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To investigate the state of IT Governance in the South African Banking sector - with particular reference to the Nedbank Branch Network at eThekwini

By

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DECLARATION

I, Christopher Pillay, hereby declare that:

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I have come to appreciate the oft-stated expression that 'no man is an island'. That, to succeed and flourish we must first acknowledge our own limitations and short comings and solicit the help, encouragement and assistance of others. It is in the light of this sentiment that I would like to thank my academic supervisor, Mr Karunagaran Naidoo, for his wisdom and guidance during my dissertation. For without his guidance, this dissertation would not have been possible.

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Abstract

Information technology (IT) is at the core of banking operations; it is the fabric pervading everything. Banks cannot provide their products and services without relying on IT; they are completely dependent on IT. This dependence on IT is a source of significant risk because the non-availability of IT systems renders the business impotent to provide its product and services and to generate revenue. This gives rise to the paradoxical dilemma in that for banks to provide their products, services and to innovate, they are dependent on IT and this dependence is the source of significant risk. More so, banks are not merely dependent on IT for their daily operational needs but also reliant on IT to achieve their strategic goals and for overall advantageous competitive positioning and it is this irony that has banking executives, regulators and stakeholders concerned.

It is well established that IT governance (ITG) is essential to the overall success of organisations. It provides a mechanism to manage the risks associated with IT as well as the ability to maximize and sustain organisational performance. Yet, given the axiomatic importance of ITG, we have seen failures of IT systems at large banking organisations resulting in huge financial losses and reputational damage; all attributed to failures in governance. More so disclosures related to these failures are opaque to non-existent; with the effectiveness of IT governance and strategic alignment being the least disclosed and transparent. The consequence of this is that we do not know the current state of IT governance nor its effectiveness at banking institutions due to the lack of transparency and disclosures in the reporting of IT failures resulting from a lapse in IT governance. Nor do we know how adequate the IT governance regime is. The externalities of banking institutions to the society at large warranted the need to understand the state of IT governance in the South African banking sector.

This study investigates the state of IT governance in the South African banking sector with particular reference to the Nedbank branch network in eThekwini, a municipality in KwaZulu-Natal. Data was collected, from Nedbank branches included in the sample, using a self-administered questionnaire as the survey instrument with items developed to interrogate the state of strategic alignment and using this as a proxy for the maturity of IT governance. This approach is well established in the literature. The results of the study showed that the Nedbank branch managers in the eThekwini region of KwaZulu-Natal agreed or strongly agreed that

there is significant strategic alignment at Nedbank and consequently a high degree or maturity of IT governance.

The study, further, recommends that a larger study be conducted to include branches from all the provinces in South Africa and compare the results. The disparity in the gender of Nedbank branch managers was noted and it would be interesting to study whether this disparity contributed to the results and is recommended for future research.

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Chapter 1

1.1 Introduction

An overview to the research study that establishes the necessary bedrock for the study is presented here. It provides a background to the field of corporate and IT governance with their definitions, together with the problems and challenges faced and its overall importance in modern management practice. The research problems and questions are presented and the theoretical model and or framework that predicate the study are discussed. The manner in which the data is collected, the sample size determination and the design of the survey instrument is also presented in this chapter. In addition, the method used to accomplish the literature survey and the manner in which the data was analysed are discussed. This chapter further presents the significance, justification and contribution of the study and describes the ethical protocols that was followed as well as provide an overview to the dissertation chapters.

1.2 Background

Corporate governance is about the stewardship of an organisation; the way it is focused and controlled. It encompasses measures that systemically provide control over the activities of managers and other agents of the organisation including subcontractors (L'Huillier, 2014). These measures include processes, procedures, principles, and rules on how to govern the organisation; and managers of organisations must consider the interests of manifold stakeholders in their decision making (Ayuso, Rodríguez, García-Castro, & Ariño, 2014). Corporate governance has been around for a while, and it has become apparent that it is a necessary constituent of success and sustainability of all modern organisations (Shkendije, 2014). It encourages organisations to create an organisational culture of transparency, fairness, accountability and ethicalness (Ayuso et al, 2014). This in turn creates a level of trust between the leaders of an organisation and all its stakeholders. Transparency and disclosure in particular are important in managing stakeholder trust and can advance the perception of trustworthiness. This advancement in the perception of trustworthiness amplifies the reputation of the organisation with trustworthy organisations cultivating stronger reputations and are claimed to bring a strategic advantage to an organisation, enhancing its profitability (Van der Merwe & Puth, 2014). Stakeholders, such as investors, take comfort in this way, and are reassured that their money is in safe hands. The importance of corporate governance, in the success and sustainability of organisations, is now well established as well as the devastating consequences when it fails. This was demonstrated during the recent global financial crisis which exposed

spectacular corporate governance failures. The case of Enron and WorldCom are examples that have been well reported. These failures can be attributed to inadequate corporate governance (Julia, 2012). (Kumar & Singh, 2013) concur in that although there are other factors that contributed to the recent global financial crisis, the major contributor was the lapse in corporate governance. Studies by (Grant, 2009) , (Peter, 2010) and (Hussein, 2011) have also identified that lapses in corporate governance contributed significantly to the recent global financial crisis. The costs of these lapses run into trillions of USD's and yet "almost no research to date has empirically analysed the influence of corporate governance characteristics, such as ownership structure or management structure, on a bank's probability of default (PD)" (Berger, Imbierowicz, & Rauch, 2014, pg. 1). Notwithstanding the lack of empirical analysis of the governance features of organisations, corporate governance or the adherence to corporate governance is indeed the life blood of 21st century organisations in that its success and sustainability is based on its adherence. The term governance is etched permanently in today's business lexicon.

Information Technology (IT) governance falls under the umbrella of corporate governance and is concerned exclusively with the Information Technology resources of the organisation, inclusive of the IT human resources. The objective is to maximize its performance to create value for the organisation whilst at the same time minimizing risks associated with it. IT has a substantial influence on overall corporate performance and its ability to compete. Neglecting to effectually manage the various IT activities and infrastructure will have a certain impact on organisational performance and growth. Further, the rapid evolution and deployment of IT across organisations, necessitates an IT governance (ITG) regime which is essential to organisational success (Zyad, Victor, Robert, & Gary, 2016). Failures at large organisations have seen them lose millions, let alone the damage to their reputation. So apart from the loses that an organisation sustains when the IT systems fail disrupting the operations of the organisation, there are other intangible loses that can have long term implications for organisations. Organisational reputation, regarded as an intangible asset, is impacted during IT failures which is attributed overall to failures in IT governance. For that matter reputational damage is inevitable in any corporate governance failure. Even though there is no steadfast way to calculate the value of reputation, damage to it is instantly clear and lasting (Lewis, 2017). A case in point is the Royal Bank of Scotland which had a IT failure in 2012 that resulted in many of its customers unable to access their accounts and unable to transact for days, losing millions in the process (TheGuardian, 2016). The banks of Ulster and NatWest were also

affected because they shared the same IT infrastructure. The South African banking sector has also experienced failures most notably that of Saambou and more recently that of African Bank; both attributed to the failures of corporate governance. Reports on IT failures at South African banks have received some media attention. In 2009 the Mail and Guardian, a highly reputable media outlet, renowned for its investigative journalism reported the IT failures at BankServ that left customers and retailers highly frustrated. IT systems failure can be categorised as an operational incident with most operational incidents and associated risks are not reported (Vuuren, 2013). Thus, there is this opaqueness when it comes to the reporting IT failures and the effectiveness of IT governance with strategic alignment been the least disclosed category (Steven, Anant, Tim, & Salvi, 2016).

Information Technology has had a major impact on all businesses irrespective of market sector. It is pervasive across every aspect of our daily lives and it is so obvious that we do not need to emphasise this anymore (Saeid, 2011). In particular, Information Technology has had a transformative influence on the banking sector. Business activities in this sector are totally dependent on IT. It has enabled banks to address the challenges and exploit opportunities present in the existing economy that is rapidly changing based the influences of leapfrog digital advances. We have reached the point in banking, in which IT is the most critical and strategic constituent of the business process itself; with banks now fully dependent on IT (Ivana, 2013). This dependence on IT comes with significant risk but at the same time the banks are dependent on it to provide new products and services and for its day to day operational needs and this paradox has stakeholders and regulatory bodies extremely concerned about the usage of IT and its related risks.

The recent financial crisis coupled with spectacular IT system failures exposed corporate governance failures, in all industry sectors, with the banking sector being more acute; so, the problem is very real. Although some catastrophic IT governance failures have been reported on, there is more opaqueness and lack of transparency in bank disclosures, if any at all, (Steven et al, 2016). This lack of transparency is supported by (Joshi, 2017); which encourages the need to understand the state of IT governance at banks. This study's focal point is the state of IT governance in the South African banking sector-with particular reference to the Nedbank branch network at eThekwini.

1.3 The Research Problem

Information Technology is at the core of banking operations; it is the fabric pervading everything. Banks cannot provide their products and services without relying on IT. They are completely dependent on IT. The banking sector is beyond the point in which IT provides mere business process enablement. It has become a crucial and fundamental constituent of the business processes themselves. This gives rise to the paradoxical dilemma in that for banks to provide their products and services they are dependent of IT, but this dependence is the source of significant risk. It is this irony that has most stakeholders concerned. More so, organisations are not just reliant on IT to provide for their daily operational needs but also reliant on IT to achieve their strategic goals and for overall advantageous competitive positioning (Zyad et al., 2016). This paradoxical relationship between IT dependence and the associated risks of this dependence needs to be managed and "information technology governance (ITG) is the structure that permits compatibility among the strategic goals of the corporation and the intentions that will aid the corporation realise a satisfactory stage of risk" (Zyad et al, 2016, pg.907). These risks are crystallised by the many catastrophic failures during the recent financial crisis which was overall attributed to failures in corporate governance, including spectacular failures of IT attributed to IT governance failures. This is echoed by (Julia, 2012), (Berger et al., 2014) and (Jakob, 2016), with (Jakob, 2016) emphasising these failures of corporate governance, in the banking sector which has come under criticism for its part in encouraging highly risky behaviour thus effectively promoting instability.

Organisations have their own characteristics but also share commonalities depending on the economic sector that they belong to. The banks are also a special case in that the banking business is characterized by significant externalities on the society at large. In this way they are very different from other organisations. Failures in the banking sector, due to governance failures or otherwise, can propagate to the entire economy yet there is lack of transparency when it comes to disclosures of governance failures. Most operational incidents and associated risks at banks are not reported with IT systems failures being an operational incident and risk (Vuuren, 2013). This lack of transparency is supported by (Joshi, 2017). The consequence of this is that we do not know the level of IT governance and maturity at banks and the externalities of the banking business on the society at large, demonstrate the need to understand this. This is at the heart of the problem in that we currently do not know the current state of IT governance nor its effectiveness at banking institutions due to the lack of transparency or opaqueness in the reporting of IT failures resulting from a lapse in IT governance. Nor do we

know how adequate the IT governance regime is. The focus of this study is the current state of IT governance in the South African banking sector - with particular reference to the Nedbank branch network at eThekwini, a municipality in KwaZulu-Natal.

1.4 Brief Background Information to the South African Banking Sector

South Africa has a very mature banking sector that is respected and regulated. In a survey conducted by the World Economic Forum, called the World Economic Forum Global Competitiveness Survey 2013/2014 (Schwab, 2013), the South African banking sector was highly rated; among the top ten (10) out of over 100 countries. Historically, Lombard Bank based in Cape Town was the first bank in South Africa; opening in1793 (ResBank, 2017). There are seventeen (17) local banks in operation with a number of other mutual and foreign banks operating in South Africa; with a combined asset value of more than 3.9 trillion rands (ResBank, 2017). South African banks have an history of strong banking management fundamentals and weathered the recent global financial crisis better than most. Notwithstanding this, the South African banking sector has seen notable banking failures with African Bank and most recently VBS Mutual bank placed under curatorship. Both attributed to lapses in corporate governance. South Africa, like in most developed economies, has a banking sector which is completely reliant on IT for all its functions, products, and services.

1.5 The Research Questions and Objectives

The primary focus of the study is to determine the state of IT governance in the South African banking sector - with particular reference to the Nedbank branch network at eThekwini. eThekwini is a municipality in KwaZulu-Natal. The degree or level of strategic alignment used as a proxy indicator for the state of IT governance is well established in the literature. Further elaboration on this approach is provided in section 3.9 in which the theory and or framework underpinning this study is explained. The use of the level or maturity of strategic alignment as a proxy indicator for the level or maturity of IT governance is adopted in this research study.

The research questions underpinning this study are:

1. Do the IT and business strategy align with each other?
2. Are the business processes and the IT processes aligned?
3. Is there alignment between the IT processes and the IT strategy?
4. Do the business strategy and the business infrastructure align with each other?

The objectives are:

1. To determine the current state of intellectual alignment at South African banks; that is the alignment between Business and IT strategy.
2. To determine the current state of operational alignment at South African banks; that is the alignment between business infrastructure and processes with the IT infrastructure and processes.
3. To determine the current state of alignment between Business strategy and the business infrastructure and processes.
4. To determine the current state of alignment between IT strategy and the IT infrastructure and processes.

1.6 The theory underpinning the study

The researcher used the Strategic Alignment Model (SAM), as adapted by (Gerow, Thatcher, & Grover, 2015), to investigate the state of IT governance at South African banks by using the degree of strategic alignment at South African banks as a proxy indicator for the state of IT governance. The use of strategic alignment as a proxy indicator for the level or maturity of IT governance is supported by (Alborz & Azar, 2013) which also established the positive relationship between strategic alignment and IT governance. Whilst (Haes & Grembergen, 2008), already concluded in their seminal study that there is a robust relationship between the maturity of an organisation's strategic alignment and the level or maturity of the organisation's IT governance. The model is described in detail in chapter 3.

1.7 Significance, justification and contribution of the study

This study explores the current state of IT governance at South African banks and in this way, contributes to a deeper understanding of the risks that exist. It cannot be understated that it is vital to understand these risks given the significant externalities that banks have on society at large should they fail, and this study will investigate the current state of IT governance that executive management could use to improve and mature its IT governance regime. In this way, it both contributes to the academic body of knowledge and has practical uses for executive management. Further, given the lack of transparency of banks, South African banks included, with regards to governance and IT governance the only way to understand the state of IT governance at banks is to conduct a study. If the study is not conducted this lack of transparency only gets more intense and we will not know the true state of IT governance at South African banks and the risks that they are exposed to and consequently the risks that the society at large is exposed due to the externalities of banking risk.

1.8 Conducting of the literature survey

A survey of academic writings was conducted on the topic. This included amongst others peer-reviewed articles, books, conference papers, and dissertations. Major academic or seminal studies was reviewed on the topic from primary sources. Secondary sources were also be used but sparingly and only when the source contained valuable information. Various electronic databases available via the UKZN online library was utilised, in addition, to other online resources such as Google scholar and open access databases.

