explain or predict observable occurrences. Positivism is based on the assumptions that reality is independent from the researcher, objective and can be measured used quantitative values. Interpretivism in contrast is based on the belief that reality is not independent from the researcher, is subjective and is interpreted using qualitative measures (Collis & Hussey, 2009).

A positivist quantitative research approach has been adopted in this research. Research data was collected via a survey questionnaire. Surveys are useful as they are easy to administer, allows the researcher to determine the values and relations of variables and constructs, can be used to predict behaviour and can permit theoretical propositions to be tested in an objective manner (Newsted, Huff and Munro, 1998). The positivist approach was applied to the collected quantitative values so that the relationships between the various independent and dependent variables outlined in the theoretical framework per chapter 3 could be measured independently. The survey questionnaire created allowed the collection of descriptive data about the respondents whereby further analysis of the relationships between the various independent and dependent variables could take place.

4.2.2 Questionnaire construction

The intention of the first six questions was to provide background information on the respondents' current roles, regional focus, years of experience, business areas and governance committee involvement. The remaining questions were used to measure the constructs outlined in the

theoretical framework.

Six construct groupings are measured in this study, namely "IT governance capability", "IT infrastructure capability", "business process improvement", "firm performance", "IT intensity" and "IT governance process formality". It is important to note that the perceptions of the respondents are measured in respect to these constructs. The measurement of these perceptions is based on existing perceptual measurement instruments that need to be modified for this study. The modified instruments may need to be revalidated, as good instruments become poor if not subsequently revalidated (Wade and Nevo, 2005).

Each construct is made up of a number of scale items that are measured using a five point likert scale, with 1 being equal to *Strongly Disagree*, 2 equal to *Disagree*, 3 equal to *Neutral*, 4 equal to *Agree* and 5 equal *Strongly Agree*.

The scale items were sourced from previously validated measures from the information systems and management literature. Where necessary the scale items were slightly reworded to correctly position the questions in the context of the business environment the respondents operated.

4.2.3 IT governance capability

The "IT governance capability" construct consists of three sub-constructs, namely "business IT strategic thinking capability", "IT strategy committee capability" and "IT steering committee capability".

4.2.3.1 Business IT strategic thinking capability

The "business IT strategic thinking" construct is measured using the instrument developed by Van Der Heijden (2001). The measurement instrument in respect to "business IT strategic thinking" under the original model was found to be reliable and valid. Van Der Heijden (2001) mentions that this measure requires further validation with an independent data set. It is hoped that this research provides this validation. The constructs three indicators are as follows (1) The vision of IT management for the role of IT is similar to the vision of business management for IT, (2) The IT division/department is closely involved in the formulation of the Bank's strategy, (3) The IT division/department maintains close relationships with business management.

4.2.3.2 IT strategy committee

The "IT strategy committee" construct is measured using three items from Ali and Green's (2009) measurement scale. The construct's three indicators are: (1) The IT strategy committee provides strategic direction and the alignment of IT with business issues, (2) The IT strategy committee provides direction for the sourcing and use of IT resources, skills and infrastructure so as to meet strategic objectives, (3) The IT strategy committee provides direction to management in respect to IT strategy.

4.2.3.3 IT steering committee capability

The "IT steering committee" construct is measured using three items from Ali and Green's (2007) measurement scale. The construct's three indicators are: (1) The IT steering committee provides strategic direction to IT projects that are in line with the strategic direction of the Bank, (2) The IT steering committee provides leadership in deriving benefits from strategic IT projects; (3) The IT steering committee provides leadership in managing strategic IT projects.

4.2.4 IT Infrastructure capability

The IT infrastructure capability consists of four sub-constructs, namely "data integration", "IT facilities and management", "training" and "interfirm communications". These sub constructs are based on the identical scales used by Law and Ngai's (2007).

4.2.4.1 Data integration

The construct's three indicators are: (1) Unique information in a database is shared across the Bank, (2) Duplication of data is eliminated, (3) Definitions of data elements are standardised.

4.2.4.2 IT facilities and management

The construct's five indicators are: (1) Server platforms have sufficient capacity, (2) Regular preventive maintenance on our IT systems minimises their down time, (3) The Bank has the expertise to manage IT facilities, (4) Internal users are happy with IT services, (5) IT administration standards and procedures are well defined.

4.2.4.3 Training

The construct's three indicators are: (1) The Bank has effective IT training programmes, (2) Training for users is sufficient, (3) Training for IT personnel is sufficient.

4.2.4.4 Interfirm communications

The construct's two indicators are: (1) Networks link the Bank and its main suppliers, (2) Networks link the Bank and its main customers.

4.2.5 Business process improvement

The "business process improvement" construct is measured using the five items from Law and Ngai's (2007) "extent of business process improvements" scale. The construct's five indicators are: (1) The Bank's

process changes help prevent defects and errors, (2) the Bank process standards are improved periodically, (3) New processes in the Bank are easier to work with, (4) Work processes are improved to facilitate coordination within the Bank, (5) The performance of IT at the bank is regularly and systematically re-viewed. Specific reference was made to the Bank's name in the indicators of the actual survey.

4.2.6 Firm performance

The "Firm Performance" construct is measured using the seven items from Ravichandran and Lertwongsatien's (2005) "firm performance" scale. The construct's eight indicators are: (1) the Bank enters new markets very quickly, (2) The Bank has brought new products and services to the market faster than our competitors, (3) The success rates of the Bank's new products and services have been high, (4) The Bank's productivity has exceeded that of our competitors, (5) The Bank's profit has exceeded that of our competitors, (6) The Bank's financial performance has been outstanding, (7) The Bank's financial performance has exceeded that of our competitors. Specific reference was made to the Bank's name in the indicators of the actual survey.

Ravichandran and Lertwongsatien's (2005) represented firm performance as two separate firm performance constructs, namely market-based performance consisting of scales (1) to (3) and operating performance consisting of scales (4) to (7). The intention is to represent firm performance as one construct consisting of all seven scales.

4.2.7 IT governance process formality

The "IT governance process formality" scale is adapted from Avlonitis' (1985) "process formality" scale where the indicators have been reworded in the context of IT process formality. The construct's three indicators are: (1) The performance of IT at the bank is regularly and systematically re-

viewed, (2) Criteria to evaluate IT's performance have been explicitly established, (3) Minimum standards of IT performance have been explicitly established to serve as warning signals, (4) Responsibility for IT decision-making has been clearly and definitely assigned.

4.2.8 IT Intensity

The "IT Intensity" construct is measured using the three items from Ravichandran and Lertwongsatien's (2005) "IT Intensity" scale. The construct's three indicators are: (1) IT is used extensively by the Bank's competitors, (2) IT is used extensively by the Bank's suppliers and business partners, (3) IT is a critical means to interact with customers in the banking industry. Specific reference is made to the Bank in the indicators.

4.3 Sampling and Data Collection

As described in the approach section, data was obtained using a survey. A single site survey was selected, as opposed to a multiple firm survey. Although a multiple site survey is beneficial as it provides empirical data supporting the general relationship between the model variables; the limitation of a multiple firm survey is it only reflects the perceptions of one or two persons per firm, whilst in a single site survey the perceptions of many representatives from a variety of roles, regions, business areas and with different lengths of experience can be explored providing greater insight and confirmation of the general relationship between variables. Since a single site survey is being used, questions specifically name the bank being surveyed to ensure that the questions resonate with the respondents. A key-informant approach is applied where respondents are asked to answer questions from the firm's perspective and not about themselves personally.

The research model per the theoretical framework described in chapter 3 was explored via an internet questionnaire survey communicated to the

senior and executive business and IT decision makers within the Corporate and Investment Banking business unit (CIB) of a global financial services company. A global financial services company was selected because this type of firm has complex IT systems to operate and thus requires IT governance mechanisms to manage its IT investment.

The sample list for the questionnaire was compiled by identifying the key senior and executive business and IT decision makers of each business area within the Corporate and Investment Banking business unit per region. Some of the key senior decision makers have responsibilities globally for a business area and/or for a particular region. CIB operates across three main designated regions, namely South Africa, Africa (excluding South Africa) and International (countries outside of Africa). The business areas that make up CIB are either revenue generating (Global Markets, Investment Banking, Real Estates Investments and Transactional Product and Services) or support areas (Client Coverage, Financial Services, Human Resources, Information Technology, Operations and Risk Management). Each business area would operate in a region. Each business area has a global head. Senior representatives from business analysis, architecture, programme management and project management were included in the sample list as their perspective would be interesting to investigate.

In total, 728 representatives were identified, which represents a large sample of the senior stakeholders and was of sufficient size to warrant empirical research. An email was communicated to the selected representatives requesting them to complete the questionnaire survey via the internet. Two email reminders were communicated before closing the survey. In total there were 195 responses of which 55 were discarded due to the questionnaire being partially completed.

According to Wade and Nevo (2005) a response rate above 20% is

considered sufficient with at least a 100 responses. The actual response rate was 19.23% with 140 respondents. Although slightly below the 20% cut-off, the response rate is considered sufficient.

4.3.1 Pretest and pilot study

The questionnaire instrument was pretested by 4 academics knowledgeable in information systems. This was to confirm the reasonableness and soundness of the survey's content especially in light that some of the constructs have had limited usage in previous studies. Feedback from the academics resulted in minor word changes to some of the survey questions.

Before submitting the survey to the identified stakeholders within the bank, a pilot was performed by submitting the survey for testing with fellow master students, previous bank colleagues as well as colleagues who have an information systems background. The purpose of the pilot tests was to ensure that the questions were understood; that the online survey was functioning correctly and that the full range of the scale was being utilised. 16 colleagues tested the online survey, which resulted in minor word changes to the questions and the design of the survey. A copy of the instructions and the final amended questionnaire is provided in Appendix B.

4.4 Analysis of Data

Data analysis for this study was performed using IBM SPSS version 19 for Windows.

4.5 Delimitations and Limitations

The questionnaire survey was available on the internet for more than two weeks, which is assumed to be a sufficient period of time to obtain enough responses to perform research. The respondents were not obligated to complete the survey which increases the possibility that respondents with a particular predisposition may have responded leading to a distorted

representation

Although due care was applied in identifying the key senior and executive business and IT decision makers of each business area, it is possible that a few key senior and executive business and IT decision makers may have been excluded from the survey.

