

**Towards a Framework to address Governance requirements  
of IT Projects in the South African Banking Industry**

by

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**A Dissertation submitted to School of Computing, University  
of South Africa in fulfilment of the requirements for the Mas-  
ter's degree in Information Technology**

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November 2016

**DECLARATION**

I declare that

*Towards a Framework to address Governance requirements of IT Projects in the South African Banking Industry.*

Is my own work and that all the sources that I have quoted or used have been acknowledged and indicated by means of complete references.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.



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Signature

20 November 2016

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Date

## **DEDICATION**

To my late dad who has been my role model, the hardest worker I have seen, who encouraged me to be the best person I can be and to do the best I can in everything I wish to achieve, Dewlall Anup and to Mum, Lavina for always being there for me and reminding me that the possibilities are endless when determined!

To my supporting and loving husband, Gona Pillay, who has motivated me to give my best, keeping me sane and always lifting my spirits. To my daughters Deshani, Mahashri and Oeshni for their patience, love, courage and support during this very demanding period.

To my big brother, Anesh Anup, for always reminding me to focus on school and studies! He has supported me, cheered me on and given me unbiased advice. He has shown me that having a real personality, and not hiding it, will get you a long way.

You guys were truly my inspiration and were ultimately responsible for my success in life.

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Lastly, I thank all who believed in me and helped me in whichever way.

## **ABSTRACT**

Project success is vitally important for companies to execute and achieve their strategies, as well as carry out their visions. Today, more than ever before, companies operate under tremendous strain to deliver results rapidly and, at the same time, remain viable and adaptable.

Many organisations face multiple constraints in the process of implementing successful governance structures, especially where meaningful information technology (IT) deals are involved. Every organisation is confronted by problems exclusive to itself as each organisation's ecological, political, geographical, economic and social issues are unique. Research has indicated that IT projects are likely to fail where governance is lacking due to organisational limitations. Each of the mentioned challenges is capable of giving rise to difficulties that make the provision of effectual governance impossible, or challenging.

Investments by financial institutions in South Africa in IT projects can conservatively be estimated at billions of rands. Given such colossal investment amounts, there is concern as to why there is still a lack of cooperation between various banking institutions in developing unified standards and procedures which result in successful management of IT projects. The unified standards would ensure that the investments in IT generate business value and mitigate the risks associated with IT, an integral part of the overall business delivery. IT governance is an integral part of corporate governance and ensures that IT goals are met, and attendant risks are mitigated. IT governance powers ensures alignment between IT investment and programme delivery, and must justly measure accomplishments.

This study was undertaken to evaluate and establish the reasons why IT project management and IT regulatory governance fail within the South African banking industry. The objectives of the study were to find ways of addressing the way in which IT project management and regulatory governance are implemented so as to address project failures. Another objective was to recommend frameworks which would usher in positive

impacts on IT project implementation and develop effective IT regulatory standards for the South African banking sector.

The findings of the study reflected that IT projects should be directed from the very top of organisations. The boards of directors and senior management should take ownership of IT projects and governance issues. The findings also revealed that there is a need for supervision by the boards of directors. This ensures that investments made in IT systems produce reasonable returns for the institutions. Regular checks of IT systems and governance compliance are essential to ensure enforcement. The research results were explained and equated to the studied information.