1.9 Design of the survey instrument, Data Collection and Sample Size

The survey instrument, in the form of a questionnaire, that was used in the study is adapted from the instrument developed by (Gerow et al., 2015). A questionnaire is a research instrument which is made up of a collection of pre-planned questions that respondents must answer. Surveys tend to be mostly self-administered with online questionnaires via the internet now very popular. These surveys are "very inexpensive to administer, results are instantly recorded in an online database, and the survey can be easily modified if needed" (Bhattacharjee, 2003, pg.75). However, this study did not make use of an online questionnaire. Due to the seniority of the target audience and their time constraints, it was decided to provide the target audience with a blank questionnaire for them to complete which will later be collected from them. The items included in the questionnaire is adapted from the study by (Gerow et al, 2015), which utilised well established protocols and techniques for the creation of survey items and associated measurement scales that has proven to be reliable. Further, this study relied on the content validity established in the study by (Gerow et al, 2015). Items in the questionnaire are grouped according to the alignment type been measured as described in the constructs in chapter 3. They are measured using a five (5) point Likert scale. Further, the survey instrument was analysed by a statistician appointed by the University of KwaZulu-Natal. After suggested changes, the survey instrument was finalised and is included in the addendums.

Sample size is determined based on several factors, but it is generally "governed by the extent of the precision and confidence desired" (Sekaran, 2003, pg. 292). (Robert & Darwyle, 1970) to a large extent simplified the process of sample size determination by providing a look up table for a given population size and its corresponding sample size. Its use has become axiomatic. Using the sample size table provided by (Sekaran, 2003, pg. 294), we note from this table that a sample size of forty (40) is recommended for a population size of forty-four (44). Forty -four (44) being the population of Nedbank branches in the eThekwini municipality

region of KwaZulu-Natal; the subjects or units of interest being the branch managers. Consequently, a sample size of forty (40) was used in this study.

1.10 Data Analysis

The outcomes of the survey were codified and captured by the researcher, using Microsoft Excel. It was then be exported into SPSS with the aid of a statistician who further assisted with the initial statistical analysis. The researcher conducted the interpretation of the results and presented the findings through the lens of the research questions employing both descriptive analysis and inferential statistics. Chapter 3 provides details about the descriptive and inferential statistics used whilst the analysis of the data and the explanation of the results from the analysis are provided in chapter 4 and chapter 5 respectively.

1.11 Ethical Considerations

The University of KwaZulu-Natal's Ethics Committee was approached to obtain ethical approval for the research study and a gate keeper's letter was obtained from Office of the Registrar at the University of KwaZulu-Natal. When this was duly approved, then and only then, did data collection begin. Respondents participated in the study based on an informed consent basis. The privacy and confidentially of the respondents will be maintained always and assurances was provided to respondents that their private information will not be disclosed and that they have the option to remain anonymous. All ethical protocols specified by the University of KwaZulu-Natal was followed.

1.12 Overview of the dissertation chapters

Chapter 1 introduces the research study. It explains the research problem, highlights the research questions and objectives and describes the theory underpinning the study. Further, it provides details on the significance, justification and contribution of the study and explains the way the literature survey was conducted together with details related to the design of the survey instrument, data collection and sample size selection. In addition, the chapter describes how the data analysis was conducted and concludes with a description of ethical considerations.

Chapter 2 presented the literature survey related to the topic of study.
Chapter 3 provided a succinct, yet comprehensive explanation of the research methodology used in this study.

Chapter 4 presented the analysis of data collected, using both descriptive and inferential statistics.

Chapter 5 details the interpretation of the results of the data analysis. This is done through the lens of the research objectives and questions. Finally, limitations of the study together with further considerations, are presented.

1.13 Conclusion

This chapter provided an overview of the study. It introduced the umbrella area of corporate governance and then IT governance together with definitions, its importance and challenges faced. In addition, it emphasised consequences when corporate governance fails. In particular, it discussed the lack of transparency in the disclosure of IT governance failures in general but more specific to the banking sector which is the focus of this study. The lack of transparency related to IT governance in the banking sector provides the impetus for the study. It is because of this lack of transparency and disclosure, that we do not have a clear picture of the state of IT governance and the externalities of the banking sector warrants this study. This chapter, in addition to introducing the area of study, presented the research problem, research questions and objectives under consideration and highlighted all methodological aspects of the study. Chapter 2 presents the literature review to gain insight into existing academic endeavours and debates around the topic of interest; IT governance.

Chapter 2

Literature Review

2.1 Introduction

The background to the study, including the research objectives, questions and all methodological aspects of the study was presented in chapter 1. In addition, chapter 1 presented the importance and justification of the study and introduced the topic of corporate governance, in particular IT governance, together with its importance and challenges. In chapter 2 the literature review is presented. The literature review provides the salient progression made in the study of corporate and IT governance. It references relevant research in this area and was conducted through the lens of the research objectives and questions.

2.2 Information Technology Governance

In most organisations' information technology has become a vital part of the business and for supporting business sustainability and growth. It would be pointing out the obvious to say that it is an indispensable component to the running of most modern organisations. But more than just essential to the running of a business from an operational and strategic perspective, it is pervasive in most organisations. The indispensability and pervasiveness of IT is now axiomatic and requires special attention in the way it is managed. This special attention is vested in corporate governance and specifically in IT governance. IT governance can be relied upon to not only provide a tool and mechanism to manage the IT assets of an organisation; it can also preserve and sustain an organization's strategy and objectives (Uky, Bobby, & Achmad, 2017).Further, this alignment is crucial to improving organisational performance (Grover & Rajiv, 2007). Information technology governance is crucially important for any contemporary organisation. Organisations must take the necessary measures to make certain that strategic alignment occurs, and this is facilitated by IT governance (Syaiful & Peter, 2009). The study by, (Kari, 2015) further emphasises just how influential IT governance is to strategic alignment; to deliver business value, manage the risks associated with the use of IT and making sure that it is used in the most optimal and responsible manner. This requires a fine balancing act because on one hand organisations are introducing IT to create value for the organisation whilst at the same time organisations must minimize risks associated with the introduction of IT. It is essentially a process that seeks to make sure that the vast investment in IT infrastructure meets the strategic and tactical goals of the organisation (Roger, 2013). The correlated relationship between IT governance and the alignment between the IT strategy and the business strategy is

now well established (Tomi & Hannu, 2006), (Steven & Wim, 2009), and (Shelly, Detmar, & Ting-Peng, 2015) amongst others; it is unquestionable and requires no further discussion except for a brief discussion on its emergance as a term which from the outset emphasied its importance.

Information Technology Governance or IT governance, as a term, started to appear in the academic literature in the early 20th century (Webb, Pollard, & Ridley, 2006). It is no secret that many IT initiatives fail attracting huge costs. (Adam, 2016), referencing the report by International Data Corporate, observes that as many as fifty (50) percent of IT projects require some work to be re-done while twenty-five (25) percentage failure outright; this was largely attributed to poor management. So, it is no wonder that its appearance as an important area for academic research is related to the expectation that IT should deliver value, and because of the poor performance of IT in delivering this value. Studies, such as that by (Farzana & Pinnington, 2014), have already established the positive influence of an organisation's governance regime on the success of its projects. More so, its prominence in academic research was spurred on by the significant risk that IT presents to the organisation when it fails. IT is suffused across all business process and functional areas in most organisations, with most being totally depended on their IT systems. Failures of IT systems can be catastrophic to organisations leaving them in a state of paralysis in which they are unable to provide their products and services to the customers resulting in huge financial losses as well as other collateral damage such as reputational damage (Michael & Anna, 2017). This dependence on IT is thus a source of significant risk and must be managed diligently. IT governance has emerged from the literature as the tool to manage the risks associated with IT and to ensure its overall and consistent success. It is thus indispensable to the efficacy of organisational operations, construction of value and for risk management (Paul & Philippe, 2012). So much so that lapses in IT governance can have devastating consequences (Uky et al, 2017).

The academic approaches and the treatment of IT governance led to a proliferation of definitions. This myriad of definitions together with the range and variety echoes the importance of governance. But at the same time, it can be a hindrance to further academic research and for IT governance practitioners (Webb et al., 2006). It is thus worthwhile to subscribe to a definition. The word govern implies the directing, controlling, or encouraging the policies or acts of persons or events (Dictionary, 2017). Corporate governance is all about the stewardship of an organisation; the way it is focused and controlled. At a foundation level, it is the process utilised to make decisions about how investments are made including IT assets,

how these investment decisions are steered and measured and how the IT assets are used to achieve organisational goals and manage the associated risks (Zyad et al, 2016). Yet another definition; "The strategic alignment of IT with the business such that maximum business value is achieved through the development and maintenance of effective IT control and accountability, performance management and risk management" (Webb et al, 2006, pg. 7). This definition embodies the key characteristics of what IT governance is; in that it is primarily concerned with the management of risk, the maximisation of the performance of the IT assets and the value that it delivers to the organisation, the control of the overall IT environment all under the ambit of strategic alignment. It emphasizes the necessary IT process, policy, control, and accountability regime.

The importance of corporate governance and IT governance is well established and its importance axiomatic. In recent times it has attracted more attention because of the collapse of colossal organisations during the recent global financial systems meltdown, with (Julia, 2012) emphasizing that these failures can be attributed to inadequate corporate governance. Worldcom and Enron are notable examples. This re-emergence also saw many governments enact a slew of legislation. A case in point is the Sarbanes– Oxley Act; which directly impacted the manner in which the IT assets are managed by American organisations (William & Frank, 2005). This focus to include IT governance also "emerged after several financial scandals at the global level in large corporates, both in the US and Europe" (Zyad et al, 2016, pg.907). In addition, the renewed focus on IT governance is because of the risks associated with IT because of the ubiquitous nature of information technology, its pervasiveness, its exponential growth, and disruptiveness; and because of the newer on the edge technologies. Big Data, Cloud Computing, and the Internet of Things (IoT) are at the forefront of this revolution. This rapid evolution to newer technologies, such as cloud computing, is straining the traditional approaches to IT management and the ever-present security concerns forcing the re-think of IT governance in the era of these newer technologies. In his seminal work, (Weiser, 1991) poignantly points out that technologies that make quantum changes in the way humans work and play, tend to graft themselves into every facet of our daily lives in a manner that they become indistinguishable and blend into it as if it was always a natural part of human life. IoT, underpinned by clouding computing and pervasive computing, is such a technology. The prevalence of the lack of standards, and lack of vendor to vendor interoperability are some of the challenges faced by IoT governance (Madakam, Ramaswamy, & Tripathi, 2015). This presents challenges for current IT governance regimes.

2.3 Legacy Systems

Legacy IT systems also contribute to the challenges in managing IT insofar as the risks associated with legacy systems. There are many different definitions for what a legacy system is. Some definitions contain references to the old dumb terminals of mainframe systems whilst others see it as thin client systems or client/server systems and yet many other definitions see it as any first-generation technology. (Crotty & Horrocks, 2017, p. 176), define legacy systems as "a system that is business critical and demonstrates one or more of the following additional characteristics: old age, obsolete languages, poor if any documentation, inadequate data management, a degraded structure, limited support capability and capacity, changed to meet business needs, increasing maintenance costs, and lacking the necessary architecture to evolve". These older systems have fundamentally different software and hardware architectures and require human resources experienced in these technologies to maintain and support them. In addition, the software and hardware vendors of these legacy technologies have discontinued support and maintenance, yet they are still in widespread use. So much so that financial services companies, which includes banks, are estimated to spend 70% of their budget on the maintenance and support of their legacy systems (Crotty & Horrocks, 2017). Notwithstanding the huge financial implications of supporting and maintaining legacy systems, the risks when they fail are exponentially high given the lack of capabilities, vendor support and non-existent documentation. Consequently, legacy systems need to be managed diligently with some researchers, such as (Crotty & Horrocks, 2017), proposing specific models to achieve this and that these models should form part of any IT governance regime.

2.4 IT Governance Models

Apart from research studies, such as (Crotty et al, 2017), proposing specific models to deal with legacy IT systems, there is no shortage of IT governance models and frameworks. Cobit, is by far the most recognised IT management and governance framework; it is also the most comprehensive tool kit for the effective management of IT (Huygh, De Haes, Joshi, & Van Grembergen, 2018). Cobit uses a collection of processes to describe and manage the IT organisation (Simonsson & Johnson, 2014). The latest version of Cobit comprises 37 processes to manage the IT organisation. ITIL, is a service delivery management framework that forms a vital part of the IT governance regime. It is popular and advances IT governance regimes by motivating innovation in process management practices (Iden & Roar, 2014). This is the essence that makes it so popular; processes play a crucial role in stimulating IT governance (De Haes & Van Grembergen, 2009). In general, it is used as a reference model for IT

governance by accentuating the control and management of IT through processes. It has matured from a suite of best practice processes to now include strategy, control and governance amongst others; regularly accepted to be an enabler for IT governance (Iden & Roar, 2014). Whist some researchers believe that it is already a mature IT governance framework, both ITIL and Cobit can be used to achieve alignment in an organisation and are thus complimentary to each other (Zeinolabedin, Mehrvarz, & Rahbar, 2014). Other governance frameworks also exist and are in use today, such as ITCG, ISO 21500 and COSO, but Cobit and ITIL are the most popular (Nicho & Khan, 2017). Specific project management methodologies that govern the management and risk associated with projects also exist. They are essentially project management governance frameworks that govern projects, programs and portfolio of projects. PMBOK and Prince2 are the two most popular with PMBOK more suitable for larger projects (Karaman & Kurt, 2015). There is indeed no shortage of IT governance frameworks.

IT governance is recognised as the best mechanism to manage the effective and efficient use of an organisations IT assets and manage the risk of the organisation whilst protecting the organisational investment in IT and force compliance (Natalia & Mircea, 2014). The bi-directional inter-relationship between IT governance and IT systems impact including its fast paced evolution is well established, (Natalia & Mircea, 2014), but the IT governance regime needed to manage it still remains a challenge to many organisations (Paulo, Adriano, André, Pamela, & Larissa,, 2014).

2.5 Banking Organisations

Banking organisations are a special case. This specialness is a result of the nature of the banking business. The banking business is characterised by significant externalities on the society at large. There is a substantial public dimension to banking organisations especially retail banks and the deposits that they take representing public savings. Banks can have a huge impact on societal costs, especially in the case of failures, and when the societal costs of a failure surpass the private internal organisational costs of a failure, there is an adverse externality effect (Michel & Anna, 2016). It is because of this that failures in banking systems can impact the workings of the entire banking ecosystem. Thus, the risks associated with failures at banks are much higher than for other organisations due to this externality effect; they play a very different role in the economy. This uniqueness of banks is further emphasised by the fact that the systemic risks attributed to them which can propagate not only across the banking sector but across the entire economy which is very different for other organisations. Apart from the significant externalities to the society at large and that systemic risks can propagate to the wider

economy, banks are also less transparent than other organisations (Chenini & Jarboui, 2016). This opaqueness related to banks contribute to further entrenching its uniqueness in relation to or comparative to other types of organisations. In addition to the externalities and opaqueness that characterise the banking sector it is also almost totally reliant on information technology.

Information technology has had a major impact on the banking sector. It has deeply altered the banking industry from both an operational and structural perspective (Marinc, 2018). Banks are using IT to interact with the customers in a fundamental different and flexible way. Almost all business activities in this sector is now dependent on IT; from deposit taking, credit granting, forex, debit and credit cards, ATM withdrawals and the introduction of innovative products and services by exploiting IT. We have reached a point in banking, in which IT is not merely an enabler, it is the most critical and strategic constituent of the business process itself. Banks are now completely dependent on IT (Ivana, 2013). This is significant because dependence means contingent on or determined by or cannot do without. This utter dependence on IT thus introduces some inimitable risk for which governance is indispensable (Marx, Moolman, & Ngwenya, 2016).