The questionnaire survey was performed at a particular point in time when the CIB business unit was operating in accordance to a Bank strategy that may have subsequently changed.

Based on the seniority of the stakeholders there was an expectation that the respondents understood terms for example IT strategy committee and IT steering committee. The possibility exists that the respondents misinterpreted terms resulting in distorted results. In the case of IT strategy committee and IT steering committee this risk was reduced by providing definitions of the terms when the survey questionnaire was distributed.

4.6 Summary

This chapter describes the research methodology undertaken in exploring the research model's relationships within the Corporate and Investment Banking business unit (CIB) of a global financial services company. The exploration of the survey questionnaire results are examined in the next chapter.

CHAPTER 5

5 Research Results

5.1 Introduction

The purpose of this chapter is to provide feedback on the survey results. Descriptive statistics in respect to the characteristics of the respondents are provided in section 5.2. An analysis of the instrument validity and reliability is provided in Section 5.3. Section 5.4 investigates the relationships between the various independent and dependent variables of the research model to determine the extent to which the respondents perceive the model. Section 5.5 explores the moderators' (IT governance process formality and IT intensity) effect on the model relationships. To re-iterate the research model hypotheses are not tested in this case study. The relationships between the constructs are explored based on the characteristics of the respondents. A review of the chapter is provided in the final section 5.6.

5.2 Descriptive Statistics

195 responses were collected over a two week period of which 55 were discarded due to incompleteness. The final sample consisted of 140 responses. The characteristics of this final sample are reflected in the table 5.1 below.

Table 5.1 Characteristics of respondents

		Number	Percentage (%)
1.	*Leadership Category*		
	Executive Management	54	38.6
	Senior Management	59	42.1
	Specialists	27	19.3
	Total	140	100
2.	*Role Location*		
	Business	93	66.4
	IT	47	33.6
	Total	140	100
3.	*Experience in Current Position*		
	0 - 2 years	38	27.1
	3 – 5 years	49	35.0
	6 – 25 years	53	37.9
	Total	140	100
4.	*Business Area*		
	Revenue Generating	38	27.1
	Support	102	72.9
	Total	140	100
5.	*Geographic Region*		
	South Africa	48	34.3
	Rest of Africa	41	29.3
	International	18	12.9
	Not Applicable	33	23.6
	Total	140	100
6.	*Area of Focus*		
	Global	36	25.7
	Local	104	74.3
	Total	140	100

Table 5.2 below provides descriptive statistics on the governance committees that respondents are involved in.

Table 5.2 Descriptive statistics in respect to Governance Committees

	Number		BUPP	EX	STR	STE	PB
Number out of 140			34	29	6	10	53
Percentage			24.3%	20.7%	4.3%	10%	37.9%
Leadership Category							
Executive Management	54	Number	16	21	3	4	15
		%	29.6%	38.9%	5.6%	7.4%	27.8%
Senior Management	59	Number	14	6	3	6	21
		%	23.7%	10.2%	5.1%	10.2%	35.6%
Specialists	27	Number	4	2	-	-	17
		%	14.8%	7.4%	-	-	63%
Role Location							
Business	93	Number	19	19	2	2	23
		%	20.4%	20.4%	2.2%	2.2%	24.7%
IT	47	Number	15	10	4	8	30
		%	31.9%	21.3%	8.5%	17%	63.8%
Experience in Current							
0 – 2 years	38	Number	7	8	2	3	13
		%	18.4%	21.1%	5.3%	7.9%	34.2%
3 – 5 years	49	Number	12	10	1	3	22
		%	24.5%	20.4%	2%	6.1%	44.9%
6 – 25 years	53	Number	15	11	3	4	18
		%	28.3%	20.8%	5.7%	7.5%	34%
Business Area							
Revenue Generating	38	Number	9	6	-	1	10
		%	23.7%	15.8%	-	2.6%	26.3%
Support	102	Number	25	23	6	10	43
		%	24.5%	22.5%	5.9%	8.8%	42.2%
Region							
South Africa	48	Number	9	4	-	1	19
		%	18.8%	8.3%	-	2.1%	39.6%
Rest of Africa	41	Number	8	13	3	5	32
		%	19.55	31.7%	7.3%	12.2%	22%
International	18	Number	5	2	1	1	7
		%	27.8%	11.1%	5.6%	5.6%	38.9%
Area of Focus							
Global	36	Number	14	10	2	3	21
		%	38.9%	27.8%	5.6%	8.3%	58.3%
Local	104	Number	20	19	4	7	32
		%	19.2%	18.3%	3.8%	6.7%	30.8%

Legend: BUPP = Business Unit Project Prioritisation Committee, EX = Executive Committee, STR = IT Strategy Committee, STE = IT Steering Committee, PB = Project

In respect to the leadership category, the executive management category consists of business directors (27), chief financial officers (3), a chief information officer (1), chief operating officers (5), chief risk officers (9) and IT directors (9); the senior management category consists of senior business managers (46) and senior IT managers (13); the specialist category consists of programme managers (7), architects (7), project managers (8) and senior business analysts (5). This study investigates the specialist category as the roles contained in this category are either responsible for designing the target architecture (architects and business analysts) or responsible for the delivery of the target architecture (programme managers and project managers). This is supported by the high involvement of the specialists (63%) in project boards. It would be expected that the specialists would not be involved in the IT strategy committees and IT steering committee meetings and this is supported by the zero participation reflected. As expected senior management (10.2%) has a greater percentage involvement than executive management in the IT steering committee. Per Ali and Green (2009) the IT steering committee is synonymous with a senior management committee. The higher executive management involvement (29.6%) in the business unit project prioritisation committee is understandable as the executive is best placed in determining what is important for the business.

Most respondents have their roles located within the Business (66.4%), which includes the roles business director, chief executive officer, chief financial officer, chief risk officer and senior business manager roles. Roles located within IT are architect, chief information officer, IT director, programme manager, project manager, senior business analyst and senior IT manager. In some organisations the programme manager, project manager and senior business analyst roles are located within the Business, however in the CIB business unit, these roles fall under the IT organisational structure. Roles located in IT have a greater percentage involvement in the IT governance committees than roles located in business. This is expected in a Corporate and Investment Bank that requires complex IT systems to operate.

Based on an analysis of the respondents, experience in current position has been classified to reflect three distinct categories, namely 0 – 2 years (27.1%), 3 – 5 years (35%) and 6 – 25 years (37.9%).

Revenue generating business areas represent 27.1% of the respondents, whilst support business areas represent 72.9%. Revenue generating business areas are business area that interacts with an external client through the exchange of a product or service. Support business areas are business areas that provide services to revenue generating business areas (E.g. IT). It is worth noting that none of the revenue generating business areas are involved in the IT strategy committee. This may explain the lack of correlation of IT management capabilities with firm performance in respect to revenue generating business areas explored further in the "model relationships" section below.

The geographic region represents the local region indicated by the respondent as the region the respondent represents. The "not applicable" category refers to respondents that have global representation and do not represent one unique region. It is worth noting that South Africa regional respondents are not involved in the IT strategy committee. This may explain the lack of correlation of IT management capabilities with firm performance in respect to South Africa explored further in the "model relationships" section below.

The area of focus classifies the respondents according to a global (25.7%) or local (74.3%) area of focus. Respondents with a global focus are responsible for a business area on a global basis. Respondents with a global focus have a higher proportionate representation across all committees as compared to those participants that have local focus. This may explain the higher number of constructs that have significant correlations as compared to the respondents that have local area of focus. This is explored further in the "model relationships" section below.

5.3 Instrument analysis

Factor Analysis was performed on each of the research model constructs using SPSS.

An initial factor analysis of the IT governance capability scale resulted in dropping two of the items due to some of their correlations being less than .3 and the total variance explained being 54.87%. The remaining seven items of the IT governance capability scale were subjected to a principal component analysis (PCA). The factorability of the correlation matrix in respect to the seven items was supported by the Kaiser-Meyer-Oklin value of .902, exceeding the recommendation of 0.6 and above, and the Bartlett's Test of Sphericity reaching statistical significance (p=0.000). PCA confirmed that the IT governance capability scale represented one factor, where one Eigen value (4.45) explained 63.57% of the variance. An inspection of the scree plot reflected a clean break after the first component.

It was decided not to use the "interfirm communication" scale as the factorability of the scale could not be confirmed due to the Kaiser-Meyer-Oklin value being less than the recommended 0.6 value and the reliability of the scale could not be confirmed as the Cronbach Alpha was less than 0.6.

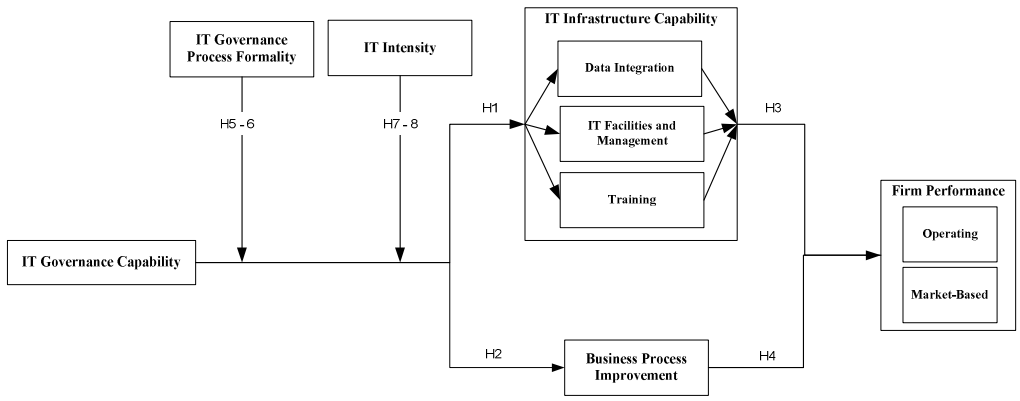
The factor analysis of the IT facilities and management scale required the dropping of one of the items.

Although the factorability of the firm performance scale was confirmed by the Kaiser-Meyer-Oklin value (.797) and Bartlett's Test of Sphericity (p=0.000); a number of the items had factor loadings less than .6 and the application of PCA revealed two factor components with Eigen values exceeding 1 (3.485, 1.654) explaining 36.79% and 36.62% of the variance respectively. As mentioned under Chapter 3, the intention was to combine the two firm performance constructs operating performance and market-based performance into one construct. Based on the results of the factor analysis this is not feasible and the Firm Performance construct needs to be separated into market-based performance and operating performance using the same scales as used by Ravichandran and Lertwongsatien (2005).

All other scales remained unchanged.

Based on the instrument analysis conclusions, the research model was revised. The revised research model and restated hypotheses are presented in the diagram below.

Figure 5.1. Revised Research Model



H1. There is a positive relationship between a firm's IT Governance Capability and IT Infrastructure Capability
H2. There is a positive relationship between a firm's IT Governance Capability and Business Process Improvement
H3. There is a positive relationship between a firm's IT Infrastructure Capability and Firm Performance
H4. There is a positive relationship between a firm's Business Process Improvement and Firm Performance
H5. IT Governance Process Formality will moderate the relationship between a firm's IT Governance Capability and IT Infrastructure Capability
H6. IT Governance Process Formality will moderate the relationship between a firm's IT Governance Capability and Business Process Improvement
H7. IT Intensity will moderate the relationship between a firm's IT Governance Capability and IT Infrastructure Capability
H8. IT Intensity will moderate the relationship between a firm's IT Governance Capability and Business Process Improvement

The instrument reliabilities and validities together with additional descriptive statistics are reflected in table 5.3 below.

Table 5.3 Instrument reliabilities and validities

Likert-scale construct	Number of Items	Mean	Standard Deviation	Total Variance Explained	Cronbach Alpha	Minimum Factor Loading
IT Governance Capability	7	3.10	.73	63.56%	.899	.636
Data Integration	3	2.32	.84	76.65%	.840	.780
IT Facilities and Management	4	2.99	.77	62.91%	.801	.713
Training	3	2.76	.71	75.35%	.834	.843
Business Process Improvements	5	3.12	.64	60.54%	.836	.735
Firm Performance : Operating	4	2.59	.78	65.34%	.821	.742
Firm Performance: Market-based	3	2.50	.89	81.79%	.887	.885
IT Governance Process Formality	4	2.87	.75	68.46%	.842	.767
IT Intensity	3	4.14	.62	69.18%	.776	.690

Note: All loadings are greater than 0.60. 5 point scale: 1 = Strongly Disagree, 5 = Strongly Agree

Reliability alphas in Table 5.3 range from .776 to .899. The minimum requirement was achieved. The table reflects the number of items per construct, the mean and standard deviation for each construct, as well as the total variance explained within each construct. The minimum factor loading for each construct ranges from .690 and .885. Detailed descriptive statistics per construct item (mean, standard deviation, factor loading) are provided in Appendix A.

Table 5.4 reflects the correlations between the refined constructs.

Table 5.4 Correlation Matrix and Descriptive Statistics

Correlation Matrix and Descriptive Statistics for Perceived IT Governance Capability, Data Integration, IT Facilities and Management, Training, Business Process Improvement, Firm Performance: Operating, Firm Performance: Market-based, IT Governance Process Formality and IT Intensity.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
IT Governance Capability	1								
Data Integration	.398**	1							
IT Facilities and Management	.627**	.389**	1						
Training	.404**	.318**	.517**	1					
Business Process Improvement	.563**	.406**	.544**	.348**	1				
Firm Performance : Operating	.351**	.310**	.331**	.129	.436**	1			
Firm Performance: Market-based	.362**	.274**	.262**	.088	.312**	.361**	1		
IT Governance Process Formality	.695**	.425**	.639**	.383**	.587**	.422**	.369**	1	
IT Intensity	-.085	-.181*	.079	-.132	-.05	-.066	-.224**	.006	1
Mean	3.10	2.32	2.99	2.76	3.12	2.59	2.50	2.87	4.14
Standard Deviation	.73	.84	.77	.71	.64	.78	.89	.75	.62

Note: N = 140. ** Correlation is statistically significant at p<0.01. * Correlation is statistically significant at p<0.05.

These correlations are interpreted in the discussions that follow.

5.4 Exploration of model relationships

Each model relationship is examined by using Pearson's product-moment correlation. A preliminary analysis was performed on each construct before calculating the correlations to ensure that that the assumptions of normality, linearity and homoscedasticity were adhered to. The model relationships are explored using the descriptive statistics and correlation matrix per table 5.5 and 5.6 as a basis.

Table 5.5 Descriptive statistics

Descriptive statistics in respect to the perceived constructs IT Governance Capability, Data Integration, IT Facilities and Management, Training, Business Process Improvement, Firm Performance: Operating and Firm Performance: Market-based

	Number		GC	DI	FM	TR	BPI	FPO	FPM
Construct Mean	140		3.103	2.316	2.985	2.761	3.118	2.591	2.4952
Construct Std Deviation			.7325	.8373	.7720	.7125	.6441	.7775	.88733
Leadership Category									
Executive Management	54	Mean	3.066	2.165	2.930	2.821	3.092	2.4028	2.3272
		Std. Dev	.7332	.7792	.7897	.6632	.6356	.7576	.73968
Senior Management	59	Mean	3.256	2.638	3.156	2.835	3.203	2.775	2.71775
		Std. Dev	.7414	.7589	.7426	.7465	.6669	.7694	.92188
Specialists	27	Mean	2.846	1.913	2.722	2.481	2.985	2.564	2.3457
		Std. Dev	.6498	.8803	.7348	.6874	.6049	.7677	1.00206
Role Location									
Business	93	Mean	3.176	2.476	2.975	2.853	3.178	2.502	2.5699
		Std. Dev	.7077	.7556	.7554	.6382	.6160	.8196	8.1439
IT	47	Mean	2.959	2.000	3.005	2.581	3.000	2.766	2.3475
		Std. Dev	.7667	.9073	.8117	.8182	.6877	.6602	1.00951
Experience in Current									
0 – 2 years	38	Mean	2.999	2.192	2.888	2.684	3.136	2.611	2.3070
		Std. Dev	.6829	.8376	.7111	.5798	.5581	.6385	.95352
3 – 5 years	49	Mean	3.174	2.312	2.994	2.775	3.098	2.678	2.5918
		Std. Dev	.6383	.8459	.8204	.6509	.5746	.8794	.83684
6 – 25 years	53	Mean	3.113	2.408	3.047	2.805	3.124	2.495	2.5409
		Std. Dev	.8449	.8334	.7753	.8486	.7628	.7713	.88004
Business Area									
Revenue Generating	38	Mean	2.981	2.385	2.855	2.701	3.057	2.493	2.6491
		Std. Dev	.6481	.7169	.7389	.6003	.6895	.7544	.85581
Support	102	Mean	3.149	2.290	3.034	2.784	3.141	2.627	2.4379
		Std. Dev	.7595	.8799	.7819	.7515	.6284	.7864	.89612
Region									
South Africa	48	Mean	3.083	2.270	2.927	2.694	3.145	2.802	2.6667
		Std. Dev	.7066	.8772	.8021	.7900	.6674	.7292	.70794
Rest of Africa	41	Mean	3.421	2.715	3.304	2.959	3.234	2.500	2.8211
		Std. Dev	.7179	.6933	.7572	.6629	.7027	.7520	.85342
International	18	Mean	2.888	2.184	2.666	2.629	2.988	2.583	1.7222
		Std. Dev	.6517	.9724	.8488	.6465	.4969	.8269	.68837
Area of Focus									
Global	36	Mean	2.837	1.935	2.750	2.602	3.022	2.416	2.2315
		Std. Dev	.7130	.6942	.6094	.6665	.5712	.7746	.93544
Local	104	Mean	3.196	2.448	3.067	2.817	3.151	2.651	2.5865
		Std. Dev	.7130	.8450	.8074	.7226	.6668	.7730	.85584

Legend: GC = IT Governance Capability, DI = Data Integration, FM = IT Facilities and Management, TR = Training, BPI = Business Process Improvements, FPO = Firm Performance: Operating , FPM = Firm Performance: Market-based

Table 5.6 Correlation Matrix between the perceived constructs

Correlation Matrix between the perceived constructs IT Governance Capability, Firm Performance – Operating, Firm Performance – Market and the constructs Data Integration, IT Facilities and Management, Training and Business Process Improvement

Construct		**IT Governance Capability**				**Firm Performance:**				**Firm Performance: Market-**			
	Number	**DI**	**FM**	**TR**	**BPI**	**DI**	**FM**	**TR**	**BPI**	**DI**	**FM**	**TR**	**BPI**
Construct Correlation	140	.398*	.627*	.404*	.563*	.310*	.331*	.129	.436*	.274*	.262*	.088	.312*
Leadership Category													
Executive Management	54	.360*	.613*	.423*	.474*	395*	.203	86	.470*	.380*	.110	-.011	.261
Senior Management	59	.398*	.667*	.399*	.659*	.240	.336*	35	.489*	.128	.309*	.098	.312*
Specialists	27	.273	.457*	.266	.445*	.127	.506**	00	.209	.185	.288	.141	.016
Role Location													
Business	93	.363*	.630*	.438*	.544*	.314*	.290*	.171	.503*	.325*	.202	.070	.257*
IT	47	.401*	.645*	.321*	.573*	.511*	.441*	.157	.405*	.156	.365*	.066	.365*
Experience in Current Position													
0 – 2 years	38	.390*	.608*	.295	.469*	.279	.281	.244	.528*	.296	.670**	.500*	.257
3 – 5 years	49	.524*	.644*	.408*	.529*	.507*	.458*	.262	.558*	.295*	.316*	.080	.431*
6 – 25 years	53	.316*	.637*	.442*	.631*	.150	.238	-.012	.325*	.220	-.087	-.137	.285*
Business Area													
Revenue Generating	38	.404*	.703*	.578*	.665*	.243	.135	.044	.437*	.183	0.106	-.233	-.044
Support	102	.406*	.600*	.358*	.530*	.337*	.389*	.149	.433*	.296*	.333**	.186	.461*
Region													
South Africa	48	.275	.572*	.491*	.596*	.264	.232	.145	.388*	.012	.003	.084	.045
Rest of Africa	41	.459*	.727*	.360*	.625*	.487*	.527*	.288	.485*	.381*	.406**	.056	.369*
International	18	.476*	.612*	.655*	.583*	.187	.560*	.546*	.239	.306	.285	.460	.483*
Area of Focus													
Global	36	.402*	.648*	.469*	.604*	.250*	.322*	.181	.397*	.207*	.228*	.114	.282*
Local	104	.228	.498*	.139	.416*	.428*	.299	-.103	.547*	.351*	.288	-.072	.371*

Note: : (**) Correlation is significant at $p < 0.01$ level; (*) Correlation is significant at $p < 0.05$ level

Legend: DI = Data Integration, FM = IT Facilities and Management, TR = Training, BPI = Business Process Improvements

5.4.1 The relationship between the firm's perceived IT governance capability and IT infrastructure capability

The relationship between IT governance capability and IT infrastructure capability consists of three separate relationships, namely: (1) IT governance capability - data integration; (2) IT governance capability - IT facilities and management and (3) IT governance capability - training.