2.6 Fintech

More than just the axiomatic risks associated with the sheer dependence of IT that needs to be managed, the challenges presented by the Fintech industry needs carefully and diligent management. These is no clear definition of Fintech and the appearance or origin of the term cannot be attributed to academic endeavour nor to IT practitioners, but it is unarguable a new industry providing technology that is specifically focused on financial activities (Schueffel, 2018). The banks are exploiting the products and services provided by the Fintech industry to improve their efficiency and to launch new innovative products and services, but these same technologies are lowering the barriers to entry to the banking sector, allowing non-traditional banking organisation to provide financial products and services in direct competition to orthodox banking institutions. The impact is now deep-seated impacting on the very business models of banking institutions. It is imperative that banks adjust their business models to remain relevant (Thun, 2015) and this is putting additional pressure on corporate governance regimes to manage risks with these new paradigms.

2.7 Legislation, Standards and Practices

A combination of legislation, regulatory bodies and standards have been used by many countries to deal with the issues of corporate governance with more than 80% of OECD

(Organisation for Economic Corporation and Development) countries using corporate governance standards with a comply or explain regime (OECD, 2017). Although South Africa is not part of the OECD, it follows the same approach to corporate governance with a mixture of legislation, regulation, and standards. The King Codes of Practice in South Africa is perhaps the most advanced corporate governance standard in the world. In the King III report, for the very first time, an entire chapter, chapter 5, was dedicated to information technology; acknowledging just how pervasive IT is in business and that the governance of IT is a corporate imperative (IDOSA & King Committee, 2017). Although the King IV report is the latest report, the King III report for the first time dedicated an entire chapter to IT. The importance of governance is further emphasised by the listing requirements of the Johannesburg Stock Exchange (JSE). The JSE makes it a listing requirement that all companies must adhere to the provisions of the King Code of Governance Practices, including those provisions related to IT (Marx et al, 2016).

2.8 Transparency and Disclosure

Despite the importance placed on IT governance, few IT banking system failures have been reported. Typically, these reports are by reporters from major media outlets. One of the most infamous IT system failures in recent history is that of the Royal Bank of Scotland, including NatWest and Ulster Bank (TheGuardian, 2016). This failure took weeks to resolve with customers unable to perform withdrawals, make credit card payments, do online and mobile banking amongst other things. The bank eventually receiving a historic fine running into the millions of British pounds. South Africa has also had its banking collapses most notable are Saambou and recently African Bank. These failures attributed to failures in corporate governance. Reports on IT failures at South African banks have received some media attention. In 2009 the Mail and Guardian, a highly reputable media outlet, renowned for its investigative journalism reported the IT failures at BankServ that left customers and retailers highly frustrated (Mail&Guardian, 2017). But in the whole, there is opaqueness when it comes to the reporting on IT failures and effectiveness of IT governance. This opaqueness surrounding IT governance and the lack of disclosure when it fails is a sign of governance maturity (Anant, Laury, Harold, Steven, & Wim, 2018). The lack of transparency in IT governance is supported by (Joshi, 2017) in that IT governance transparency is still not yet fully implanted and not fully understood in insofar has IT governance research is concerned.

2.9 IT Governance Models

The academic literature is replete with models and methods for measuring the effectiveness of IT governance regimes adopted by an organisation. The balance score card is one approach which is widely used to measure IT governance (Borousan, Hojabri, Manafi, & Hooman, 2011). It has various perspectives as part of its methodology. These perspectives typically include financial, stakeholders, internal processes, learning and growth. It has been established that there is a significant symbiosis between strategic alignment and IT governance (Prasad, Green, & Heales, 2012) and (Hiekkanen, 2015). Many other studies have also highlighted the mediation played by IT governance on strategic alignment (llmudeen & Malik, 2016). The impact of IT governance on strategic alignment and the concomitance impact is established in studies by (Haes & Grembergen, 2008), (Alborz & Azar, 2013) and (Shelly et al., 2015). So, another approach is to measure the level of strategic alignment and use this as a measure of the level or maturity of IT governance. That is, use the degree of strategic alignment as a proxy for the degree or maturity of IT governance; which is supported by (Thompson & James, 1999), (Nfuka & Rusu, 2010), (Sabegh & Motlagh, 2012), (Alborz & Azar, 2013), and (Shelly et al, 2015). Models for alignment have been proposed but the seminal work by Henderson and Venkatraman proved to be the most transformative (Coltman, Tallon, Sharma, & Queiroz, 2015). In their seminal work, the Strategic Alignment Model (SAM) was developed to assist organisations with their strategic alignment and this model has become lexiconic in modern alignment literature (Henderson & Venkatraman, 1993).

2.10 Conclusion

The importance of IT governance is well established. So, too the association between alignment and governance; that is strategic alignment and IT governance. In addition, models, tools and frameworks exist not only to implement and monitor governance but also to measure it. Yet many organisations still struggle with it. The sheer dependence on IT for most organisations and the concomitant risk associated with this dependence makes IT governance indispensable. Notwithstanding organisations in other industry sectors, the importance of IT governance in manging the risk associated with its pervasive use in banking particularly, and the sheer dependence on IT by banks is well established. But the number of catastrophic governance failures at banks, including IT governance failures, brings to the fore that IT governance is more aspirational than reality in many organisations and warrants a closer look and this paper aims to do just that with regards to the state of IT governance at South African banks.

Chapter 3

Research Methodology

3.1 Introduction

In this chapter the research methodology is described. The population and sample are discussed together with the sampling technique that was employed. Further, the data collection instrument and its validation are discussed and the way the data collection instrument was administered together with the way the data was analysed is also described here.

3.2 Research Design

Research methods can be categorized into quantitative, qualitative, and mixed methods which are essentially the tools of a researcher (Creswell, 2009). The purpose of quantitative research is all about conclusiveness. It attempts to be quantificational to the problem under study and uses the results to make predictions about the larger population (Sekaran, 2003). Each of these research methods are not dichotomies but represent different ends of a gamut, and the selection of one method over another is based on assumptions and the strategies (data collection, analysis, and interpretation) that the researcher intends to employ to conduct the study (Creswell, 2009). The nature of the study and the research problem under investigation is also a key consideration. Quantitative research is characterised by studying a sample from a population and extrapolating the results to the entire population. The researcher intends to gather and analyse measurable data on items that operationalise the constructs in the adapted SAM model by (Gerow et al, 2015) to establish the level or degree of strategic alignment at South African banks. This is then used as a proxy to draw conclusions on the state of IT governance at South African banks. The researcher chose to use the quantitative methodology making use of a structured questionnaire or survey as the data gathering instrument and making use of statistical analysis, both descriptive and inferential, to analyse and interpret the data.

3.3 Population of the Study

The total collection of units that is of interest, is called the population; where a unit is an event, person or animate object (Sekaran, 2003). The target population for this study is all the Nedbank branches located in the eThekwini municipality area of KwaZulu-Natal with the units of interest being the branch managers. There are currently 44 Nedbank branches in eThekwini and these branches formed the population of the study.

3.4 Sample of the study

"Sampling is the statistical process of selecting a subset (called a 'sample') of a population of interest for the purpose of making observations and statistical inferences about that population" (Bhattacharjee, 2012, pg. 65). A sample of Nedbank branches based in eThekwini municipality region of KwaZulu-Natal was taken and data was only collected from the branch managers of these banks.

3.5 Sample Size

There are several decisions that go into the determination of a sample size, but it is generally "governed by the extent of the precision and confidence desired" (Sekaran, 2003, pg. 292). (Robert & Darwyle, 1970) to a large extent simplified the process of sample size determination by providing a table. Researchers could consult this table and determine the sample size required for their studies based on the population and thus avoided the mundanities of performing this calculation manually. Its use has become axiomatic. Using the sample size table provided by (Sekaran, 2003), we note from this table that a sample size of forty (40) is recommended for a population size of forty-six (44). Accordingly, the study drew a sample of 40 Nedbank branches to participate in the study by placing all the names of the Nedbank branches in eThekwini into a hat and drawing 40 names from the hat.

3.6 Sampling Method

There are certain mandatory requirements when quantitative research methodology is used; most notably the sampling technique must be probability sampling which is used in this study. It is a requirement of the quantitative research method. There are several different probability sampling methods each with their own unique characteristics and each have their own applicability. They are broadly categorised under unrestricted or restricted in nature and there are various methods available to the researcher. They range from simple random sampling all the way to cluster sampling. Other common methods are stratified and systematic sampling. In probability sampling every person, event or object as the same probability of being included in the sample. More so, given that this study uses quantitative research methodology, probability sampling is mandatory since "the representativeness of the sample is of importance in the interests of wider generalisability" (Sekaran,2003, pg.270). Each technique differs in the mechanisms employed to extract the sample and each technique differing on the amount of bias injected and the degree of generalisability offered. Unrestricted simple random sampling offers the least amount of bias and the most generalisability than all other probability sampling techniques or methods (Sekaran, 2003) and for this reason this sampling method was used in

the study. The names of the Nedbank branches in eThekwini was placed in a hat and 40 names was drawn. These branches formed the sample, with the branch managers in these branches being the units of interest.

3.7 Data Collection Instrument

The study employed a questionnaire to survey the population. A questionnaire is a research instrument which is made up of a collection of pre-planned questions that respondents must answer. Surveys can be administered personally, mailed to the respondents or distributed electronically. Surveys tend to be mostly self-administered with online questionnaires via the internet now very popular. "These surveys are very inexpensive to administer, results are instantly recorded in an online database, and the survey can be easily modified if needed" (Bhattacharjee, 2003, pg.75). However, the researcher could not capitalise on the various advantages of online survey administration due to the constraints of the units of interest related to the nature of their jobs, associated time commitments and the natural environment of their workplace. Further, due the small sample size, the researcher was aiming for almost 100% response rate, with personally administered questionnaires having the distinct advantage of assuring an almost 100% response rate (Sekaran, 2003). It is for this reason; this study did not make use of an online questionnaire. Instead, the researcher opted to use a self-administered printed blank questionnaire which was dropped off with the units of interest and collected personally. The items included in the questionnaire was adapted from the study by (Gerow et al, 2015) which relied on the process (Scott, Phillip, & Nathan, 2011). Figure 1 below illustrates the process that the study, (Gerow et al, 2015) relied upon. Further, the content validity established in that study was relied upon. The survey instrument utilised a five (5) point Likert

scale with items grouped according to the alignment type been measured as described in the constructs.
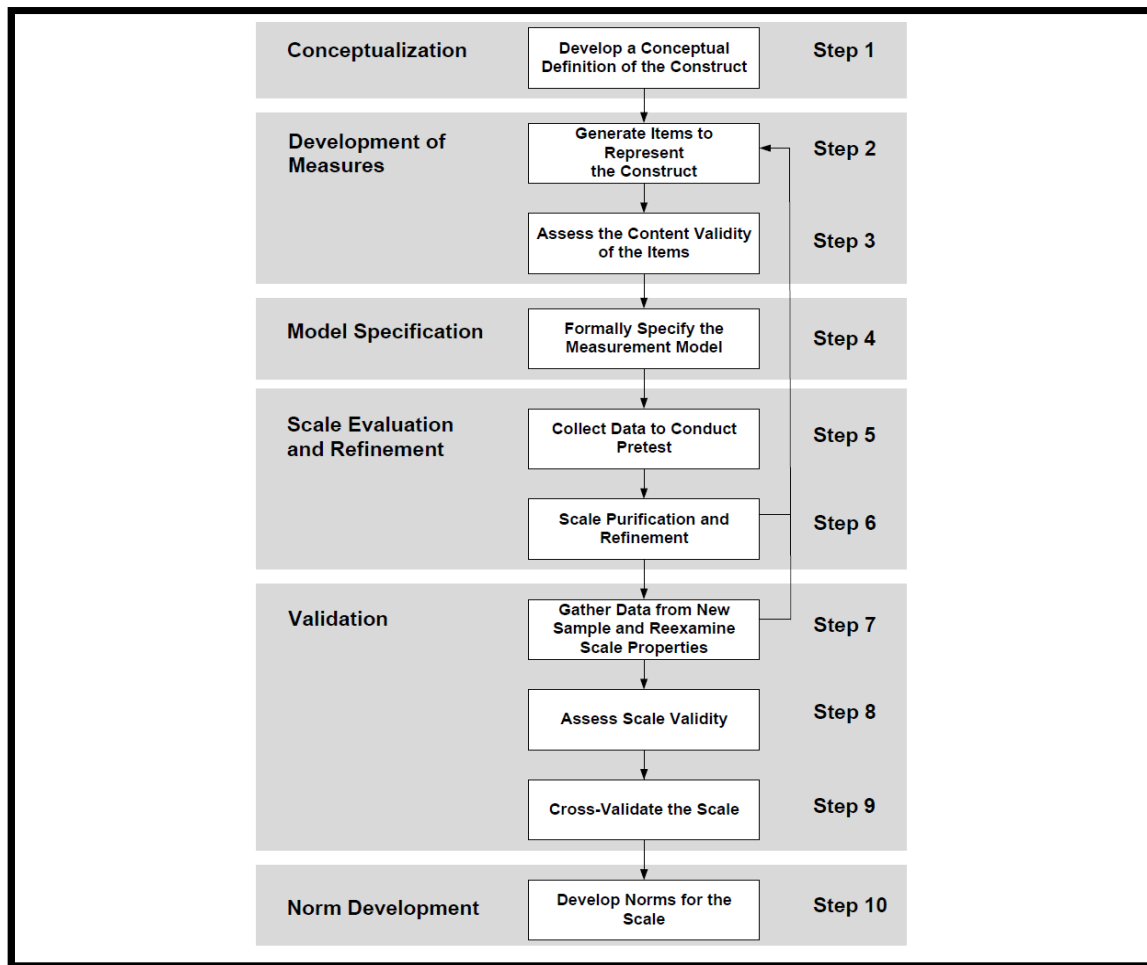
Figure 1: Overview of Scale Development Procedure *source (Scott et al., 2011)

3.8 Data Quality Control, Reliability and Validity

To make sure that our research is indeed scientific we need reliable and validated measures (Sekaran, 2003). Data quality is established through validity and reliability and describes the goodness of an instrument in measuring what it wishes to measure. A thorough measuring instrument or tool must be dependable, easy to use, consistent and constant; that is reliable. While validity is concerned with how well the survey instrument measures the underlying constructs (C R, 2004). The empirical study by (Albert H & Varun, 1998) established items for planning alignment. (Sang M., Kihyun, Patrick, & Hyesung, 2008) established items for operational alignment. Other studies have established items that measure strategic alignment. (Gerow et al, 2015) adapting these items created an instrument that measures all the constructs in the SAM and this study adopted this instrument and relied on the validity and reliability already established.

3.9 Theory or Framework Underpinning the Study

There are many IT governance theories, models, and frameworks in use today such as COBIT and ITIL. Each organisation is unique and may decide to use exclusively one of them or a combination of them to create a unique organisational framework. (Eugene & Johan, 2006) supports the above and emphasises the point that there is no shortage of IT governance frameworks to govern IT in an effective manner. However, (Ko, 2008), referencing the ITGI (IT Governance Institute), indicates that a generic IT Governance framework or model must address the mitigation of risk and the overall enhancement of organisational performance by extracting the maximum amount of performance from the IT assets; including all IT human resources. The academic literature argues that strategic alignment is the focus of IT governance (Thompson & James, 1999) and (Nfuka & Rusu, 2010). Further, IT governance assists in this alignment (Shelly et al., 2015), with well-designed IT governance instruments important in achieving strategic alignment (Shelly et al, 2015). Strategic Alignment is thus a vital IT governance practice. More so, (Sabegh & Motlagh, 2012) demonstrate that IT resource management and performance management, both components of IT governance have a substantial impact on strategic alignment. This is again supported by the study by (Alborz & Azar, 2013) which emphasised this statistically significant relationship. While (Haes & Grembergen, 2008), already established this in their seminal study; an organisation with a highly evolved and mature IT governance regime would in all probability have a have degree of strategic alignment. Put another way, the degree of strategic alignment can be used as an indicator of the maturity of IT governance. The researcher used the Strategic Alignment Model (SAM), as adapted by (Gerow et al, 2015), to investigate the state of IT governance at South African banks by using the degree of strategic alignment at South African banks as a proxy indicator for the state of IT governance.

The Strategic Alignment Model (SAM)
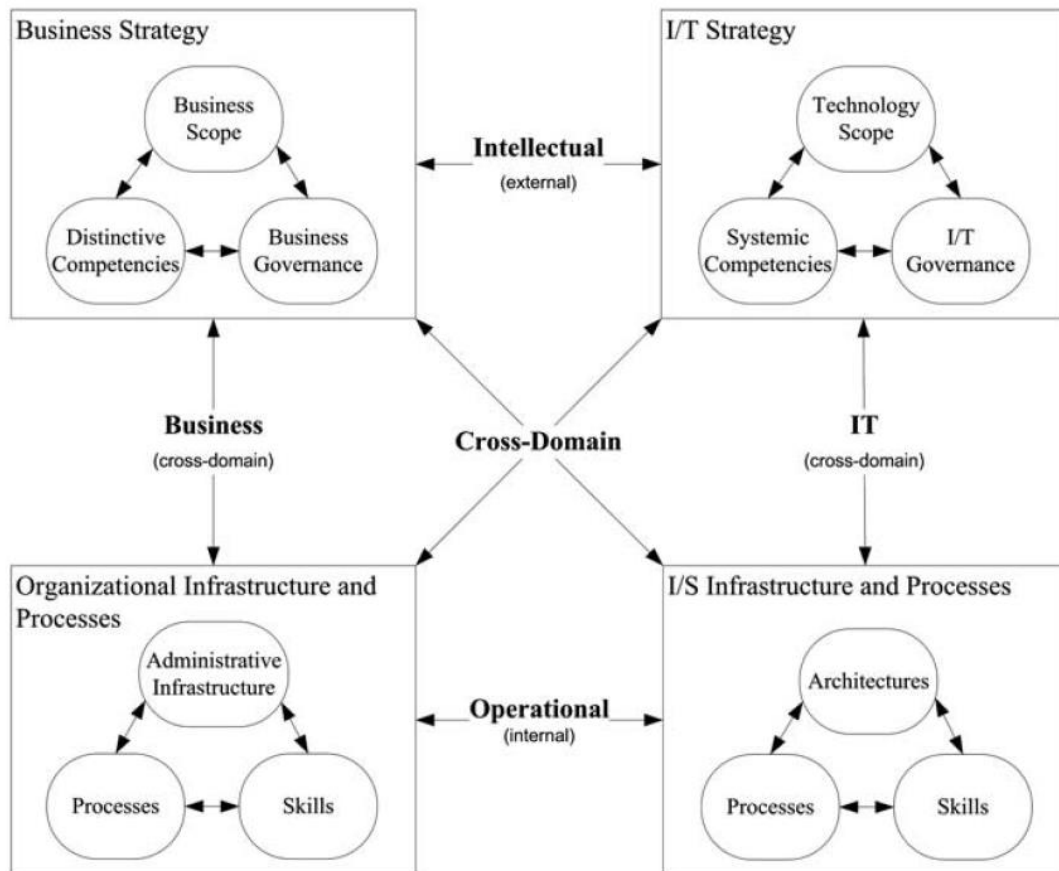
*Figure 2: Henderson and Venkatraman's Strategic Alignment model *Source (Gerow et al, 2015)*

The SAM is depicted above. Case study reference have shown that the SAM correctly reflect alignment ideas and thoughts that are used in contemporary business. More so, the SAM was empirically tested for the relationship between the overall performance of an organisation and the level or maturity of strategic alignment and found to be statistically positive in that alignment of the four dominant domains of the SAM and the cross-domain alignment, impact a company's performance positively (Gerow et al, 2015). Put differently, the crucial message in the SAM is that to improve an organisations performance management must ensure that the organisations business strategy and IT strategy must be sufficiently aligned.

SAM is comprised of four central domains. They are IT and business strategy, and organisational and IS infrastructure and processes. Further, the model describes six alignment types which represents the constructs of the model.

Construct 1: Business Alignment

Business alignment refers to the extent that the core business processes and infrastructure support the business strategy which is externally focused on the market in which the organisation competes in. This alignment is necessary from the strategic execution perspective. That is, the organisational design choices are constrained and driven by the business strategy which determines the choices for the business infrastructure and processes. The level or degree of business alignment is assessed by the extent that the internal business processes support the business strategy (Gerow et al, 2015).

Construct 2: IT Alignment

IT Alignment refers to the extent that the overall IT strategy is underpinned by the supporting IT hardware, software and processes. This is collectively referred to as the IT infrastructure. The irony of IT strategy is that its formulation must be based on the business strategy which it is intended to support, and, in this way, it is constrained. Notwithstanding the constraint, IT alignment is necessary from the technology transformative perspective. The IT infrastructure designed for the organisation is informed by the IT strategy which is driven by the business strategy. The level or degree of IT alignment is assessed by the extent that the internal IT infrastructure supports the IT strategy (Gerow et al, 2015).

Construct 3: Intellectual Alignment

Intellectual Alignment is the degree to which the IT strategy and the business strategy are aligned to each other. Intellectual alignment is assessed by the extent or maturity of this alignment. From the traditional alignment literature view point, this would mean that the IT strategy is designed in support of a fixed and predefined business strategy. However, looking at it from a perspective that this alignment can create advantageous competitive positioning, intellectual alignment is then concerned with the manner in which the IT capabilities is leveraged that have the potential to impact the creation of new product and services; impacting the business strategy itself ((Henderson & Venkatraman, 1993). This bi-directional link, which is further underlined by other researchers, provides the opportunity for the IT strategy to influence the business strategy (Gerow et al, 2015).

Construct 4: Operational Alignment

Operational Alignment is the alignment that exists between the business and IT infrastructure and between the business and IT processes. It is more about the ability of management to ensure that the business and IT infrastructure and processes are aligned (Gerow et al, 2015). In other words, to integrate the infrastructure and processes of both business and IT.

Construct 5: Alignment between the Business Strategy and IT infrastructure and processes

The alignment between the IT infrastructure and processes and the business strategy, are important since changes in the business strategy will cascade through the IT organisation requiring that the IT infrastructure and processes adapt to support the evolving business strategy. It is all about how the parallelism between the IT infrastructure and process and that of the evolving business strategy (Gerow et al, 2015).

Construct 6: Alignment between the IT Strategy and Business Infrastructure and Processes

Changes in the business infrastructure and processes will require concomitant changes in the IT strategy. It is all about the alignment between the IT strategy and the evolving business strategy manifesting in the changes to the business infrastructure and processes (Gerow et al, 2015).

3.10 Application of the SAM

The researcher used the SAM model, as adapted by (Gerow et al, 2015), to study the state of IT governance by using the constructs described in 3.9. The degree or level of strategic alignment was used as a proxy indicator for the state of IT governance and this is well established in the literature. Studies by (Thompson & James, 1999), (Nfuka & Rusu, 2010), (Sabegh & Motlagh, 2012), (Alborz & Azar, 2013), and (Shelly et al, 2015) support this.

3.11 Statistical Analysis

3.11.1 Descriptive Statistics

In data analysis we have essentially three main objectives which is to get a sense of the data, to test the goodness of the data collected and to test the research hypothesis (Sekaran, 2003). Descriptive analysis, with simple summarised graphical presentation of the data, forms the base of nearly all quantitative data analysis (William, 2006). It is utilised to describe the main features of the data collected and to present them in a summarised fashion using simple graphics. Virtually all descriptive quantitative data analysis is based on the measure of central tendency and dispersion which gives us a feel for the data. The mean is the most popular measure of central tendency. It is used here because the sample mean ($\bar{x}$) can be used to estimate the population mean (μ). The lack of bias in this estimation allows us to use the sample mean to infer the population mean (Tiemann, 2010). Dispersion around the mean or any other measure of central tendency is calculated using either the range or standard deviation (δ), with the latter being the more accurate. Further, the sample standard deviation (S^2) is used to infer the population (δ) standard deviation since S^2 is a non-biased estimator of δ. Researchers make the effort to calculate measures of central tendency such as the mean, standard deviations and variance because they allow us to assess how effect the survey items measure the constructs and also how the participants in the survey perceived the individual items in the survey (Sekaran, 2003). In addition, it also affords us the opportunity to detect bias if we find that respondents tend to respond similarly to all items in the survey instrument. The distribution of the data, which is the summary of individual values, is the initial step into converting data into information. The easiest way to present the data in a meaningful way is in the form of a rudimentary list, called a frequency distribution. It allows you to analyse how frequently each datum occurs in the sample (Susan & Barbara, 2017). It is the base and initial point for virtually all statistical analysis (Geoffrey, David, & David, 2005).It is most often presented in the form of graphs or tables for better articulation. The details of the descriptive statistics related to the data collected is presented in chapter 4, including central tendency and dispersion measures and frequency distributions.

3.11.2 Inferential Statistics

Inferential statistics, as the name suggests, allows us to deduce characteristics of the population based on a subset of the population; without the need to gather data from the entire population (Sekaran, 2003). In this study, the One sample t-test, Wilcoxon test and the Cronbach's alpha were calculated.

3.11.3 One Sample t-test

The t-test is an inferential, parametric, statistic used to determine if there is statistical difference between the population and sample means with the population mean either known or hypothesized (Kent State University, 2018). It tells us that if there are differences, whether these differences are significant and could not have happened by chance. The t-test has a probability (p) associated with it and $p < 0.05$ is the critical value. That is, there is a greater than 95% chance that the data is significant. The t-test was applied to each item of the survey instrument to test for significant agreement or disagreement and that this did not happen randomly or by chance.

3.11.4 Wilcoxon Signed Rank Test

This is a non-parametric statistical test. It is non-parametric equivalent of the t-test. When the population is not normally distributed then the Wilcox Signed Rank Test can be used to compare samples (Amandeep & Robin, 2015). Because the study sample is small, and the data is not always normal, the Wilcoxon signed rank test is employed to verify the results of the t-test. Based on the consistency of the results from the two tests, the t-test results were given because it is easier to interpret and report.

3.11.5 Cronbach's Alpha

The assessment of a data collection instrument is hinged on the concepts of validity and reliability. The extent to which the measuring instrument measures what it is intended to measure falls under the ambit of validity and how consistent it does this is the ambit of reliability (Mohsen & Reg, 2011). Further reliability is not predicated on validity, but the converse holds true in that an instrument can be reliable without the establishment of validity. So, the reliability of an instrument does not rely on its validity and it is possible to use Cronbach's Alpha to measure the reliability of an instrument. It offers a measure of the reliability of an instrument which describes the degree or extent that all the items in an instrument measure the identical construct. Cronbach's alpha is expressed as a number between 0 and 1 and if the items in a test are correlated to each other, the alpha value increases with α

> 0.70 acceptable. That is, when α > 0.70, then all single construct measures are reliable with the single measures formed by calculating the average of the scores for all items in a construct. Given this background, Cronbach's alpha for this study was calculated and the results are presented in chapter 4.

3.12 Conclusion

This chapter described the manner in which the study will be conducted. In particular the study was conducted subscribing to the quantitative research methodology with a sample size of 40 to be chosen from a population size of 44 representing all the Nedbank branches in the eThekwini municipality region of KwaZulu-Natal. Random sampling was used with the names of the Nedbank branches to constitute the sample drawn randomly from the names of all the Nedbank branches in eThekwini which was be placed in a hat. A self-administered questionnaire was used to collect the data, which consisted of a collection of pre-planned questions that was self-administered. The model that was used to underpin the study is the SAM model as adapted by (Gerow et al, 2015) and the data was analysed using both descriptive and inferential statistics. Measures of central tendency was calculated to gauge the responses to the items in the questionnaire and how effective they are in relation to the constructs. To test that chance did not play a part in statistical significance related to either the agreement or disagreement to the items in the questionnaire, the One Sample t-test was used. Due to the sample size being small, the Wilcoxon Signed Rank test was performed, and the results compared. This was done to confirm the results of the One Sample t-test. Finally, to test for the reliability of the survey instrument itself, the Cronbach's Alpha test was performed.

Chapter 4

Data Analysis

4.1 Introduction

In this chapter, the analysis of the data is presented. Data analysis is the interpretation of the data, collected from a representative sample of the population, to answer the research questions (Sekaran, 2003). The target population for this study was all the Nedbank branches located in the eThekwini municipality area of KwaZulu-Natal; with the subjects being the Nedbank branch managers. From a population of 44 branches, actual data was collected from 28 branch managers, with 11 branches closed-down and 5 did not respond; a response rate greater than eighty eight percent (>88%). The population frame employed and published by Nedbank included branches that closed down and it could be argued that this changed the population size. The data was collected through a questionnaire and analysed. The analysis employed a mixture of statistical techniques both inferential and descriptive. The mean and the standard deviation being the primary descriptive statistical measure employed with the results presented in the form of graphs and frequency tables. A One sample t-test in conjunction with a Paired sample t-test was performed. The One sample t-test is used to test if the mean determined from the data collected differs significantly from an expected value; whilst the Paired sample t-test is utilised to test if two means belonging to a single group is compatible. Further, it should be noted that because the sample size in the study is small and the data is not always normal, all results have been checked using the Wilcoxon test – a non-parametric equivalent to the t-test. In all cases the results are consistent across the two methods of analyses. However, the t-tests results are only presented because they are easier to report and interpret. Finally, we calculated Cronbach's alpha which measures reliability and internal consistency of the survey instrument.