Overall the respondent mean average in respect to the firm's IT governance capability is neutral (3.1) with the specialists (2.85), the International region (2.89) and the global "Area of focus" (2.84) rating the firm's IT governance capability below par. The lower average for the specialists could indicate some dissatisfaction with the Firm's IT governance capability in delivery and adherence to the firm's target architecture. The International region is mainly represented by respondents from London, the financial capital of the world. It is the writer's opinion that the lower IT governance capability for the International region could be an indication that the governance standards that the International respondents experienced at other banks in the London area may be of a higher nature. It is interesting to note that the mean average for Rest of Africa respondents is higher (3.42). This could like likewise indicate that the IT governance experience that the Rest of Africa respondents may have experienced at other firms in the Rest of Africa may be of a lower nature. The Rest of Africa region is a developing region in comparison to the International region that is more developed.

5.4.1.1 The relationship between the firm's perceived IT governance capability and data integration

There is a moderate positive relationship between IT governance capability and data integration ($r = .398$, $n=140$, $p < 0.01$). Out of all the IT infrastructure capability constructs, data integration reflects the lowest mean average (2.32), which possibly alludes that there may be data

integration issues in existence within the Corporate and Investment bank.

The "leadership category" confirms the positive relationship in respect to executive management ($r = .360$, $n=54$, $p < 0.01$) and senior management ($r = .398$, $n=59$, $p < 0.01$); however no confident view can be expressed in respect to the specialists category. Executive management's correlation is lower than the overall correlation. This may be as a result of executive management being less likely being involved in data integration issues and thus less likely to appreciate the benefits that IT governance capability has on data integration. The specialists have the lowest mean averages for both IT governance capability (2.85) and data integration (1.91). Specialists are usually the roles most involved in data integration issues and these low values support the assertion that there are data integration issues existing within the Corporate and Investment Bank.

The "role location" confirms the positive relationship, where the business role ($r=.363$, $n=93$, $p<0.01$) correlation is lower than the overall correlation, whilst IT ($r=.401$, $n=47$, $p<0.01$) is higher. This difference possibly reflects IT having a greater appreciation on IT governance's impact on data integration, as IT roles are more involved in data integration matters than business.

The "experience in current position" perspective reflects a much higher correlation than the overall correlation in respect to the "3-5" years' category. This may reflect that more experienced stakeholders have a greater appreciation for IT governance's impact on data integration. Mean averages for the "data integration" capability reflects a steady minor increase as the respondent becomes more experienced, however data integration means remain below average.

The business area correlations and means for revenue generating areas

and support areas did not differ much from the overall correlation and mean. Across business areas there appears to be a consistent view that there are data integration issues.

The region perspective for Rest of Africa ($r=.459$, $n=41$, $p<0.01$) and International($r=.476$, $n=18$, $p<0.05$) has a higher correlation compared to the overall correlation. No confidence can be expressed in respect to the South Africa region correlation.

The area of focus correlation for global perspective did not differ much from the overall correlation. No confidence can be expressed in respect to the local correlation. The low average (1.94) for the "global" area of focus may reflect that respondents with a global focus have a higher dependency for data to be properly integrated across regions and this low average again supports data integration issues within the firm.

5.4.1.2 The relationships between a firm's perceived IT governance capability and perceived IT facilities and management

There is a strong positive relationship between IT governance capability and IT facilities and management ($r =.627$, $n=140$, $p < 0.01$). The respondents mean average (2.99) in respect to IT facilities and management is neutral.

The leadership category confirms the positive relationship in respect to executive management ($r =.613$, $n=54$, $p < 0.01$) and senior management ($r =.667$, $n=59$, $p < 0.01$); however the specialists relationship is only moderately positive ($r =.457$, $n=27$, $p < 0.05$) with it average mean lower (2.72).

The role location and experience in current position are very similar to the overall correlation.

The business area correlation for revenue generating areas ($r=.703$, $n=38$, $p<0.01$) is moderately higher than the overall correlation. Revenue

generating areas have a below average perception in respect to the firm's IT governance capability and IT facilities and management capability. By improving the firm's IT governance capability the impact on the IT facilities and management capability is significant, unfortunately no opinion can be expressed as to the impact on the firm's performance as the correlations between IT facilities and management capability and firm Performance are not significant from the perspective of the Revenue generating areas.

The Rest of Africa ($r=.727$, $n=41$, $p<0.01$) region has a significant higher correlation than the other regions. The mean average is also higher (3.30). Rest of Africa's significantly higher correlation could indicate that an improvement in IT governance capability has a significant impact on IT facilities and management capability. This could be due to the Rest of Africa being less mature in respect IT facilities and management as CIB has only recently entered the Rest of Africa region where greater IT governance mechanisms allows greater improvements in the Rest of Africa's IT facilities and management. Rest of Africa's IT facilities and management capability is starting off from a lower base.

The local area of focus ($r=.498$, $n=104$, $p<0.01$) perspective had a much lower correlation compared to the global correlation. It is possible that this could reflect the view that stakeholders who have a global responsibility versus a local responsibility have a greater appreciation for IT governance and its impact on the IT facilities and management capability especially where standardisation of IT facilities and management across regions is important in providing cost savings.

5.4.1.3 The relationships between a firm's perceived IT governance capability and perceived training

There is a strong positive relationship between IT governance capability and IT training ($r =.404$, $n=140$, $p < 0.01$). The overall mean for training

is 2.76, which reflects a slight dissatisfaction with the firm's training capability. This dissatisfaction seems to be strongest with the specialists (2.48) and roles located in IT (2.58).

The business area correlation for revenue generating areas ($r=.578$, $n=38$, $p<0.01$) is significantly higher than the overall correlation, whilst the supporting areas is marginally lower ($r=.358$, $n=102$, $p<0.01$). Revenue generating business areas view IT governance having a greater impact on the training capability as compared to support business areas.

The region perspective for South Africa ($r=.491$, $n=48$, $p<0.01$) and International ($r=.655$, $n=18$, $p<0.01$) have a higher correlation as compared to the overall correlation, whilst Rest of Africa ($r=.360$, $n=41$, $p<0.05$) has a significant lower correlation. Rest of Africa's lower correlation could be due to Africa's corporate and investment banking markets being less sophisticated in respect to corporate and investment banking products and services as compared to South Africa and International's markets. A moderator needs to be identified (For example "sophistication of markets" moderator could explain these differences, which should be explored in further research.

5.4.2 The relationships between a firm's perceived IT governance capability and perceived business process improvement

There is a strong positive relationship between IT governance capability and the business process improvements ($r =.563$, $n=140$, $p < 0.01$). The mean average (3.12) for business process improvements reflects a slight satisfaction with the firm's business processes.

Senior management's ($r =.659$, $n=59$, $p < 0.01$) correlation is moderately higher than the overall correlation; whilst the executive management is moderately lower ($r =.474$, $n=54$, $p < 0.01$). Although both correlations are strong, the difference could be explained by the view that senior

management are involved and impacted by business processes to a greater extent than executive management.

The experience in current position categories reflects a trend where the correlations become stronger the more experienced the respondents. The more experienced the respondent the greater appreciation there is that IT governance capability improves business processes.

The role location confirms the positive relationship, where the business ($r=.544$, $n=93$, $p<0.01$) correlation is marginally lower than the overall correlation, whilst IT ($r=.573$, $n=47$, $p<0.01$) has a marginally higher correlation. This is in contrast to the writer's expectation that the business correlation should have been higher than IT, as business roles would be more impacted by business process improvements. There could be a number of factors that explains this contrast that should be explored in further research. For example where there is greater capacity for automating business processes does this impact business' view.

The business area correlation for revenue generating areas ($r=.665$, $n=38$, $p<0.01$) is significantly higher than the overall correlation, whilst the supporting areas is marginally lower ($r=.530$, $n=102$, $p<0.01$). Revenue generating business areas view IT governance capability having a greater impact on the business process improvements as compared to support business areas. In the corporate and investment banking industry business processes are more complex in the revenue generating areas as compared to the support area, which could explain the higher correlation.

All three regions, South Africa ($r=.596$, $n=48$, $p<0.01$), International ($r=.583$, $n=18$, $p<0.05$) and Rest of Africa ($r=.625$, $n=41$, $p<0.01$), have higher correlations as compared to the overall correlation. Rest of Africa's significantly higher correlation could be an indication that there a greater room for improving business processes in Africa. This is supported by the

fact that the firm in the past has mainly focused on its South African and International regions. It is only recently that the firm has decided to rollout its products and services into Rest of Africa. Business processes in Africa are not as mature as the business processes in South Africa and International.

The area of focus correlation for the global ($r=.604$, $n=36$, $p<0.01$) perspective was moderately higher than the overall correlation, whilst the local ($r=.416$, $n=36$, $p<0.05$) perspective was significantly lower. The higher global correlation could reflect the view that stakeholders who have a global responsibility versus a local responsibility have a greater appreciation for IT governance and its impact on business process improvements. One of the challenges of the global representatives is to standardise and remove duplication in business processes and thus have a high dependency on the IT governance in achieving this.

5.4.3 The relationship between a firm's perceived IT infrastructure capability and perceived firm performance

As mentioned under the instrument analysis section the firm performance construct was separated into operating performance and market-based performance constructs. The relationship between IT infrastructure capability and firm performance consists of six separate relationships, namely: (1) data integration – firm performance: operating; (2) data integration – firm performance: market-based; (3) IT facilities and management - firm performance: operating; (4) IT facilities and management - firm performance: market-based; (5) training - firm performance: operating; (6) training - firm performance: market-based.