4.2 Demographics

The demographic data collected is presented in Figure1, below. The gender disparity is striking, in that 82.1 % are female. 92.9% non-white. While 64.3% are between the ages of 30 to 40 years inclusive. In more recent times, there has been an ongoing discussion about the representation of females in organisations and whether this representation contributes positively to organisational financial performance and/or corporate governance. Research findings have been contradictory in this regard. (Siri, Ruth, & Val, 2009), concludes that there is growing evidence that gender multiplicity contributes to more positive or effective corporate governance. Whilst, a more recent study, (Jan, Romina, Karina, & Sven, 2015), concludes that

a larger representation of females does not matter when it comes to organisational performance. Gender representation, especially female representation, and the impact on organisational performance and/or corporate governance, is outside the scope of this study. The stark gender disparity among the branch managers at Nedbank in the eThekwini region, however, it is worth noting and consequently the above commentary.
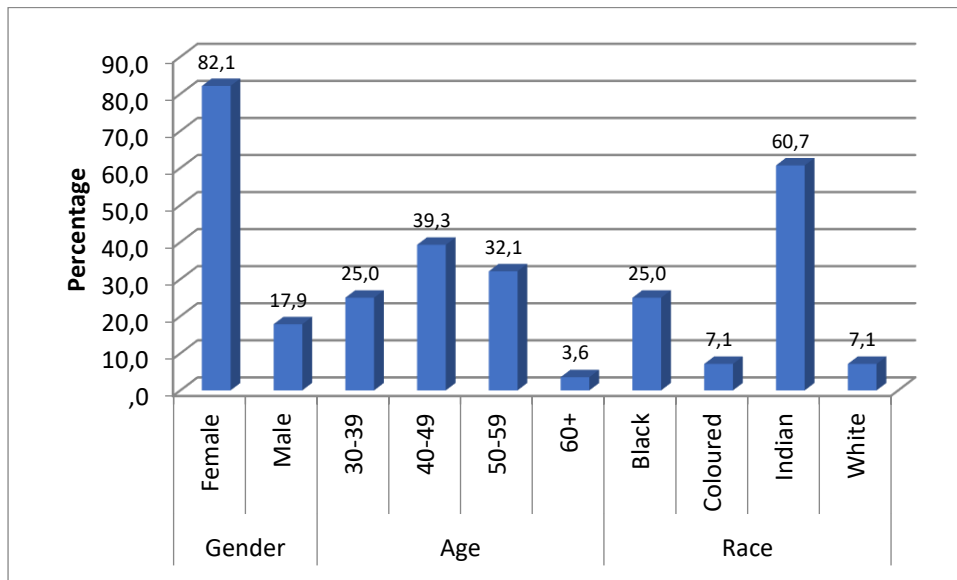
Figure 3: Demographics of Nedbank Branch Managers in the eThekwini Municipality Region

4.3 The alignment between the business focused strategies and the IT Strategies.

The objective in this section of the survey instrument was to understand to what extent does the business strategy and the IT strategy align with each other. Results from the analysis indicate that Nedbank branch managers in the eThekwini region believe there is significant alignment between the business focused strategies and the IT strategies. Q 4.1 to Q 4.6 was designed to assess this. 78.6 % either agree or strongly agree that the IT strategies support the business strategies and that the IT strategies and business focused strategies are aligned. Further, 63.5% either agree or strongly agree that IT strategies are adapted to business strategic change and aligned with the business's strategic plan. In addition, 75 %, either agree or strongly agree that the strategic importance of emerging technologies is assessed, with 82.2 % either agree or strongly agree that IT goals and objectives are adapted to the business goals and objectives. Table 1 – 6 and Figure 4 is provided here for a comprehensive reading of the results and for completeness. The one-sample t-test was also applied to test for significant agreement/disagreement to each of the questions. There is significant agreement that: IT

strategies support business strategies (M=4.00, t(27)=4.861, p=<.0005; IT Strategies align to business strategies (M=3.86, t(27)=4.500, p=<.0005); IT Strategies adapted to business strategic change (M=3.63, t(26)=3.703, p=<.0005); IT Strategies align with business's strategic plan (M=3.75, t(27)=3.813, p=<.0005); Strategic importance of emerging technologies is assessed (M=3.93, t(27)=4.837, p=<.0005); The business goals and objectives are adapted to the IT goals and objectives (M=3.96, t(27)=5.306, p=<.0005).
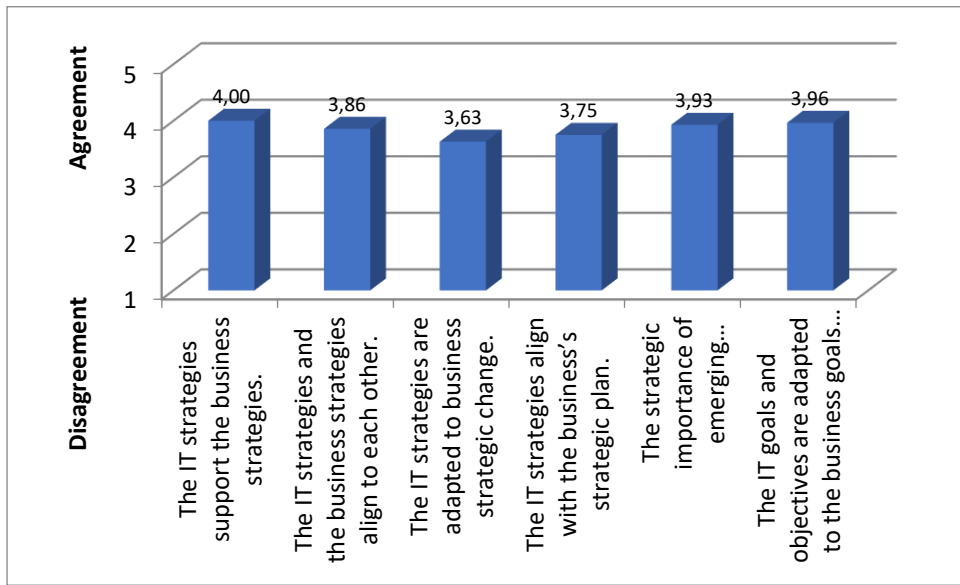
Figure 4 Q (4.1)-Q (4.6) Agreement / Disagreement; p=<.0005

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	17.9	17.9	17.9
	Neutral	1	3.6	3.6	21.4
	Agree	11	39.3	39.3	60.7
	Strongly agree	11	39.3	39.3	100.0
	Total	28	100.0	100.0	

Table 1 (Q 4.1) IT Strategies Support the Business Strategies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	17.9	17.9	17.9
	Neutral	1	3.6	3.6	21.4
	Agree	15	53.6	53.6	75.0
	Strongly agree	7	25.0	25.0	100.0
	Total	28	100.0	100.0	

Table 2 (Q 4.2) IT Strategies and the Business Strategies Align to each other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	3	10.7	11.1	11.1
	Neutral	8	28.6	29.6	40.7
	Agree	12	42.9	44.4	85.2
	Strongly agree	4	14.3	14.8	100.0
	Total	27	96.4	100.0	
Missing	System	1	3.6		
Total		28	100.0		

Table 3 (Q 4.3) IT Strategies are adapted to business strategic change

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	17.9	17.9	17.9
	Neutral	4	14.3	14.3	32.1
	Agree	12	42.9	42.9	75.0
	Strongly agree	7	25.0	25.0	100.0
	Total	28	100.0	100.0	

Table 4 (Q 4.4) IT Strategies align with the business strategic plan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	14.3	14.3	14.3
	Neutral	3	10.7	10.7	25.0
	Agree	12	42.9	42.9	67.9
	Strongly agree	9	32.1	32.1	100.0
	Total	28	100.0	100.0	

Table 5 (Q 4.5) Strategic importance of emerging technologies is assessed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	14.3	14.3	14.3
	Neutral	1	3.6	3.6	17.9
	Agree	15	53.6	53.6	71.4
	Strongly agree	8	28.6	28.6	100.0
	Total	28	100.0	100.0	

Table 6 (Q 4.6) IT goals and objectives evolve to meet the business goals and objectives.

4.4 The alignment between the business and IT processes.

The objective with this section of the survey instrument was to understand to what extent does the business processes and the IT processes align with each other. Results from the analysis indicate that Nedbank branch managers in the eThekwini region believe there is significant alignment between the business processes and IT processes. Q 5.1 to Q 5.5 were designed to assess this. 78.6% either agree or strongly agree that the IT processes support the business processes and that 71.5% agree or strongly agree that the IT processes are adaptable to the business processes. 67.8% agree or strongly agree that the business processes and IT processes are aligned and that there is a fit between the IT infrastructure and the business infrastructure. Further, 64.3% agree or strongly agree that the business infrastructure and IT infrastructure are aligned.

The one-sample t-test was also applied to test for significant agreement/disagreement to each of the questions. There is significant agreement that: The IT processes support the business processes M(3.75), t(27)=3.950, p=<.0005; The IT processes are adjusted/adapted to the business processes M(3.71), t(27)=3.873, p=<.0005; The business processes and IT processes are aligned M(3.57), t(27)=3.151, p=<.0005; The fit between the IT infrastructure and the business infrastructure is identified M(3.71), t(27)=3.731, p=<.0005; The business infrastructure and IT infrastructure are aligned M(3.57), t(27)=3.032, p=<.0005.
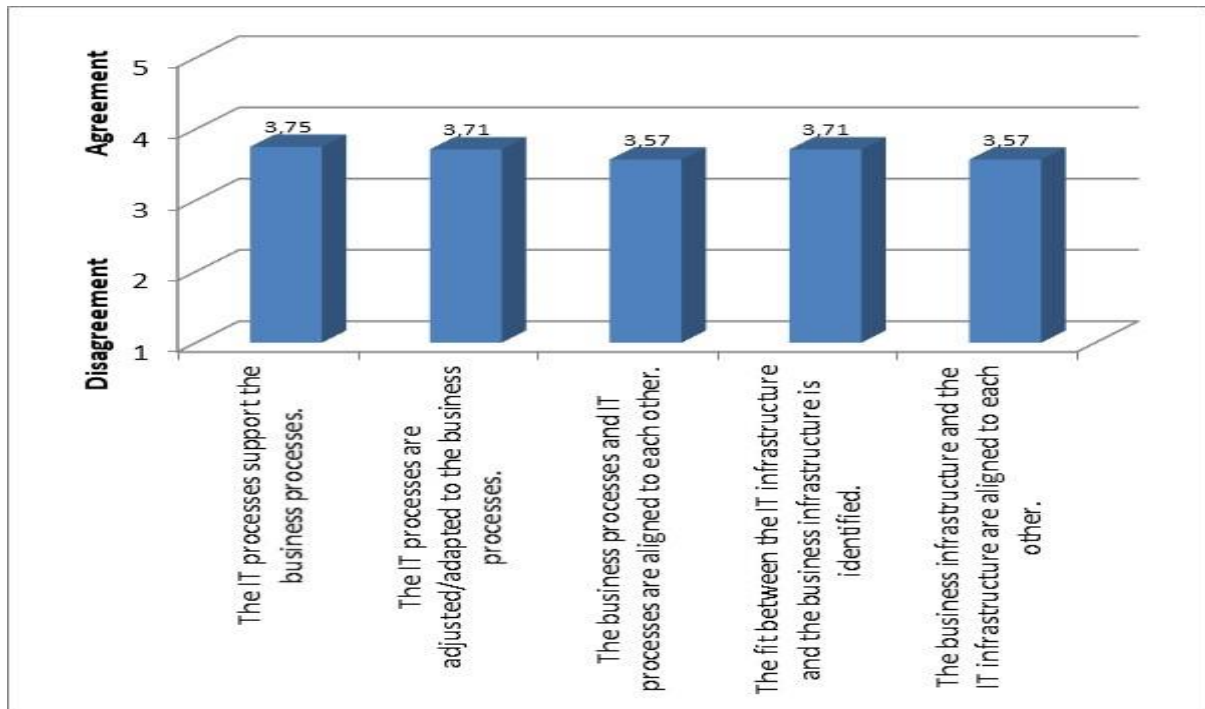
Figure 5 Q (5.1)-Q (5.5) Agreement / Disagreement; p=<.0005

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	21.4	21.4	21.4
	Agree	17	60.7	60.7	82.1
	Strongly agree	5	17.9	17.9	100.0
	Total	28	100.0	100.0	

Table 7 Q (5.1) The IT processes support the business processes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	17.9	17.9	17.9
	Neutral	3	10.7	10.7	28.6
	Agree	15	53.6	53.6	82.1
	Strongly agree	5	17.9	17.9	100.0
	Total	28	100.0	100.0	

Table 8 Q(5.2) The IT processes are adjusted/adapted to the business processes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	21.4	21.4	21.4
	Neutral	3	10.7	10.7	32.1
	Agree	16	57.1	57.1	89.3
	Strongly agree	3	10.7	10.7	100.0
	Total	28	100.0	100.0	

Table 9 Q(5.3) The business processes and IT processes are aligned to each other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	17.9	17.9	17.9
	Neutral	4	14.3	14.3	32.1
	Agree	13	46.4	46.4	78.6
	Strongly agree	6	21.4	21.4	100.0
	Total	28	100.0	100.0	

Table 10 Q(5.4) The fit between the IT infrastructure and the business infrastructure is identified

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	21.4	21.4	21.4
	Neutral	4	14.3	14.3	35.7
	Agree	14	50.0	50.0	85.7
	Strongly agree	4	14.3	14.3	100.0
	Total	28	100.0	100.0	

Table 11 Q(5.5) The business infrastructure and the IT infrastructure are aligned to each other

4.5 The alignment between the IT processes and the strategy of the business.

The objective with this section of the survey instrument was to understand to what degree does the IT processes align themselves to the business strategy. Results from the analysis indicate that Nedbank branch managers in the eThekwini region believe there is significant alignment between the business strategies and IT processes. Q 6.1 to Q 6.5 were designed to assess this. 78.5% either agree or strongly agree that the IT processes support the business strategies and that the internal IT processes are adjusted/adapted to the business strategies. 75% either agree or strongly agree that the internal IT processes and the business strategies are aligned to each other. 64.3% either agree or strongly agree that the fit between the business-related strategic opportunities and the IT infrastructure is identified. 71.4% either agree or strongly agree that the IT infrastructure aligns with the business strategies. The one-sample t-test was also applied to test for significant agreement/disagreement to each of the questions. There is significant agreement that: The IT processes support the business strategies M(3.75), t(27)=3.950, p=<.0005; The internal IT processes are adjusted/adapted to the business strategies M(3.82), t(27)=4.420, p=<.0005; The internal IT processes and the business strategies are aligned to each other M(3.75), t(27)=4.473, p=<.0005; The fit between the business-related strategic opportunities and the IT infrastructure is identified M(3.68), t(27)=3.800, p=<.0005; The IT infrastructure aligns with the business strategies M(3.61), t(27)=3.360, p=<.0005.
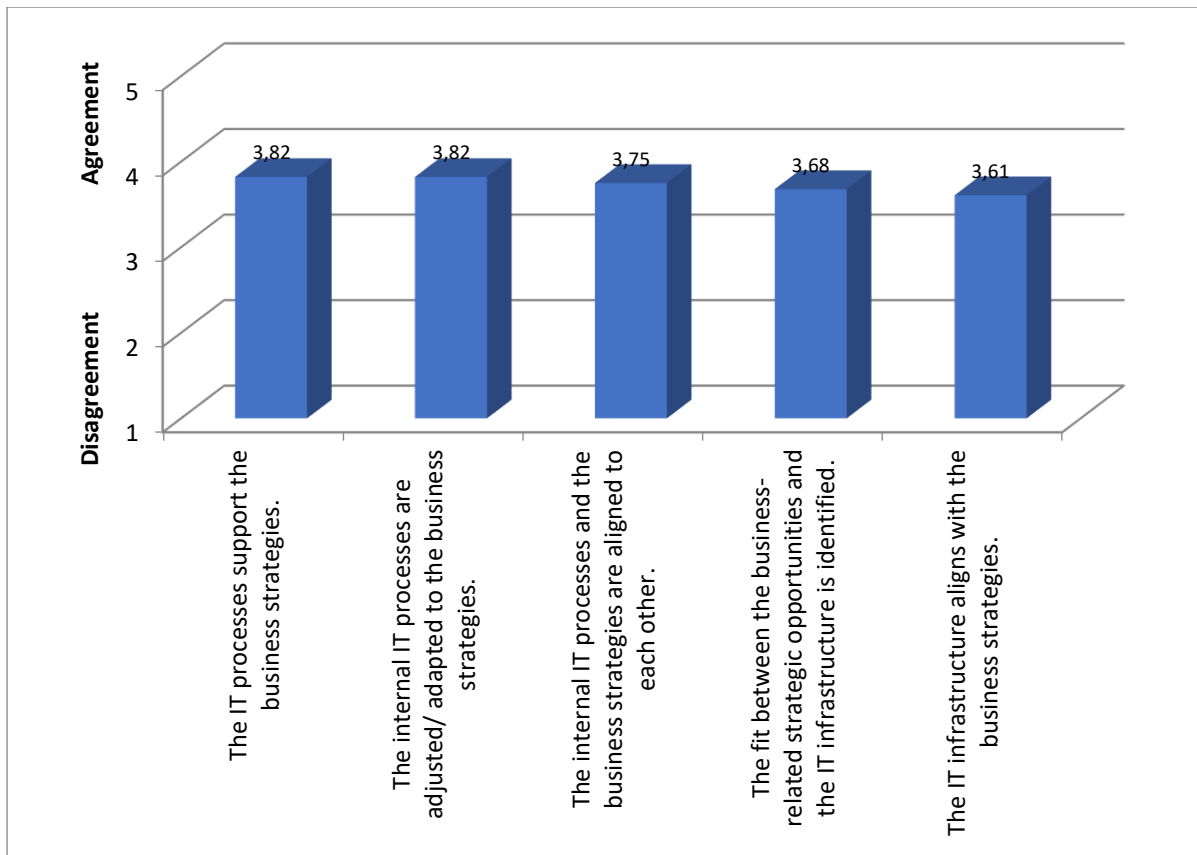
Figure 6 Q (6.1)-Q (6.5) Agreement / Disagreement; p=<.0005