5.4.3.1 The relationships between a firm's perceived data integration and perceived firm performance

There is a moderately positive relationship between data integration and firm performance in respect to both operating firm performance ($r =.310$,

n=140, $p < 0.01$) and market-based firm performance ($r = .274$, n=140, $p < 0.01$). The higher correlation in respect to operating firm performance reflects a view that the data integration capability has a greater impact on operating firm performance as compared to market firm performance.

It is only the executive management who have a moderately positive relationship for both operating firm performance ($r = .395$, n=54, $p < 0.01$) and market-based firm performance ($r = .380$, n=54, $p < 0.01$). The executive management is best positioned to perceive the impact that a data integration capability has on a firm's performance as a whole.

The role location perspective confirms the positive relationship, where roles located in the business have similar correlations to the overall correlations in respect to both operating firm performance and market-based firm performance. The data integration capability has a stronger positive relationship with operating firm performance ($r = .511$, n=47, $p < 0.01$) in respect to roles located in IT. IT is exposed to "data integration" issues more than business roles and thus appreciates the impact as to how the data integration capability helps with operating firm performance. IT roles reflected one of the lowest averages for data integration (2.0), which reflects dissatisfaction. IT roles have no correlation to market-based firm performance, which is understandable since IT roles probably has less exposure to the introduction of new products and the entering of new markets.

The experience in current position perspective reflects that the "3-5 years" category for both operating firm performance ($r=.507$, n=49, $p<0.01$) and market-based firm performance ($r=.295$, n=49, $p<0.01$) have marginally higher correlations as compared to the overall correlation, whilst no confidence can be expressed in respect to the "0–2 years" and "6–25 years" perspectives. No explanation can be provided as to why moderately experienced respondents perceive a positive correlation

The business area correlation for support areas for both operating firm performance (r=.337, n=102, p<0.01) and market firm performance (r=.296, n=102, p<0.01) is marginally higher than the overall correlation, whilst no confidence can be expressed in respect to the revenue generating areas. Revenue generating business areas are usually the originators of data and therefore not impacted by data integration issues, whilst support business areas (E.g. risk management and finance services) usually dependent on their data from revenue generating business areas and are thus more exposed to data integration issues. This explains the perception why supporting business area respondents perceive data integration capability to have a positive correlation with both operating and market-based firm performance.

The region correlation for Rest of Africa for both operating firm performance (r=.487, n=41, p<0.01) and market firm performance (r=.381, n=41, p<0.05) is significantly higher than the overall correlation, whilst no confidence can be expressed in respect to the International and South African region. Rest of Africa's significantly higher correlation could indicate Rest of Africa's data integration capability is low due to the firm only entering the Rest of Africa markets recently. The perception exists that by improving Rest of Africa's data integration capability there is a significant impact on firm performance. The writer is aware of known data integration issues in the Rest of Africa.

The area of focus correlation for the local perspective for both operating firm performance (r=.428, n=104, p<0.01) and market performance (r=.351, n=104, p<0.05) is significantly and moderately higher respectively than the overall correlation, whilst the global perspective for both operating firm performance (r=.250, n=36, p<0.05) and market firm performance (r=.207, n=36, p<0.05) is moderately lower. The higher local correlation could reflect the view that data integration capability at a

local level has a greater impact on firm performance as compared to a global level. This is an interesting point of view as CIB is seeking to promote greater global alignment across the regions, yet the data integration capability has a higher positive relationship in respect to areas that have a local focus.

Based on the evidence, if the firm had to focus on its IT governance capabilities in respect to data integration matters this will increase the firm's data integration capability, which will consequently improve the firm's operating and market based performance.

5.4.3.2 The relationships between a firm's perceived IT facilities and management and firm performance

There is a strong positive relationship between IT facilities and management capability and firm performance in respect to both operating firm performance ($r = .331$, $n=140$, $p < 0.01$) and market-based firm performance ($r = .262$, $n=140$, $p < 0.01$). The higher correlation in respect to operating firm performance may reflect a view that the IT facilities and management capability has a greater impact on operating firm performance as compared to market firm performance.

The leadership category confirms the positive relationship in respect to senior management for both operating firm performance ($r = .336$, $n=59$, $p < 0.01$) and market firm performance ($r = .309$, $n=59$, $p < 0.05$). No confidence can be expressed in respect to executive management. Senior management due to the responsibilities of their work level would value an IT facilities and management capability more than executive management in having a positive impact on firm performance. In a multi firm study the respondents are usually executive management and this insight would not have been detected.

The business location role ($r=.290$, $n=93$, $p<0.01$) correlation in respect

to operating firm performance is marginally lower than the overall correlation, whilst IT (r=.441, n=46, p<0.01) has a significant higher correlation. It is understandable the correlation for IT located roles would be significantly higher since IT is more involved in IT facilities and management matters. The IT (r=.365, n=47, p<0.05) correlation in respect to market-based firm performance is significantly higher than the overall correlation, whilst no confidence can be expressed in respect to business' perspective.

The experience in current position perspective reflects no correlation in respect to the "0-2 years" category for operating firm performance but a significantly higher positive relationship in respect to the market-based firm performance (r=.670, n=38, p<0.01) as compared to the overall correlation. The experience in current position perspective reflects a stronger positive correlation in respect to the "3-5 years" category for operating firm performance (r=.458, n=49, p<0.01) and a slightly higher positive relationship in respect to market-based firm performance (r=.316, n=49, p<0.05) as compared to the overall correlation. No confidence can be expressed in respect to the "6–25 years" perspectives.

The business area correlation for support areas for both operating firm performance (r=.389, n=102, p<0.01) and market-based firm performance (r=.333, n=102, p<0.01) is moderately higher than the overall correlation, whilst no confidence can be expressed in respect to the revenue generating areas. No interpretation in respect to business area correlations has been made.

The region correlation for Rest of Africa for both operating firm performance (r=.527, n=41, p<0.01) and market-based firm performance (r=.406, n=41, p<0.01) is significantly higher than the overall correlation, whilst no confidence can be expressed in respect to the South African region. International (r=.560, n=18, p<0.05) has a significant correlation

with operating firm performance, whilst no confidence can be expressed in respect to market-based firm performance. Rest of Africa's significantly higher correlation could indicate that an improvement in IT facilities and management capability will have a significant impact on firm performance. This could be due to the Rest of Africa being less mature in respect IT facilities and management as CIB has only recently entered the Rest of Africa region in selling its products and services.

The area of focus correlation for the global perspective for both operating firm performance ($r=.322$, $n=36$, $p<0.01$) and market performance ($r=.228$, $n=36$, $p<0.05$) is marginally lower respectively than the overall correlation, whilst no confident view can be expressed in respect to the local perspective. It is understandable that the global area of focus would have positive correlations in particular when a strategic objective of CIB is to remove and consolidate duplicate infrastructures that exist in the regions as well to consolidate and locate its global IT management services in South Africa. This will have a positive impact on firm performance.

5.4.3.3 The relationships between a firm's perceived training and firm performance

There is no relationship between training capability and firm performance in respect to both operating firm performance and market firm performance. Correlations do however exist in respect to the experience in current position and region perspectives. The experience in current position perspective reflects that the "0-2 years" category for market-based firm performance ($r=.500$, $n=38$, $p<0.05$) has a strong positive correlation. It appears less experienced stakeholders have a perception that training capability improves firm performance. This could be as a result of less experienced individuals possibly having a view that an improvement in the training capability where they are the training beneficiaries there is a positive impact on market-based performance. It is interesting to note that "0-2 years" category has the lowest mean average of all the categories (2.68), which reflects dissatisfaction with the firm's training capability.

The region correlation for International reflects a strong positive relation between the training capability and the operating firm performance ($r=.546$, $n=18$, $p<0.05$). The only explanation for this could be because the International region operates in highly regulated and sophisticated banking environment where a training capability is important to achieve operating firm performance. There is a trend where new regulation originally implemented in the International environment is subsequently rolled out to South Africa then to the Rest of Africa. It will be interesting to perform the same research in a couple of years to detect whether there will be a positive correlation between the training capability in South African and the Rest of Africa.

5.4.4 The relationships between a firm's perceived business process improvement and perceived firm performance

There is a strong positive relationship between business process improvement and firm performance in respect to both operating firm performance ($r =.436$, $n=140$, $p < 0.01$) and market firm performance (r

=.312, n=140, p < 0.01). The higher correlation in respect to operating firm performance reflects a view that business process improvements has a greater impact on operating firm performance as compared to market firm performance.

The leadership category confirms the positive relationship in respect to executive management and senior management for operating firm performance, whilst no confidence can be expressed in terms of the specialists. Both the executive management's (r=.470, n=54, p<0.01) and senior management's (r=.489, n=59, p<0.01) correlations are moderately higher than the overall correlation in respect to operating firm performance. The senior management leadership category (r=.312, n=59, p<0.05) has the same correlation as the overall correlation for market firm performance, whilst no confidence can be expressed in terms of the executive management and specialists.
Business versus IT perspective confirms the positive relationship, where the business (r=.503, n=93, p<0.01) correlation in respect to operating firm performance is moderately higher than the overall correlation, whilst IT (r=.405, n=47, p<0.01) has a marginally lower correlation. In contrast the IT (r=.365, n=47, p<0.05) correlation in respect to market firm performance is moderately higher than the overall correlation, whilst the business correlation as a moderately lower (r=.257, n=93, p<0.05). Business views business process improvements having a greater impact on operating firm performance than market firm performance, whilst the converse applies to IT.

The experience in current position perspective reflects that the "0 - 2 years" category (r=.528, n=38, p<0.01) and "3 - 5 years" category (r=.558, n=49, p<0.01) for operating firm performance have significantly higher correlations as compared to the overall correlation, whilst the "6 – 25 years" category (r=.325, n=53, p<0.05) has a significantly lower correlation. The experience in current position perspective reflects that

the "3 - 5 years" category (r=.431, n=49, p<0.01) for market firm performance has significantly higher correlation as compared to the overall correlation, whilst the "6 – 25 years" category (r=.285, n=53, p<0.05) has a moderately lower correlation. No confidence can be expressed in respect to the "0-2 years" perspective for market firm performance.

The business area correlations for support (r=.433, n=102, p<0.01) and revenue generating (r=.437, n=38, p<0.01) areas for operating firm performance are not much different from the overall correlation, whilst the support correlation with market firm performance has a significant higher correlation as compared to the overall correlation. No interpretation in respect to business area correlations has been made.

The region correlation for Rest of Africa for both operating firm performance (r=.485, n=41, p<0.01) and market firm performance (r=.369, n=41, p<0.05) is moderately higher than the overall correlation. South Africa's (r=.388, n=48, p<0.01) correlation in respect to operating market performance is moderately lower in comparison to the overall correlation, whilst no confidence can be expressed in respect to International's correlation. International's (r=.483, n=18, p<0.05) correlation in respect to market firm performance is significantly higher, whilst no confidence can be expressed in respect to South Africa's correlation. Rest of Africa's significantly higher correlation indicates that business process improvements have a significant impact on firm performance. This could be due to the Rest of Africa being less advanced as compared to South Africa and would benefit more from process improvements. This can only be confirmed with further research.

The area of focus correlation for the global perspective for both operating firm performance (r=.397, n=36, p<0.01) and market performance (r=.282, n=36, p<0.01) is marginally lower than the overall correlation.

The area of focus correlation for the Local perspective for both operating firm performance ($r=.547$, $n=104$, $p<0.01$) and market performance ($r=.371$, $n=104$, $p<0.05$) is significantly and moderately higher respectively than the overall correlation. This could reflect a reception that from a local perspective improving process capability has a greater impact on Firm Performance. Further research in this difference needs to take place.

5.5 Exploration of the moderators effect on the model relationships

This section explores the moderators' (IT governance process formality and IT intensity) effect on the model relationships "IT governance capability – IT infrastructure capability" and "IT governance capability – business process improvement". A preliminary analysis was performed on the IT governance process formality and IT intensity constructs before calculating the correlations to ensure that that the assumptions of normality, linearity and homoscedasticity were adhered to. Each relationship is examined by using Pearson's product-moment correlations which are reflected in the high-low correlation matrices per table 5.7 (high and low perceived IT Governance Process Formality) and 5.8 (high and low perceived IT Intensity) where the sample was split into two groups using SPSS.

Exploration of the moderators' impact based on the various respondents' characteristics is limited due to the lack of significant confidence in the correlations in respect to high-low comparisons for a number of respondent characteristics. This will require further exploration in future research where a larger sample size should improve the confidence in the correlations of the respondents' characteristics.

Table 5.7 High-Low Correlation Matrix - IT Governance Process Formality

High-Low Correlation Matrix where IT Governance Process Formality is the moderator between the perceived construct IT Governance Capability and the perceived constructs IT Infrastructure Capability (Data Integration, IT Facilities and Management and Training) and Business Process Improvement respectively

	High					**Low**				
Construct	**Number**	**IT Infrastructure Capability**			**Business Process Improvement**	**Number**	**IT Infrastructure Capability**			**Business Process Improvement**
		DI	**FM**	**TR**			**DI**	**FM**	**TR**	
IT Governance Capability	70	.232	.407*	.239*	.435**	70	.231	.538	.280*	.337**
Leadership Category										
Executive Management	23	-.092	.424*	.152	.258	31	.279		14	.292
Senior Management	37	.331*	.470*	.276	.573**	22	.382	.708	47	.511*
Specialists	10	.371	-.205	.178	.315	17	-.046	.366	33	.069
Role Location										
Business	50	.230	.445*	.207	.455*	43	.172	.581	.389**	.296
IT	20	.299	.312	.358	.361	27	.214	.510	.103	.355
Experience in Current										
0 – 2 years	19	.292	.358	.138	.511*	19	.295	.688	.245	.227
3 – 5 years	30	.239	.455*	.246	.251	19	.551*	.576	.379	.423
6 – 25 years	21	.017	.206	.077	.280	32	.144	.516	.268	.375*
Business Area										
Revenue Generating	18	.050	.238	-.192	.386	20	.366	.832	.695**	.663**
Support	52	.284*	.406*	.288*	.445**	50	.180	.391	.104	.169
Region										
South Africa	23	.244	.069	.020	-.096	25	.012	.593	.426*	.587**
Rest of Africa	28	.217	.613*	.264	.691**	13	.373	.545	.116	.070
International	8	.513	.333	.627	.341	10	.350	.736	.630	.760*
Area of Focus										
Global	10	-.400	.009	.110	-.061	26	.378	.401	.109	.205
Local	60	-	.444*	.268*	.489**	44	.135	.612	.382*	.420**

Note: : (**) Correlation is significant at $p < 0.01$ level; (*) Correlation is significant at $p < 0.05$ level

Legend: DI = Data Integration, FM = IT Facilities and Management, TR = Training, BPI = Business Process Improvements

Table 5.8 High-Low Correlation Matrix- IT Intensity

High-Low Correlation Matrix where IT Intensity is the moderator between the perceived construct IT Governance Capability and the perceived constructs IT Infrastructure Capability (Data Integration, IT Facilities and Management and Training) and Business Process

	High					**Low**				
Construct	**Number**	**IT Infrastructure Capability**			**Business Process Improvement**	**Number**	**IT Infrastructure Capability**			**Business Process Improvement**
		DI	**FM**	**TR**			**DI**	**FM**	**TR**	
IT Governance Capability	70	.465*	.639*	.364**	.624**	70	.316*	.624	.462**	.481**
Leadership Category										
Executive Management	25	.571*	.592*	.328	.523**	29	.224	.644**	12**	.441*
Senior Management	30	.322	.658*	.398*	.766**	29	.484*	.678	52*	.506**
Specialists	15	.235	.600*	.062	.367	12	.125	.347	16	.544
Role Location										
Business	38	.321*	.583*	.443**	.629**	55	.382**	.660	.478**	.485**
IT	32	.482*	.727*	.272	.589**	15	.045	.410	.413	.471
Experience in Current										
0 – 2 years	20	.539*	.605*	.337	.513*	18	.133	.633	.274	.391
3 – 5 years	24	.543*	.750*	.481*	.687**	25	.498*	.521	.367	.366
6 – 25 years	26	.333	.573*	.320	.666**	27	.277	.691	.545**	.612**
Business Area										
Revenue Generating	15	.477	.746*	.556*	.727**	23	.379	.680	.663**	.584**
Support	55	.465*	.614*	.327*	.594**	47	.316*	.602	.379**	.431**
Region										
South Africa	20	.313	.596*	.571**	.659**	28	.249	.591	.419	.535**
Rest of Africa	23	.486*	.764*	.298	.620**	18	.437	.695	.458	.634**
International	10	.570	.556	.562	.459	8	.358	.809	.792*	.782*
Area of Focus										
Global	18	.383	.433	-.158	.656**	18	.072	.550	.411	.146
Local	52	.422*	.658*	.460**	.624**	52	.379*	.662	.491**	.580**

Note: : (**) Correlation is significant at $p < 0.01$ level; (*) Correlation is significant at $p < 0.05$ level

Legend: DI = Data Integration, FM = IT Facilities and Management, TR = Training, BPI = Business Process Improvements

5.5.1 The effect of perceived IT governance process formality on the IT governance capability – IT infrastructure capability relationships

The IT Governance Process Formality has no moderating effect on the IT governance capability and data integration capability relationship.

The IT governance process formality has a moderating effect on IT facilities and management relationship. This moderating affect is the inverse as to what was expected where perceived higher levels of IT governance process formality (high: $r=.407$, $p<0.01$ versus low: $r=.538$, $p<0.01$) reduces the impact of IT governance capability on IT facilities and management. The strength of the moderator impact varies across the various respondent characteristics where correlations with significant confident values were available (I.e. leadership category – executive management, senior management; experience in current position – "3 – 5 years", area of focus – local). It should be noted that the support business area has a moderating affect that is in conflict with the overall moderating affect (high: $r=.406$, $p<0.01$ versus low: $r=.391$, $p<0.01$).

The IT governance process formality has a moderating effect on the training capability relationship. This moderating affect is the inverse as to what was expected where perceived higher levels of IT governance process formality (high: $r=.239$, $p<0.05$ versus low: $r=.280$, $p<0.05$) reduces the impact of IT governance capability on the training capability relationships. The strength of the moderator impact varies across the various respondent characteristics where correlations with significant confident values were available (I.e. area of focus - local).

5.5.2 The effect of perceived IT governance process formality on the IT governance capability – business process improvement relationship

The IT governance process formality has a moderating effect on the IT governance capability and business process improvement relationship where high perceived levels of IT governance formality improves the impact of IT governance capability on business process improvement (high: $r = .435$, $p<0.01$ versus low: $r =.337$, $p<0.01$). The strength of the moderator impact varies across the various respondent characteristics where correlations with significant confident values were available (I.e. leadership category – senior management; area of focus - local).

5.5.3 The effect of perceived IT intensity on IT governance capability - IT infrastructure capability relationships

IT intensity has a moderating effect on data integration where high levels of perceived IT intensity improves the impact of IT governance capability on data integration (high: $r = .465$, $p<0.01$ versus low: $r =.316$, $p<0.01$). The strength of the moderator impact varies across the various respondent characteristics where correlations with significant confident values were available (I.e. experience in current position – 3 – 5 years; business area – support; area of focus - local).

The moderating effect in respect to IT facilities and management (high: r = .639, p<0.01 versus low: r =.624, p<0.01) is marginal. However, under the leadership category characteristic, senior management perceives IT intensity to have a significant positive moderating affect (High: r = .750, p<0.01 versus Low: r =.521, p<0.01), whilst the converse is the case in respect to executive management (high: r = .605, p<0.01 versus low: r =.633, p<0.01) and specialists (high: r = .573, p<0.01 versus low: r =.691, p<0.01). Under the experience in current position characteristic, "3 – 5 years" respondents perceives IT intensity to have a positive moderating affect at high levels of IT intensity (high: r = .750, p<0.01 versus low: r =.521, p<0.01), whilst the converse is the case in respect to executive management (high: r = .605, p<0.01 versus low: r =.633, p<0.01) and specialists (high: r = .573, p<0.01 versus low: r =.691, p<0.01). It is interesting that there are moderating impacts for certain respondent characteristics whilst not for the overall relationship, which supports the assertion in chapter 3 that a limitation of a multiple site survey is that it only reflects their perceptions of one or two persons per firm.