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	17.9	17.9	17.9
	Neutral	1	3.6	3.6	21.4
	Agree	16	57.1	57.1	78.6
	Strongly agree	6	21.4	21.4	100.0
	Total	28	100.0	100.0	

Table 12 Q(6.1) The IT processes support the business strategies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	17.9	17.9	17.9
	Neutral	1	3.6	3.6	21.4
	Agree	16	57.1	57.1	78.6
	Strongly agree	6	21.4	21.4	100.0
	Total	28	100.0	100.0	

Table 13 Q(6.2) The internal IT processes are adjusted/adapted to the business strategies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	14.3	14.3	14.3
	Neutral	3	10.7	10.7	25.0
	Agree	17	60.7	60.7	85.7
	Strongly agree	4	14.3	14.3	100.0
	Total	28	100.0	100.0	

Table 14 Q (6.3) The internal IT processes and the business strategies are aligned to each other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	14.3	14.3	14.3
	Neutral	6	21.4	21.4	35.7
	Agree	13	46.4	46.4	82.1
	Strongly agree	5	17.9	17.9	100.0
	Total	28	100.0	100.0	

Table 15 Q (6.4) The fit between the business-related strategic opportunities and the IT infrastructure is identified

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	21.4	21.4	21.4
	Neutral	2	7.1	7.1	28.6
	Agree	17	60.7	60.7	89.3
	Strongly agree	3	10.7	10.7	100.0
	Total	28	100.0	100.0	

Table 16 Q (6.5) The IT infrastructure aligns with the business strategies

4.6 The alignment between the IT strategy and the business processes.

The objective with this section of the survey instrument was to understand to what extent is there alignment between the IT strategy and business processes. Results from the analysis indicate that Nedbank branch managers in the eThekwini region believe there is significant alignment. Q 7.1 to Q 7.5 was designed to assess this. 75% either agree or strongly agree that the IT strategies support the business processes, whilst 71.4% agree or strongly that the IT strategies are adapted/adjusted to the internal business processes. Further, 57.1 % agree or strongly agree that the externally focused IT strategies and internal business processes are aligned to each other. In addition, 64.3% agree or strongly agree that the fit between IT-related strategic opportunities and business infrastructure is identified, with 57.2% either agreeing or strongly agreeing that the business infrastructure aligns with the externally focused IT strategies. The one-sample t-test was also applied to test for significant agreement/disagreement to each of the questions. There is significant agreement that: The IT strategies support the business processes M(3.82), t(27)=4.260, p=<.0005; The IT strategies are adapted/adjusted to the internal business processes M(3.79), t(27)=4.032, p=<.0005; The externally focused IT strategies and internal business processes are aligned with each other M(3.57), t(27)=2.828, p=<.0005; The fit between IT-related strategic opportunities and the business infrastructure is identified M(3.64), t(27)=3.438, p=<.0005; The business infrastructure aligns with the externally focused IT strategies M(3.57), t(27)=3.032, p=<.0005.
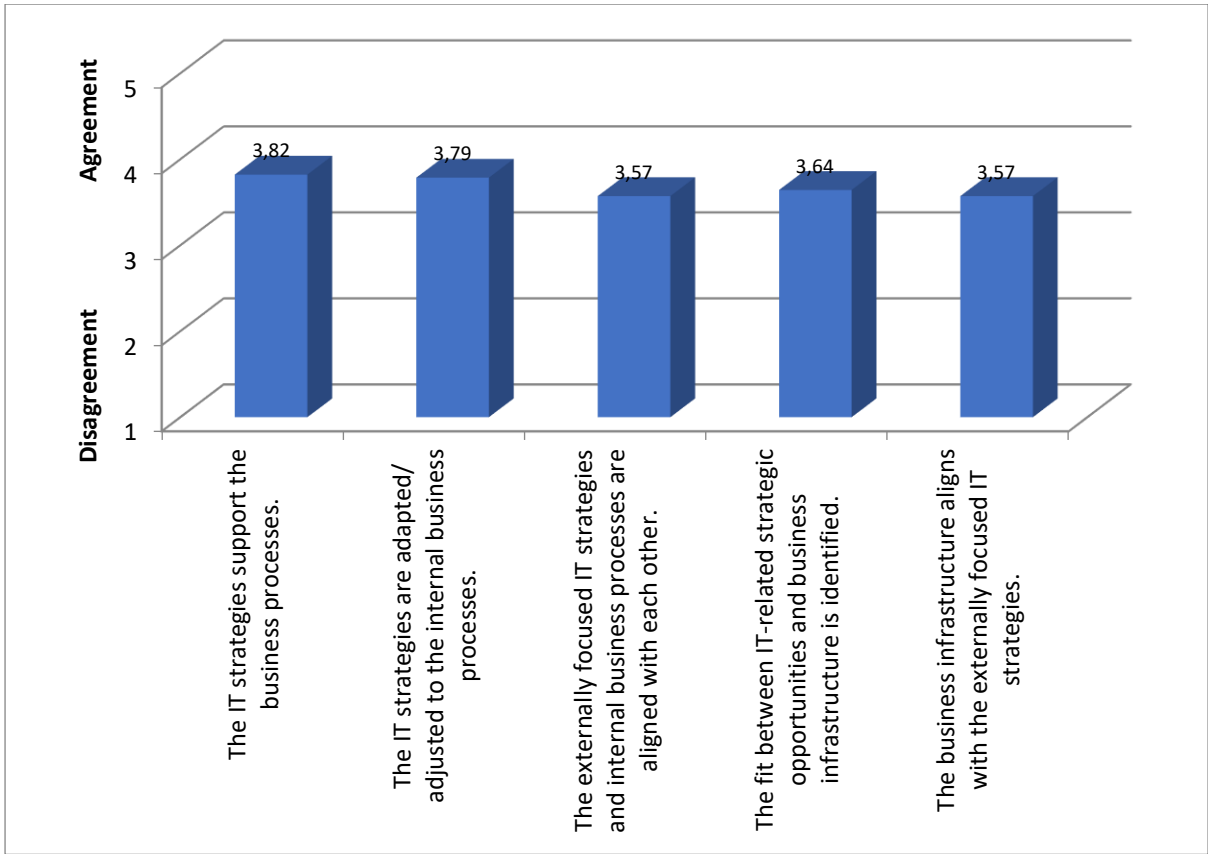
Figure 7 Q(7.1)-Q (7.5) Agreement / Disagreement ; p<=.0005

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	17.9	17.9	17.9
	Neutral	2	7.1	7.1	25.0
	Agree	14	50.0	50.0	75.0
	Strongly agree	7	25.0	25.0	100.0
	Total	28	100.0	100.0	

Table 17 Q(7.1) The IT strategies support the business processes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	17.9	17.9	17.9
	Neutral	3	10.7	10.7	28.6
	Agree	13	46.4	46.4	75.0
	Strongly agree	7	25.0	25.0	100.0
	Total	28	100.0	100.0	

Table 18 Q(7.2) The IT strategies are adapted/adjusted to the internal business processes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	21.4	21.4	21.4
	Neutral	6	21.4	21.4	42.9
	Agree	10	35.7	35.7	78.6
	Strongly agree	6	21.4	21.4	100.0
	Total	28	100.0	100.0	

Table 19 Q(7.3) The externally focused IT strategies and internal business processes are aligned with each other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	17.9	17.9	17.9
	Neutral	5	17.9	17.9	35.7
	Agree	13	46.4	46.4	82.1
	Strongly agree	5	17.9	17.9	100.0
	Total	28	100.0	100.0	

Table 20 Q(7.4) The fit between the IT-related strategic opportunities and the business infrastructure is identified

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	17.9	17.9	17.9
	Neutral	7	25.0	25.0	42.9
	Agree	11	39.3	39.3	82.1
	Strongly agree	5	17.9	17.9	100.0
	Total	28	100.0	100.0	

Table 21 Q(7.5) The business infrastructure aligns with the externally focused IT strategies

4.7 The alignment between IT processes and the IT strategy

The objective with this section of the survey instrument was to understand to what extent is there alignment between the IT processes and the IT strategy. Results from the analysis indicate that Nedbank branch managers in the eThekwini region believe there is significant alignment between the IT processes and the IT strategy. Q 8.1 to Q 8.5 was designed to assess this. 60.7% either agree or strongly agree that the IT processes support the IT strategies and that the IT strategies are aligned with the IT processes. 67,8 % either agree or strongly agree that the internal IT strategies are adapted/adjusted to the internal IT processes. 60.7% and 64.3 % either agree or strongly agree that the fit between the IT-related strategic opportunities and the IT infrastructure is identified and that the IT infrastructure aligns with the IT strategy, respectively. The one-sample t-test was also applied to test for significant agreement/disagreement to each of the questions. There is significant agreement that: The IT

processes support the IT strategies M(3.64), t(27)=3.104, p=<.0005; The IT strategies are adapted/adjusted to the internal IT processes M(3.71), t(27)=3.731, p=<.0005; The IT strategies are aligned with the IT processes M(3.61), t(27)=2.835, p=<.0005; The fit between the IT-related strategic opportunities and its IT infrastructure is identified M(3.68), t(27)=3.652, p=<.0005; The IT infrastructure aligns with the IT strategy M(3.68), t(27)=3.293, p=<.0005.
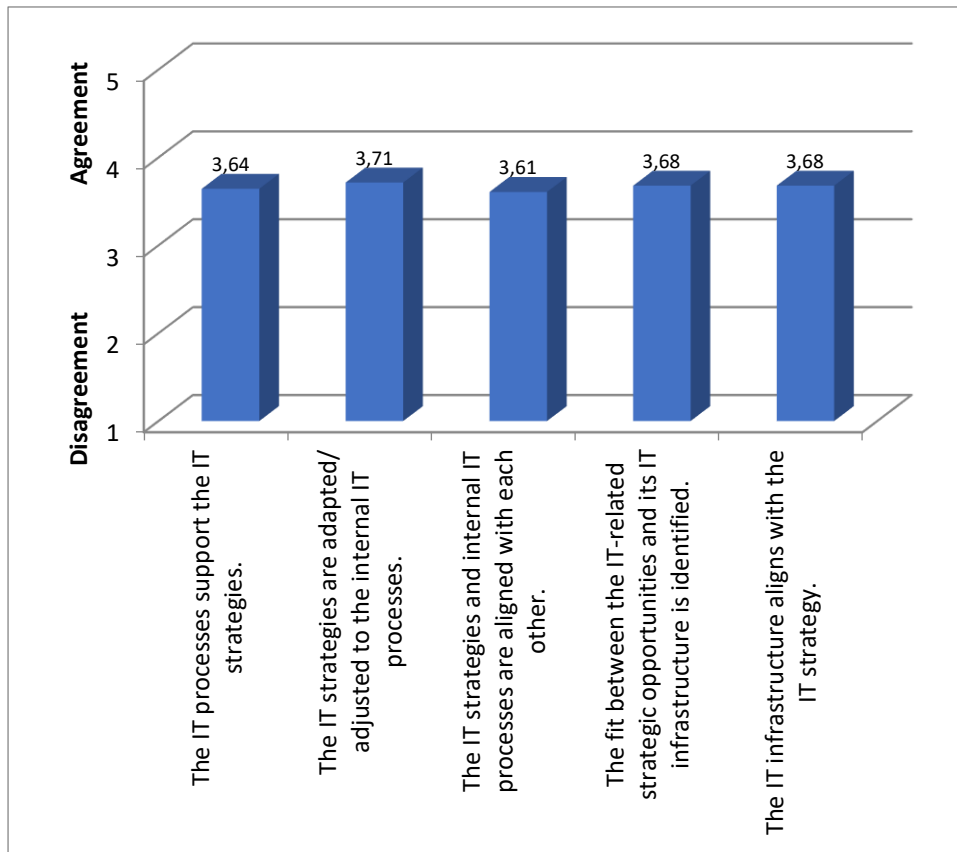
Figure 8 Q(8.1)-Q(8.5) Agreement / Disagreement ; p=<.0005

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	21.4	21.4	21.4
	Neutral	5	17.9	17.9	39.3
	Agree	10	35.7	35.7	75.0
	Strongly agree	7	25.0	25.0	100.0
	Total	28	100.0	100.0	

Table 22 Q(8.1) The IT processes support the IT strategies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	17.9	17.9	17.9
	Neutral	4	14.3	14.3	32.1
	Agree	13	46.4	46.4	78.6
	Strongly agree	6	21.4	21.4	100.0
	Total	28	100.0	100.0	

Table 23 Q(8.2) The IT strategies are adapted/adjusted to the internal IT processes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	7	25.0	25.0	25.0
	Neutral	4	14.3	14.3	39.3
	Agree	10	35.7	35.7	75.0
	Strongly agree	7	25.0	25.0	100.0
	Total	28	100.0	100.0	

Table 24 Q(8.3) The IT strategies and internal IT processes are aligned to each other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	14.3	14.3	14.3
	Neutral	7	25.0	25.0	39.3
	Agree	11	39.3	39.3	78.6
	Strongly agree	6	21.4	21.4	100.0
	Total	28	100.0	100.0	

Table 25 Q(8.4) The fit between the IT-related strategic opportunities and its IT infrastructure is identified

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	21.4	21.4	21.4
	Neutral	4	14.3	14.3	35.7
	Agree	11	39.3	39.3	75.0
	Strongly agree	7	25.0	25.0	100.0
	Total	28	100.0	100.0	