IT intensity has a moderating effect on the training capability relationship. This moderating affect is the inverse as to what was expected where perceived higher levels of IT intensity (high: r =.364, p<0.01 versus low: r =.462, p<0.01) reduces the impact of IT governance capability on the training capability relationships. Further research should explore this moderating impact as to why high IT intensity reduces the impact of the IT governance capability on the training capability. The strength of the moderator impact varies across the various respondent characteristics where correlations with significant confident values were available (I.e. leadership category - senior management; role location – business; business area – revenue generating, support; area of focus - local).

5.5.4 The effect of perceived IT intensity on the IT governance

capability - business process improvement relationship

The IT intensity has a moderating effect on the IT governance capability and business process improvement relationship where high perceived levels of IT intensity improves the impact of IT governance capability on business process improvement (high: $r = .624$, $p<0.01$ versus low: $r =.481$, $p<0.01$). In exploring the leadership category, the moderator impact is far greater for senior management (high: $r = .766$, $p<0.01$ versus low: $r =.506$, $p<0.01$) than executive management (high: $r = .523$, $p<0.01$ versus low: $r =.441$, $p<0.01$). Following on the view expressed in the previous section that senior management are involved and impacted by business processes to a greater extent than executive management, the impact appears to be greater when the business processes require greater IT intensity. In exploring the business area, the moderator impact is far greater for support areas (high: $r = .594$, $p<0.01$ versus low: $r =.431$, $p<0.01$) versus revenue generating areas (high: $r = .727$, $p<0.01$ versus low: $r =.584$, $p<0.01$).

IT intensity has a moderating effect on the IT governance capability and the business process improvement relationship. The results confirm that IT governance capability is more strongly correlated to the business process improvement construct at higher levels of IT intensity.

5.6 Summary

This chapter provided feedback on the findings of the survey results where: (1) descriptive statistics analysis was performed in respect to the characteristics of the respondents, (2) the model relationships between the independent and dependent variables were explored from the perspective of the various respondent characteristics and (3) the exploration of the impact that moderators (IT governance process formality and IT intensity) effected the model relationships. A summary of the major results of the findings, limitations of the study and recommendations for further research is discussed in chapter 6.

CHAPTER 6

6 Conclusion

6.1 Introduction

The previous chapters provided the foundation upon which a theoretical model based on the resource view of the firm was outlined, the methodology chosen to explore the model relationships and the results of this exploration. The study was based on a single site survey, a corporate and investment banking firm, where the respondent characteristics were used as a basis in exploring the relationships between the model variables so as to provide greater insight in respect to the variable relationships. The general relationships between the model variables were not tested. This chapter provides a summary of the major results of this exploration. The research limitations and recommendations for further study are also discussed.

6.2 Summary of major results

On examining the perceptions of the respondents in respect to the effect of IT governance capability on IT management capabilities and business process improvement respectively and their consequent impact on firm performance a number of useful insights were obtained. These insights were provided by analysing the relationships according to the respondents' characteristics in terms of leadership category, role location, experience in current position, business area, region and area of focus.

The general relationship between the firm's perceived IT governance capability and data integration capability was confirmed. The executive management had a lower correlation than the overall correlation, which is understandable considering the executive management is less involved in data integration issues as compared to senior management. Senior management has a greater appreciation as the impact IT governance has on data integration. By including respondents from different leadership categories it appears a much higher overall correlation is possible as compared to a multiple site survey, which would normally only include executive management.

The general relationship between the firm's perceived IT governance capability and IT facilities and management capability was confirmed. Revenue generating areas had a moderately higher correlation as compared to the overall correlation, whilst the opposite was the case in respect to the support areas. The Rest of Africa region had a significantly higher correlation; this is a region in the writer's opinion that is known to be less mature in respect to its IT facilities and management. The local area of focus had a much lower correlation as compared to the global correlation, which supports the bank's global strategy to consolidate its IT facilities and management across regions.

The general relationship between the firm's perceived IT governance capability and training capability was confirmed. It appears that regions (South Africa and International) with high levels of sophistication, regulation and product complexity have stronger relationships, whilst in the Rest of Africa region which has lower levels of sophistication, regulation and product complexity there was a weaker relationship in comparison to the overall correlation.

The general relationship between the firm's perceived IT governance capability and business process improvement capability was confirmed. Senior management had a stronger relationship as compared to executive management, which can be explained due to the fact senior management is impacted more by improvements in business processes. The more experienced the respondent became the greater the improvements in IT governance capability had on business process improvements. Revenue generating business areas had a stronger relationship in comparison to support areas. An explanation for this is that the bank has more complex business processes in their revenue generating areas and thus benefits from greater IT governance. In comparison to the overall correlation, the global area of focus has a stronger relationship, whilst the local area of focus has a weaker relationship. This is understandable where one of the main challenges of a global representative is to standardise and remove duplicate business processes. There is a dependency on IT governance in achieving standardisation and the removal of duplicate processes. Support business areas have slightly higher correlation as compared to the overall correlation for both operating firm performance and market-based performance. This is understandable since support business areas are more exposed to data integration issues as compared to revenue generating business areas.

The general relationship between the firm's perceived data integration and firm performance (operating and market-based) was confirmed. The role location IT had a significantly stronger relationship as compared to the overall relationship in respect to operating firm performance, which is understandable considering that IT roles are more exposed to data integration issues. The Rest of Africa region has a significantly stronger relationship as compared to the overall relationship in respect to both operating and market-based firm performance. This could be due to the Rest of Africa's data integration capability being at a lower level of maturity in comparison to other regions. It appears the impact is far greater when the data integration capability has a lower level of maturity.

The general relationship between the firm's perceived IT facilities and management capability and firm performance (operating and market-based) was confirmed. The role location IT had a significantly stronger relationship as compared to the overall relationship in respect to firm performance (operating and market-based), which is understandable considering that IT roles are more involved in IT facilities and management matters. The Rest of Africa region has a significantly stronger relationship as compared to the overall relationship in respect to both operating and market-based firm performance. This could be due to the Rest of Africa's IT facilities and management capability being at a lower level of maturity compared to other regions with the impact being far greater where the IT facilities and management capability has a lower level of maturity.

The general relationship between the firm's perceived training capability and firm performance (operating and market-based) was not confirmed. There is a perception amongst less experienced respondents that improvements in training capability improves market-based performance. The International region also reflected a strong positive correlation with in respect to operating firm performance. An explanation for this could be due to the International region operating in a more sophisticated and highly regulated market which would require a training capability.

The general relationship between the firm's perceived business process improvement capability and firm performance (operating and market-based) was confirmed. The Rest of Africa region had a significantly stronger relationship as compared to the overall relationship in respect to both operating and market-based firm performance. This could be due to the Rest of Africa's business process improvement capability being at a lower level of maturity compared to other regions with the impact being far greater where the business process improvement capability has a lower level of maturity. It was expected that where the area of focus was global, the relationship would be stronger as compared to the overall correlation due to the expectation that the benefits would be greater where the focus would be to standardise business processes across regions. The converse was found in this study.

The exploration of the moderators' impact on the relationships per the research model from the perspective of a number of the respondent characteristics was limited due to the lack of significant confidence in the correlations in respect to the high-low comparisons.

There was no confirmation that IT governance process formality moderator had a moderating impact on the IT governance capability and data integration capability relationship. There were unexpected findings where the IT governance process formality moderator impacted negatively both the training and IT facilities and management capabilities. However, in the case of the support business area the moderating effect on IT facilities and management was positive. The moderating effect of IT governance process formality on the IT governance capability and business process Improvements relationships was confirmed positively.

There was confirmation that the IT intensity moderator had a moderating impact on the IT governance capability and data integration capability relationship. The research highlighted the importance of the IT governance capability in a firm whose business success is highly dependent on the IT function.

This case study provided insights based on the characteristics of the respondents that would not normally be available in a multiple site survey.

In addition Law and Ngai (2007) requested for additional research to validate the dimensions (data integration, IT infrastructure capability, and training) of the "IT infrastructure capability" construct. Van Der Heijden (2001) requested that that the "business IT strategic thinking" measure be further validated with an independent data set. The factor analysis provided additional support for previous research findings as to the validity and reliability of these constructs.

6.3 Research Limitations

This research has a number of limitations. Firstly the research model's hypotheses were not tested due to a single site survey taking place. Secondly, cross-sectional data at a particular period of time was used. Any causal relationships suggested or insights obtained when exploring the respondents characteristics need to be used with care. The questionnaire survey was performed at a particular point in time when the CIB business

unit was operating in accordance to a Bank strategy that may have subsequently changed. Longitudinal studies should confirm the causal relationship taking into account any change in bank strategy, the model's underlying theoretical model was used as the basis for the interpretation of the causal relationships.

Thirdly, interpretation of the certain respondents characteristics was limited (I.e. the specialists) due to lower response rates for certain characteristics. It is hoped that in future research a larger sample will be used.

6.4 Recommendations for Further Study

The model has not be been verified in this study, the model and instrument developed can be used as a basis for future research across many firms and industries. The model's hypotheses need to be tested through a multiple site survey where the questionnaire remains essentially the same so that the characteristics of the respondents can be explored. This future research can:

- Support this research's results that the IT governance capability has a greater impact on IT facilities and management in respect to revenue generating business areas as compared to support areas. It may be more beneficial and practical for firms to first strengthening its IT governance capability in revenue generating business areas;
- Assess whether by strengthening the IT governance capability in firms that have a lower level of maturity in respect to its IT facilities and management capability the impact is far greater as compared to firms that have high level of maturity;
- Confirm whether IT based roles in comparison to business based roles have a stronger impact on the data integration and operating firm performance relationship;

- Confirm whether support business areas in comparison to revenue generating business areas have a stronger impact on the data integration and firm performance (operating and market-based) relationship;
- Assess whether by strengthening the data integration capability in firms that have a lower level of maturity will have a greater impact on firm performance as compared to firms that have high level of maturity;
- Assess whether by strengthening the IT facilities and management capability in firms that have a lower level of maturity will have a greater impact on firm performance as compared to firms that have high level of maturity;
- Assess whether by strengthening the business process improvement capability in firms that have a lower level of maturity will have a greater impact on firm performance as compared to firms that have high level of maturity;
- Assess whether respondents with a global focus versus a local focus have a greater or lesser impact on firm performance;
    - Test the model relationships impacted by the IT governance process formality moderator due to the unexpected results from this study. Some mixed results were found where the moderating effect of IT governance process formality's impact on training and IT facilities and management was found to be negative whilst the moderating effect on business process improvement was positive.

Depending on whether a firm has a centralised or federated governance form, future research should explore the impact of the respondent's area of focus (local versus global) on the model's relationships. Especially in the case where the firm has the intention to consolidate its IT facilities and management across regions and to standardise and remove duplicate business process across regions.

A "sophistication of markets" construct should be created or identified that measures a region's level of market sophistication so as to assess the moderating impact it has on:

- The IT governance capability and training capability relationship.
- The training capability and firm performance relationship.

A "business process complexity" construct should be created or identified that measures the complexity of a business processes so as assess the moderating impact it has on the IT governance capability and business process improvement capability relationship.

Based on the findings of the IT governance formality relationships it may be useful in future research to explore how contingency factors particular to a firm influences the "IT governance process formality's impact on IT infrastructure capability and business process improvement. Avlonitis (1985) argues that firms that have highly bureaucratic structures and processes are more effective for companies in stable environments, whilst less formalised structures and processes are appropriate for firms in changing and uncertain times.

Exploration of the moderators' (IT governance process formality and IT intensity) impact based on the various respondents' characteristics is limited due to the lack of significant confidence in the correlations in respect to high-low comparisons for a number of respondent characteristics. This will require further exploration in future research where a larger sample size across many firms should improve the confidence in the correlations of the respondents' characteristics.

Law and Ngai (2007) requested additional empirical studies to explore the relationship between IT infrastructure capability and business process improvements. The research model in this study can be expanded to explore this relationship further.

6.5 Conclusion

An in depth single site survey has provided results not normally available via a multiple site survey. It appears that for certain respondent characteristics the impact that IT governance capability has on IT infrastructure capabilities and improved business process improvements and their consequent impact on firm performance is far greater. These insights provide greater cognisance to the importance of ensuring that the right amount of IT governance is implemented so as to ensure that a firm's IT governance effectiveness is enhanced according to the level of experience of key stakeholders, the operating regions and the level of maturity in respect to IT infrastructure capabilities (data integration, IT facilities and management and training). Application of this research model and its instrument in a multi-site survey should validate the relationships as well confirm or enhance the insights obtained to date.

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7 Appendix A. Descriptive Statistics

Table A.1 Descriptive Statistics by Item

Descriptive Statistics by Item

Item	Item Mean	Standard Deviation	Cronbach Alpha	Item Loading
IT Governance Capability				
BIS2	2.95	1.055	.899	.636
STR1	3.17	.848		.779
STR2	3.20	.961		.803
STR3	3.15	.897		.841
STE1	3.21	.835		.853
STE2	2.99	.941		.846
STE3	3.06	.943		.802
Data Integration				
DI1	2.59	.996	.840	.780
DI2	2.09	.897		.937
DI3	2.27	.988		.902
IT Facilities and Management				
FM2	3.16	1.006	.801	.713
FM3	3.31	.944		.811
FM4	2.68	.991		.817
FM5	2.80	.961		.827
Training				
TR1	2.71	.798	.834	.850
TR2	2.78	.866		.843
TR3	2.79	.800		.910
Business Process Improvements				
BP1	3.11	.840	.836	.752
BP2	3.29	.852		.786
BP3	3.06	.815		.754
BP4	3.07	.828		.856
BP5	3.05	.808		.735
Firm Performance: Operating				
FP1	2.54	.992	.821	.742
FP2	2.44	1.047		.867
FP3	2.86	.915		.841
FP4	2.53	.893		.777
Firm Performance: Market-based				
FP5	2.63	1.020	.887	.904
FP6	2.37	.992		.885
FP7	2.49	.933		.924
IT Governance Process Formality				
GPF1	2.98	.901	.842	.841
GPF2	2.69	.856		.878
GPF3	2.88	.877		.819
GPF4	2.92	.990		.767
IT Intensity				
ITINT1	4.136	.8415	.776	.872
ITINT2	3.907	.7481		.858
ITINT3	4.364	.6483		.760

Legend: BIS = Business IT Strategic Thinking, STR = IT Strategy Committee, STE = IT Steering Committee, DI = Data Integration, FM = IT Facilities and Management, TR = Training, BPI = Business Process Improvements, GPF = IT Governance Formality, ITINT = IT Intensity. Note: All items had loadings greater than .60

8 Appendix B. Questionnaire Instruction and Items

B1: Survey Instructions

Dear Colleague,

In order to complete my Master of Commerce (Information Systems) at the University of the Witwatersrand, I am conducting research on IT Governance.

MR Y, CIB Global Chief Information Officer, has endorsed this study to proceed within Corporate and Investment Banking across the following geographic regions:

- South Africa
- Rest of Africa
- International

The survey was approved unconditionally by the Wits University Human Research Ethics Committee (Non-Medical), Protocol Number: H100847.

Your response is important and there are no right or wrong answers. This survey is both confidential and anonymous; this is ensured by the questionnaire having no responses which might identify the willing participants; and by the destruction of the questionnaires after the survey is over and the University requirements are met. Your personal participation is completely voluntary and involves no risk, penalty, or loss of benefits to you whether or not you participate. You may withdraw from the survey at any stage if you so choose.

The entire survey should take approximately 15 minutes to complete. Please indicate your perception based on the options available, by selecting the appropriate box.

Thank you for considering participating in the study. If you have any concerns or questions, or if you would wish to obtain a copy of the aggregated results of the survey, please contact me.

It would be much appreciated if you could participate in the survey by completing the questionnaire available on the following internet site:
http://www.surveymethods.com/EndUser.aspx?A185E9F3A6E3FDF2A5

Kind regards,

Richard Pritz

Footnote:
An IT Strategy Committee advises the board and executive management on IT Strategy and focuses on current and future strategic IT issues.
An IT Steering Committee assists the executive in the delivery of IT strategy; oversees day-to-day management of IT service delivery and IT projects and focuses on implementation.

B2: Research Instrument

B2.1: Details in respect to respondent's profile
Which role best describes your current position?

- Architect
- Business Director
- Chief Executive Officer
- Chief Financial Officer
- Chief Information Officer
- Chief Operating Officer
- Chief Risk Officer
- Chief Technical Officer
- IT Director
- Programme Manager
- Project Manager
- Senior Business Analyst
- Senior Business Manager
- Senior IT Manager
- If other, please specify

Years experience in current position
Select value from:

- 1 to 30 or
- More than 30 years

Which Corporate & Investment Banking geographic region do you represent or requires your focus?

- South Africa
- Rest of Africa
- International
- Global

Which business area do you represent?

- Client Coverage
- Financial Services
- Global Markets
- Human Resources
- Information Technology
- Investment Banking
- Operations
- Real Estate Investments
- Risk Management
- Transactional Product & Services
- If other, please specify

Do you sit on any of the following committees or its equivalent?

- Business Unit Project (BUPP) Prioritisation Committee

- Executive Committee
- IT Strategy Committee
- IT Steering Committee
- Project Board
- Not Applicable

Which roles have you participated in during key IT strategic projects?

- Architect
- Programme Executive
- Programme Manager
- Project Manger
- Project Sponsor
- Senior Business Analyst
- Senior Supplier
- Senior User
- If other, please specify

B2.2: Variable items and key dimensions

Perceived IT Governance Capability:

Business IT Strategic Thinking Capability:

BIS1 The vision of IT management for the role of IT is similar to the vision of business management for IT

BIS2 The IT Division/Department is closely involved in the formulation of the Bank's strategy

BIS3 The IT Division/Department maintains close relationships with business management

IT Strategy Committee Capability:

STR1 The IT Strategy Committee provides strategic direction and the alignment of IT with business issues

STR2 The IT Strategy Committee provides direction for the sourcing and use of IT resources, skills and infrastructure so as to meet strategic objectives

STR3 The IT Strategy Committee provides direction to management in respect to IT strategy

IT Steering Committee Capability:

STE1 The IT Steering Committee provides strategic direction to IT projects that are in line with the strategic direction of the Bank

STE2 The IT Steering Committee provides leadership in deriving benefits from strategic IT projects

STE3 The IT Steering Committee provides leadership in managing strategic IT projects

Perceived Dimensions of IT Infrastructure Capabilities:

Data Integration:

DI1 Unique information in a database is shared across the Bank

DI2 Duplication of data is eliminated

DI3 Definitions of data elements are standardised

IT Facilities and Management:

FM1 Server platforms have sufficient capacity

FM2 Regular preventive maintenance on our IT systems minimises their down time

FM3 The Bank has the expertise to manage IT facilities

FM4 Internal users are happy with IT services

FM5 IT administration standards and procedures are well defined

Training:

TR1 The Bank has effective IT training programmes

TR2 Training for users is sufficient

TR3 Training for IT personnel is sufficient

Interfirm Communications:

IC1 Networks link the Bank and its main suppliers

IC2 Networks link the Bank and its main customers

Perceived Business Process Improvements:

BPI1 The Bank's process changes help prevent defects and errors

BPI2 The Bank process standards are improved periodically

BPI3 New processes in the Bank are easier to work with

BPI4 Work processes are improved to facilitate coordination within the Bank

BPI5 Work processes are improved to facilitate coordination with external parties

Perceived IT Governance Process Formality:

GPF1 The performance of IT at the bank is regularly and systematically reviewed

GPF2 Criteria to evaluate IT's performance have been explicitly established

GPF3 Minimum standards of IT performance have been explicitly established to serve as warning signals

GPF4 Responsibility for IT decision-making has been clearly and definitely assigned

Perceived IT Intensity

ITINT1 IT is used extensively by the Bank's competitors

ITINT2 IT is used extensively by the Bank's suppliers and business partners

ITINT3 IT is a critical means to interact with customers in the banking industry

Perceived Firm Performance:

FP1 The Bank enters new markets very quickly

FP2 The Bank has brought new products and services to the market faster than our competitors

FP3 The success rates of the Bank's new products and services have

been high

FP4 The Bank's productivity has exceeded that of our competitors

FP5 The Bank's profit has exceeded that of our competitors

FP6 The Bank's financial performance has been outstanding

FP7 The Bank's financial performance has exceeded that of our competitors