Table 26 Q(8.5) The IT infrastructure aligns with the IT strategy

4.8 The alignment between business strategy and the business infrastructure

The objective with this section of the survey instrument was to understand to what extent is there alignment between business infrastructure and processes and the business strategy. Results from the analysis indicate that Nedbank branch managers in the eThekwini region believe there is significant alignment between the business strategy and the business infrastructure. 85.7% either agree or strongly agree that the business processes support the business strategy. 84.7% either agree or strongly agree that the business strategies are adapted/adjusted to the internal business processes and 82.2% either agree or strongly agree that they are aligned to each other. 75% agree or strongly agree that the fit between the business-related strategic opportunities and the business infrastructure is identified and that the business infrastructure aligns with the business strategies. The one-sample t-test was also applied to test for significant agreement/disagreement to each of the questions. There is significant agreement that: The business processes support the business strategies M(4.07, t(27)=5.793, p=<.0005; The business strategies are adapted/adjusted to the internal business

processes M(4.04), t(27)=5.700, p=<.0005; Business strategies and the internal business processes are aligned to each other M(3.96), t(27)=5.306, p=<.0005; The fit between the business related strategic opportunities and the business infrastructure is identified M(3.86), t(27)=4.674, p=<.0005; The business infrastructure aligns with the business strategies M(3.89), t(27)=4.753, p=<.0005.
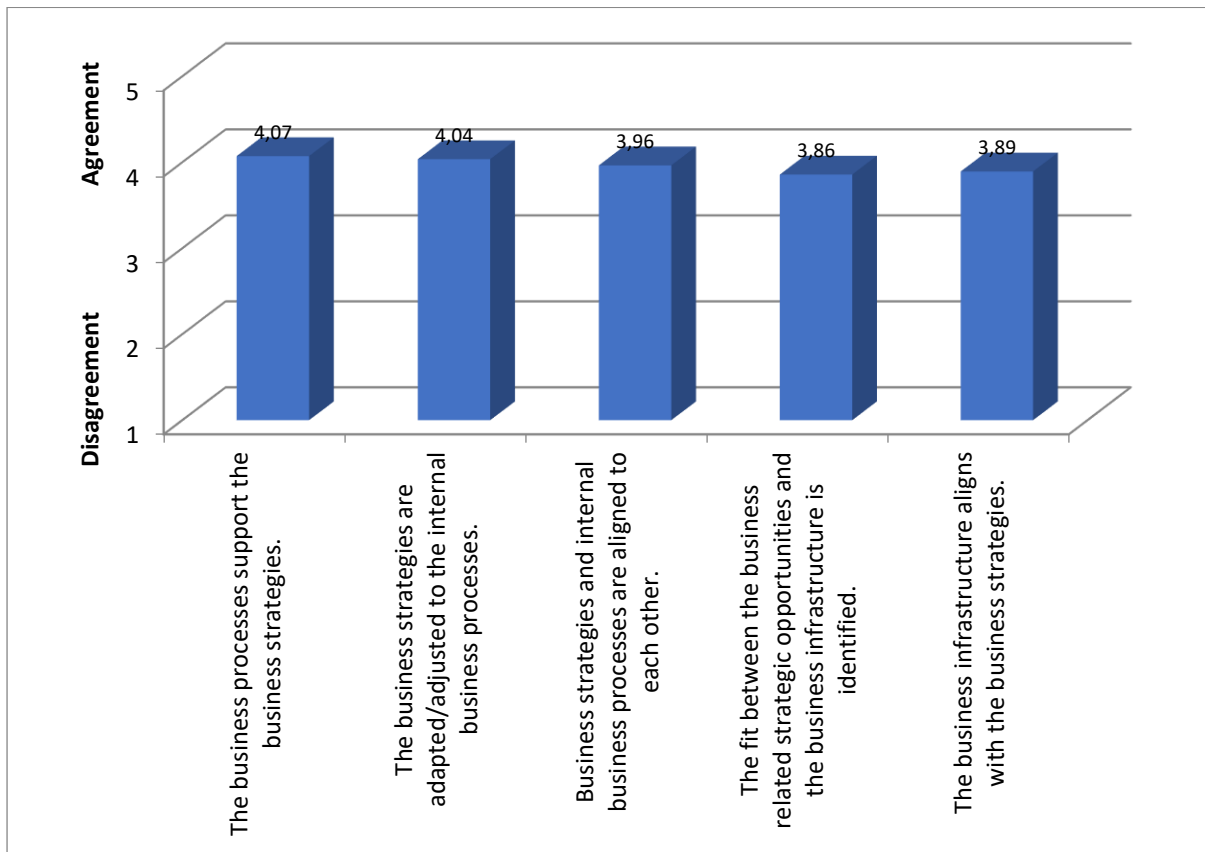
Figure 9 Q(9.1)-Q(9.5) Agreement / Disagreement ; p<=.0005

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	14.3	14.3	14.3
	Agree	14	50.0	50.0	64.3
	Strongly agree	10	35.7	35.7	100.0
	Total	28	100.0	100.0	

Table 27 Q(9.1) The business processes support the business strategy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	14.3	14.3	14.3
	Agree	15	53.6	53.6	67.9
	Strongly agree	9	32.1	32.1	100.0
	Total	28	100.0	100.0	

Table 28 Q (9.2) The business strategies are adapted/adjusted to the internal business processes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	14.3	14.3	14.3
	Neutral	1	3.6	3.6	17.9
	Agree	15	53.6	53.6	71.4
	Strongly agree	8	28.6	28.6	100.0
	Total	28	100.0	100.0	

Table 29 Q (9.3) The business strategies and the internal business processes are aligned to each other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	14.3	14.3	14.3
	Neutral	3	10.7	10.7	25.0
	Agree	14	50.0	50.0	75.0
	Strongly agree	7	25.0	25.0	100.0
	Total	28	100.0	100.0	

Table 30 Q (9.4) The fit between the business related strategic opportunities and the business infrastructure is identified

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	4	14.3	14.3	14.3
	Neutral	3	10.7	10.7	25.0
	Agree	13	46.4	46.4	71.4
	Strongly agree	8	28.6	28.6	100.0
	Total	28	100.0	100.0	

Table 31 Q (9.5) The business infrastructure aligns with the business strategies

4.9 Reliability and Consistency

Reliability is measured using Cronbach's alpha; that is Cronbach's alpha is used to test whether the combined items is reliable in measuring the underlying construct. For a reliable measure, Cronbach's coefficient alpha > 0.7. The reliability statistics is summarised in the table 32, below.

Construct	Items	Alpha
BS-ITS	4.1 – 4.6	.948
BP-ITP	5.1 – 5.5	.944
BS-ITP	6.1-6.5	.942
BP-ITS	7.1-7.5	.944
ITP-ITS	8.1-8.5	.965
BP-BS	9.1-9.5	.963

Table 32 Cronbach Alpha for Construct and Item Reliability

From the alpha values in table 32, we can conclude that all single construct measures are reliable, and that the internal consistency of the questionnaire can be relied upon.

4.10 Conclusion

The purpose of this chapter is to present the analysis of the data. Both inferential and descriptive statistics was used. The One Sample t-test was employed to test for significant agreement or disagreement. Significant agreement on all individual items of the survey instrument was noted. In particular, we found that there is significant agreement that the IT strategies support the business strategies, that both the IT and business strategies align to each and that the IT strategies can adapt to accommodate business strategic change. Because the sample size was small and the data not all ways normal, the results was checked using the Wilcoxon test. In all cases the results are consistent across the two methods. Further, from the Cronbach alpha test we concluded that all single construct measures are reliable, and that the internal consistency of the questionnaire can be relied upon.

Chapter 5

Interpretation of the results and recommendations

5.1 Introduction

In this chapter the results of the data analysis are discussed making use of the research questions as the focal point. It should be noted that the aim of the study was to investigate the current state of IT governance in the South African banking sector - with particular reference to the Nedbank branch network at eThekwini, a municipality in KwaZulu-Natal. To achieve this, the researcher attempted to study the current state of strategic alignment in the banking sector with particular reference to the Nedbank branch network in eThekwini and use this as a proxy for the current state of IT governance. This approach, that is the use of the state or maturity of strategic alignment as a proxy for the state or maturity of IT governance, is well established in the literature and is relied upon in this study. The four (4) research questions, through which the data analysis conducted in chapter 4 will be discussed, is listed below:

1. Is there alignment between the business focused strategies and the IT strategy?
2. Are the business processes and the IT processes aligned?
3. Is there alignment between the IT processes and the IT strategy?
4. Do the business strategy and the business infrastructure align with each other?

This chapter also presents the overall findings and recommendations.

5.2 Discussion and Findings

5.2.1 Is there alignment between the IT strategy and business focused strategies?

The data analysis reflects a significant agreement amongst the respondents that there is significant alignment between the business and IT strategies. This alignment is accentuated by the data in that there is significant agreement amongst the respondents that the IT and business strategies are supportive of one another and that although the IT strategy is constrained by the business strategy, it is able to adapt to change in support of the changes in the business strategy. What is perhaps more significant, and that which was exposed during the data analysis, is that not only is there significant agreement amongst the respondents that there is alignment between both the IT and business strategy but that this alignment is not static and straight jacketed but able to evolve in a fluid manner whenever the dynamics of the business environment necessitate a change in the business strategy. This is supported by more than 73% of the

respondents that either agree or strongly agree. The model used in the study suggest that for significant strategic alignment to exist there must be concomitant alignment between the strategies of the business and that of the internal IT organisation's strategy. In addition, there must be also be alignment between the IT strategy and the internal IT organisations infrastructure and processes. This is not withstanding the alignment that must exist between business infrastructure and processes with the business strategy. There must also be cross domain alignment; that is the alignment between the IT and business infrastructure and processes. According to the model this is suggestive of a high degree of strategic alignment maturity and in turn would suggest a high degree of IT governance maturity given that the correlation between a high degree of strategic alignment and the maturity of IT governance is well established in the literature.

5.2.2 Are the business processes and IT processes aligned?

70% of the respondents are in agreement that there is significant alignment between the IT and business processes; that is, they either agree or strongly agree with this. The alignment and integration of the business and IT processes is really the adhesive that makes the strategic alignment more tangible rather than illusionary. This once again demonstrates robust and real strategic alignment which is tangibly underpinned by the aligned business and IT processes and consequently a very mature IT governance regime.

5.2.3 Is there alignment between the IT processes and IT strategy?

It is an exercise is futility to craft an IT strategy but not have the necessary processes aligned to the strategy to implement and support it. This lack of IT processes in support of the IT strategy will render the alignment between the business and IT strategy aspirational at best. It is axiomatic that a well aligned IT strategy with its IT processes will support the alignment between the IT and business strategy and this is evident from the respondents in that > 60% of them either agree or strongly agree that there is alignment between the IT strategy and processes. This is once again an indicator of the maturity of strategic alignment and concomitantly an indicator of the maturity of IT governance.

5.2.4 Do the business strategy and the business infrastructure align with each other?

Crafting a business strategy and not having the business infrastructure in place to implement and support the strategy is tantamount to hitching a horse to a cart with no wheels; it will get you nowhere. So, it is essential that the business infrastructure is in place to give impetus to

the business strategy. 80.72% of the respondents either agreed or strongly agreed that the business strategy and the business infrastructure is aligned. That is the business infrastructure is in place to support the business strategy. The SAM model emphasizes that for strong and mature strategic alignment to occur there must be alignment across all the alignment types. That is the organisations business strategy be aligned to the IT strategy and the IT hardware, software, human resources, and processes. At the same time the IT strategy must be aligned to the business strategy and the business processes and infrastructure. The responses from the respondents suggest a high level of alignment between the business strategy and business infrastructure and consequently the confidence of the respondents is indicative of the maturity or level strategic alignment and consequently the maturity of the governance regime. It should also be noted that from the analysis using the Friedman's test which should that there is a significant difference in mean agreement of the alignment types: there is significantly more agreement that the business strategy and the business processes are aligned. Whilst there is this difference, it should be noted that there is significant agreement that all are aligned.

5.2.5 Cross domain alignment?

Although we did not formulate any research questions related to cross domain alignment, that is the alignment between the overall business vision, mission, goals, objectives and tactics (business strategy) and the IT organisational landscape including all hardware, software and processes (IT infrastructure and processes); and the alignment between the internal IT organisations vision, mission, goals, objectives and tactics (IT strategy) and the business strategy, we collected data on these alignment types as well. Both descriptive and statistical analysis was applied to the data collected with respondents indicting that there is significant alignment between the cross-domain alignment types.

5.3 Overall Findings

It was found from the data analysis that the respondents agreed or strongly agreed that there is significant alignment across all the alignment types. That is, the Nedbank branch managers in the eThekwini region of KwaZulu-Natal believe that there is significant strategic alignment within Nedbank and consequently a high degree or maturity of IT governance.

(Gomes, 2007) found that the state of governance in South Africa was less than optimal relating to IT governance; but found it encouraging that South African organisations have acknowledged this and committed to addressing this. Looking at it from a project management perspective, (Marnewick & Labuschagne, 2010) found that most South African organisations

have corporate governance in place but they do not comply with IT and IT project governance. This study included a broad spectrum of South African organisations, with some interviewees coming from South African banks. However, the research on IT governance, particularly, in the South African banking sector is sparse. Due to this lack of research, in particular on the state of IT governance at South African banks, it is difficult to discuss the finds in this study with other studies.

5.4 Limitations

This study was limited to the eThekwini region of KwaZulu-Natal.

5.5 Recommendations

It is recommended that a larger study be conducted to include branches from all the provinces in South Africa and compare the results. Further, the disparity in the gender of the branch managers was noted and it would be interesting to study whether this disparity contributed to the results and is recommended also for future research.

5.6 Conclusion

The aim of this study was to investigate the state of IT governance in the South African banking sector - with particular reference to the Nedbank branch network at eThekwini, a municipality in KwaZulu-Natal. In this regard, the analysis of the data distilled through the research questions support the conclusion that there is alignment between the business and IT strategy, between the business and IT processes, between the business strategy and the business infrastructure and between the IT strategy and the IT processes. In other words, there is significant alignment across all alignment types. By using the level or maturity of strategic alignment as a proxy indicator for IT governance, we conclude that there is a high level of IT governance maturity.

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Addendum A – Research Instrument

UNIVERSITY OF KWAZULU-NATAL

School of Management, Information Technology & Governance,

Discipline of Information Systems and Technology

M Com Research Project

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Supervisor: Karunagaran Naidoo

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Mobile: 083 799 1746

Research Office: Ms. M Snyman (031) 260 8350

Dear Respondent,

I am a Masters in Commerce student in the School of Information Systems & Technology, at the University of KwaZulu-Natal. You are invited to participate in a research project entitled "To investigate the state of IT governance in the South African Banking sector-with particular reference to the Nedbank Branch Network in eThekwini".

The aim of the study is to assess the current state or level of IT governance in the South African banking sector with reference to the bank branch network in eThekwini, KwaZulu Natal. The banking sector has reached a point in which IT is no longer just an enabler, it is the key strategic constituent of the business process itself with banks now fully dependent on IT. This dependence comes with significant risk that needs to be managed and governance is a key component in this risk management and this demonstrates the need to understand the state of IT governance in the South African banking sector.

The results of this survey are intended to contribute to the broader understanding of the current state of IT governance in the South African banking sector and present senior and executive management an "as-is" picture of the current state governance which can be used in their IT governance endeavours.

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no financial gain from participating in this project. Confidentiality and anonymity of records identifying you as a participant will be maintained by the School Management, Information Technology & Governance, and UKZN.

If there are any questions or concerns about participating in this study, please contact the researcher or my supervisor via the numbers provided above.

Approximately 20 minutes is required to complete the questionnaire. I hope you will take the time to complete the questionnaire.

Yours faithfully

Researcher's Signature: _____   Date: _____

This page should be retained by the participant

UNIVERSITY OF KWAZULU-NATAL

School of Management Information Technology and Governance,

Discipline Information Systems & Technology

M Com Research Project

Researcher: Christopher Pillay

Supervisor: Karunagaran Naidoo

Research Office: Ms. M Snyman (031) 260 8350

CONSENT

I _____ (full names of participant)

hereby confirm that I understand the contents of this document and the nature of the research

project, and I consent to participating in the research project. I understand that I am at liberty to

withdraw from the project at any time, should I desire to.

_____   _____

Signature of Participant   Date

This page should be retained by the researcher

UNIVERSITY OF
KWAZULU-NATAL

Respondent number: _____

Voluntary, Questionnaire for

Researcher: Christopher Pillay

Supervisor: Karunagaran Naidoo

Research Office**:** Ms. M Snyman (031) 260 8350

School of Management, Information Systems & Technology and Governance

Faculty of Information Systems & Technology

University of KwaZulu-Natal, Durban, South Africa

- Please complete this voluntary questionnaire.
- Please be forthright in your answers.
- Complete the questionnaire by pen and please do not revise your initial answers.
- Please indicate your response to the Question by (X) in the appropriate boxes.
- Please sign the letter of informed consent, giving me permission to use your responses for this research project.

Section A: Biographical Information about yourself

Please mark only ONE option per question.

1. What is your gender?

Female	Male

2. What is your age (in years)?

18-20	21-29	30-39	40-49	50-59	60+

3. What is your ethnic identity?

Black	Coloured	Indian	White	Other, specify _____

Section B: Survey Questionnaire

Definitions:

IT strategy: A long-term action plan for achieving a mission and goals in the context of a rapidly changing IT environment. So, IT strategy refers to IT mission and goals.

Business strategy: A long-term action plan for achieving a mission and goals in the context of a rapidly changing market environment. So, business strategy refers to business mission and goals.

Alignment: The link between an organization's overall mission and goals and the goals of each of the units (such as IT) that contribute to the success of those overall goals. So, for example when we say that the IT strategies and the business strategies align to each other, we mean that there is a link between the IT strategies and the business strategies in such a manner that this link (alignment) contributes to the success of the overall business mission and goals.

Emerging Technologies: New technology that is currently being developed, or will be developed within the next five to ten years. The Internet of Things (IOT) and biometric payment systems are examples of emerging technologies.

Internal IT processes: These are IT operational management processes. For example, IT processes to optimise the use of IT assets or processes to streamline the supply chain. Internal IT processes are those that are inwardly focused on the IT department.

Internal business processes: Business operational management processes. For example, business processes to optimise the use of personnel so that they are better focused to service customers. Internal business processes are those that are inwardly focused on the various business departments.

External focused IT strategy: A long term-term action plan for achieving a mission and goals in the context of a rapidly changing IT and business environment. So, externally focused IT strategy is about the IT mission and goals that are focused on assisting the business achieve the business strategy.

IT related strategic opportunities: Refers to the use or adoption of new IT technology that helps support how the business competes in the market.

Business related strategic opportunities: Refers to the use or adoption of new business models that helps support how the business competes in the market.

Business infrastructure: Refers to the physical assets related to the business such as branches, call centres

Business processes: Refers to the business policies, procedures, personnel and structure.

IT infrastructure: Refers to the physical assets related to the IT function such as IT call centres, data centres.

IT processes*:* Refers to the IT policies, procedures, personnel and systems.

4. **The alignment between the business focused strategies (business mission and goals) and the IT strategies (IT mission and goals).**

Think about the alignment between business strategies and IT strategies. We are trying to determine to what extent this is fulfilled **at your bank** by trying to get a sense of whether the IT strategy supports how the business competes in the market. So, for example, if your **IT mission and goals** are integrated with your **business mission and goals**, you would select "Strongly agree".

Indicate your agreement with each of the following statements **with regard to your bank:**

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
4.1 The IT strategies support the business strategies.					
4.2 The IT strategies and the business strategies align to each other.					
4.3 The IT strategies are adapted to business strategic change.					
4.4 The IT strategies align with the business's strategic plan.					
4.5 The strategic importance of emerging technologies is assessed.					
4.6 The IT goals and objectives are adapted to the business goals and objectives.					

5. **The alignment between the business processes (internal business policies, procedures, personnel and structure) and the IT processes (IT policies, procedures, personnel and systems).**

Think about the alignment between the business processes and the IT processes. We are trying to determine to what extent this is fulfilled **at your bank** by trying to get a sense of whether there are technical capabilities in place to support the business processes. For example, if your IT policies, procedures, personnel and systems strongly support your internal business policies, procedures, personnel and structures, you would select "Strongly agree".

Indicate your agreement with each of the following statements **with regard to your bank:**

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
5.1 The IT processes support the business processes.					
5.2 The IT processes are adjusted/adapted to the business processes.					
5.3 The business processes and IT processes are aligned to each other.					
5.4 The fit between the IT infrastructure and the business infrastructure is identified.					
5.5 The business infrastructure and the IT infrastructure are aligned to each other.					

6. The alignment between the business strategy (business mission and goals) and the IT processes (IT policies, procedures, personnel and systems).

Think about the alignment between the business strategy and the IT processes. We are trying to determine to what extent this is fulfilled **at your bank** by trying to get a sense of whether the technical capabilities in place help you execute and develop your business strategy. For example, if your IT policies, procedures, personnel and systems strongly support your business mission and goals, you would select "Strongly agree".

Indicate your agreement with each of the following statements **with regard to your bank:**

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
6.1 The IT processes support the business strategies.					
6.2 The internal IT processes are adjusted/ adapted to the business strategies.					
6.3 The internal IT processes and the business strategies are aligned to each other.					
6.4 The fit between the business-related strategic opportunities and the IT infrastructure is identified.					
6.5 The IT infrastructure aligns with the business strategies.					

7. The alignment between the business processes (internal business policies, procedures, personnel and structure) and the IT strategy (IT mission and goals).

Think about the alignment between the IT strategy and the business processes. We are trying to determine to what extent this is fulfilled **at your bank** by trying to get a sense of whether the business processes help you to execute and develop your IT strategies. For example, if your business policies, procedures, personnel and structure strongly support your IT mission and goals, you would select "Strongly agree".

Indicate your agreement with each of the following statements **with regard to your bank:**

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
7.1 The IT strategies support the business processes.					
7.2 The IT strategies are adapted/ adjusted to the internal business processes.					
7.3 The externally focused IT strategies and internal business processes are aligned with each other.					
7.4 The fit between IT-related strategic opportunities and business infrastructure is identified.					
7.5 The business infrastructure aligns with the externally focused IT strategies.					

8. **The alignment between IT processes (IT policies, procedures, personnel and systems) and the IT strategy (IT mission and goals).**

Think about the alignment between the IT strategy and IT processes. We are trying to determine to what extent this is fulfilled **at your bank** by trying to get a sense of whether the technical capabilities help you to execute and develop your IT strategies. For example, if your IT policies, procedures, personnel and systems strongly support your IT mission and goals, you would select "Strongly agree".

Indicate your agreement with each of the following statements **with regard to your bank:**

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
8.1 The IT processes support the IT strategies.					
8.2 The IT strategies are adapted/ adjusted to the internal IT processes.					
8.3 The IT strategies and internal IT processes are aligned with each other.					
8.4 The fit between the IT-related strategic opportunities and its IT infrastructure is identified.					
8.5 The IT infrastructure aligns with the IT strategy.					

9. **The alignment between the business strategy (business missions and goals) and the business infrastructure (the physical assets related to the business such as branches, call centres).**

Think about the alignment between the business strategy and the business infrastructure. We are trying to determine to what extent this is fulfilled **at your bank** by trying to get a sense of whether the business processes / infrastructure help you to execute and develop your business strategy. For example, if your business policies, procedures, personnel, structure supported by the physical assets strongly support your business mission and goals, you would select "Strongly agree".

Indicate your agreement with each of the following statements **with regard to your bank:**

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
9.1 The business processes support the business strategies.					
9.2 The business strategies are adapted/adjusted to the internal business processes.					
9.3 Business strategies and internal business processes are aligned to each other.					
9.4 The fit between the business related strategic opportunities and the business infrastructure is identified.					
9.5 The business infrastructure aligns with the business strategies.					

Thank you very much.
Your time and effort to complete the questionnaire is highly appreciated.

Addendum B – Data Analysis

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
4.1 The IT strategies support the business strategies.	28	4.00	1.089	.206
4.2 The IT strategies and the business strategies align to each other.	28	3.86	1.008	.190
4.3 The IT strategies are adapted to business strategic change.	27	3.63	.884	.170
4.4 The IT strategies align with the business's strategic plan.	28	3.75	1.041	.197
4.5 The strategic importance of emerging technologies is assessed.	28	3.93	1.016	.192
4.6 The IT goals and objectives are adapted to the business goals and objectives.	28	3.96	.962	.182

One-Sample Test

	Test Value = 3				95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
4.1 The IT strategies support the business strategies.	4.861	27	.000	1.000	.58	1.42
4.2 The IT strategies and the business strategies align to each other.	4.500	27	.000	.857	.47	1.25
4.3 The IT strategies are adapted to business strategic change.	3.703	26	.001	.630	.28	.98
4.4 The IT strategies align with the business's strategic plan.	3.813	27	.001	.750	.35	1.15
4.5 The strategic importance of emerging technologies is assessed.	4.837	27	.000	.929	.53	1.32
4.6 The IT goals and objectives are adapted to the business goals and objectives.	5.306	27	.000	.964	.59	1.34

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
5.1 The IT processes support the business processes.	28	3.75	1.005	.190
5.2 The IT processes are adjusted/adapted to the business processes.	28	3.71	.976	.184
5.3 The business processes and IT processes are aligned to each other.	28	3.57	.959	.181
5.4 The fit between the IT infrastructure and the business infrastructure is identified.	28	3.71	1.013	.191
5.5 The business infrastructure and the IT infrastructure are aligned to each other.	28	3.57	.997	.188

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
5.1 The IT processes support the business processes.	3.950	27	.001	.750	.36	1.14
5.2 The IT processes are adjusted/adapted to the business processes.	3.873	27	.001	.714	.34	1.09
5.3 The business processes and IT processes are aligned to each other.	3.151	27	.004	.571	.20	.94
5.4 The fit between the IT infrastructure and the business infrastructure is identified.	3.731	27	.001	.714	.32	1.11
5.5 The business infrastructure and the IT infrastructure are aligned to each other.	3.032	27	.005	.571	.18	.96

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
6.1 The IT processes support the business strategies.	28	3.82	.983	.186
6.2 The internal IT processes are adjusted/ adapted to the business strategies.	28	3.82	.983	.186
6.3 The internal IT processes and the business strategies are aligned to each other.	28	3.75	.887	.168
6.4 The fit between the business-related strategic opportunities and the IT infrastructure is identified.	28	3.68	.945	.179
6.5 The IT infrastructure aligns with the business strategies.	28	3.61	.956	.181

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
6.1 The IT processes support the business strategies.	4.420	27	.000	.821	.44	1.20
6.2 The internal IT processes are adjusted/ adapted to the business strategies.	4.420	27	.000	.821	.44	1.20
6.3 The internal IT processes and the business strategies are aligned to each other.	4.473	27	.000	.750	.41	1.09
6.4 The fit between the business-related strategic opportunities and the IT infrastructure is identified.	3.800	27	.001	.679	.31	1.04
6.5 The IT infrastructure aligns with the business strategies.	3.360	27	.002	.607	.24	.98

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
7.1 The IT strategies support the business processes.	28	3.82	1.020	.193
7.2 The IT strategies are adapted/ adjusted to the internal business processes.	28	3.79	1.031	.195
7.3 The externally focused IT strategies and internal business processes are aligned with each other.	28	3.57	1.069	.202
7.4 The fit between IT-related strategic opportunities and business infrastructure is identified.	28	3.64	.989	.187
7.5 The business infrastructure aligns with the externally focused IT strategies.	28	3.57	.997	.188

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
7.1 The IT strategies support the business processes.	4.260	27	.000	.821	.43	1.22
7.2 The IT strategies are adapted/ adjusted to the internal business processes.	4.032	27	.000	.786	.39	1.19
7.3 The externally focused IT strategies and internal business processes are aligned with each other.	2.828	27	.009	.571	.16	.99
7.4 The fit between IT-related strategic opportunities and business infrastructure is identified.	3.438	27	.002	.643	.26	1.03
7.5 The business infrastructure aligns with the externally focused IT strategies.	3.032	27	.005	.571	.18	.96

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
8.1 The IT processes support the IT strategies.	28	3.64	1.096	.207
8.2 The IT strategies are adapted/ adjusted to the internal IT processes.	28	3.71	1.013	.191
8.3 The IT strategies and internal IT processes are aligned with each other.	28	3.61	1.133	.214
8.4 The fit between the IT-related strategic opportunities and its IT infrastructure is identified.	28	3.68	.983	.186
8.5 The IT infrastructure aligns with the IT strategy.	28	3.68	1.090	.206

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
8.1 The IT processes support the IT strategies.	3.104	27	.004	.643	.22	1.07
8.2 The IT strategies are adapted/ adjusted to the internal IT processes.	3.731	27	.001	.714	.32	1.11
8.3 The IT strategies and internal IT processes are aligned with each other.	2.835	27	.009	.607	.17	1.05
8.4 The fit between the IT-related strategic opportunities and its IT infrastructure is identified.	3.652	27	.001	.679	.30	1.06
8.5 The IT infrastructure aligns with the IT strategy.	3.293	27	.003	.679	.26	1.10

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
9.1 The business processes support the business strategies.	28	4.07	.979	.185
9.2 The business strategies are adapted/adjusted to the internal business processes.	28	4.04	.962	.182
9.3 Business strategies and internal business processes are aligned to each other.	28	3.96	.962	.182
9.4 The fit between the business related strategic opportunities and the business infrastructure is identified.	28	3.86	.970	.183
9.5 The business infrastructure aligns with the business strategies.	28	3.89	.994	.188

One-Sample Test

	Test Value = 3					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
9.1 The business processes support the business strategies.	5.793	27	.000	1.071	.69	1.45
9.2 The business strategies are adapted/adjusted to the internal business processes.	5.700	27	.000	1.036	.66	1.41
9.3 Business strategies and internal business processes are aligned to each other.	5.306	27	.000	.964	.59	1.34
9.4 The fit between the business related strategic opportunities and the business infrastructure is identified.	4.674	27	.000	.857	.48	1.23
9.5 The business infrastructure aligns with the business strategies.	4.753	27	.000	.893	.51	1.28

Addendum C – Gatekeepers Consent

To: Christopher Pillay

Re: Assistance with Research

I, Dev. Govender, in my capacity as Executive Head: Business Transformation hereby give permission to Christopher Pillay (Student No.8727913) to conduct research in my organization.

The student MAY/MAY NOT (delete whichever is not applicable) use the name of the organisation in the dissertation. Nedbank will like the opportunity to get a copy of the research results.

Signature of Manager/ Gatekeeper:...

Title: Executive Head: Business Transformation

Date: 25 September 2017

Addendum D – Ethical Clearance

UNIVERSITY OF ™
KWAZULU-NATAL

INYUVESI
YAKWAZULU-NATALI

18 December 2017

Mr Christopher Pillay (8727913)
School of Management, IT & Governance
Westville Campus

Dear Mr Pillay,

Protocol reference number: HSS/2296/017M
Project title: To investigate the state of IT Governance in the South African Banking Sector – with particular reference to the Nedbank's Branch Network at eThekwini

Approval Notification – Expedited Application
In response to your application received on 08 December 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL.**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

....
Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Mr Karunagaran Naidoo
Cc Academic Leader Research: Professor Isabel Martins
Cc School Administrator: Ms Angela Pearce