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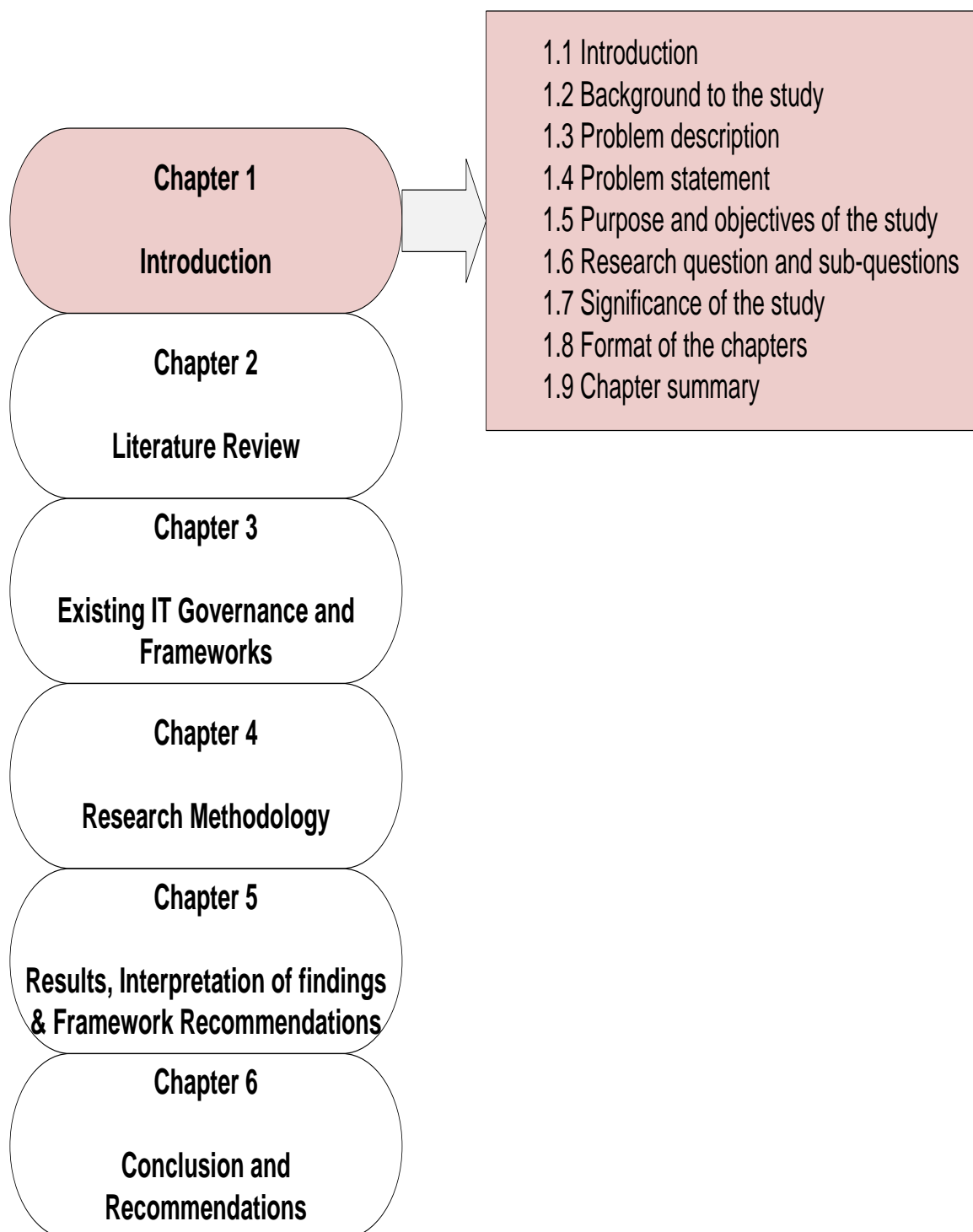
## **LIST OF ACRONYMS**

<b>ATM</b>	Automated Teller Machine
<b>CobiT</b>	Control Objectives for Information and Related Technology
<b>CIO</b>	Chief Information Officer
<b>CMMI</b>	Capability Maturity Model Integration
<b>CMMI-DEV</b>	Capability Maturity Model Integration for Development
<b>CMMI-SVC</b>	Capability Maturity Model Integration for Service
<b>DFI</b>	Development Finance Institution
<b>EFT</b>	Electronic Funds Transfer
<b>ERP</b>	Enterprise Resource Planning
<b>FSB</b>	Financial Services Board
<b>GoPM</b>	Governance of Project Management
<b>ICT</b>	Information and Communication Technology
<b>ITG</b>	Information Technology Governance
<b>ITGI</b>	Information Technology Governance Institute
<b>ITIL</b>	Information Technology Infrastructure Library
<b>ISACA</b>	Information Systems Audit and Control Association
<b>ISIC</b>	International Standard Industry Classification
<b>NBFI</b>	Non-banking Financial Institution
<b>OGC</b>	Office of Government Commerce
<b>PCO</b>	Professional Conference Organisers
<b>PMBOK</b>	Project Management Board of Knowledge
<b>PMI</b>	Project Management Institute
<b>PMO</b>	Project Management Office
<b>POPI</b>	Protection of public information



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## **1. CHAPTER 1: INTRODUCTION**

### **1.1 Introduction**

Project success is vitally important for companies to execute and achieve their strategies and carry out their visions. Today, more than ever before, companies operate under tremendous strain to deliver results rapidly and, at the same time, remain viable and adaptable (Alami, 2015).

The concept of information technology (IT) governance emerged when Brown (1997) and Sambamurthy & Zmud (1999) in the late 1990s did research on IT governance arrangement and frameworks. They considered IT governance to represent an organisation's IT related authority patterns. IT governance was, nevertheless, not regarded as a field on its own until 2004 when Weill & Ross (2004) merged existing research about how management of IT is carried out across 250 organisations, including 400 direct case studies as well as hundreds of interviews with managers. The study culminated in the crucial observation that IT governance is a fundamental instrument in realising value from IT investment, and thereby ensuring that IT complements organisational objectives.

Van Grembergen *et al.*, (2003) define IT governance as the process of enabling an organisation to achieve its goal by ensuring and enabling the effective and efficient use of IT. To ensure that an overall organisational efficiency, decreased costs and increased control over IT infrastructure are adopted remains the responsibility of the board of directors, executives and IT managers.

According to Patel (2002:163) "IT governance improves organisational accountability, thereby resulting in a return on investments". IT governance standards, such as Control Objectives for Information and Related Technology (CobiT) and Information Technology Infrastructure Library (ITIL), are internationally accepted and promote these benefits (Carroll, Ridley & Young, 2004).

IT governance includes all the associations and connections between the various interested parties concerned as well as the management and co-ordination of such parties. This is done to achieve the objectives of the organisation in an effective and cost-effective manner. An effectual and capable business governance plan enables the organisation to smoothly run all facets of its business and to thus achieve the set goals. IT governance is a subcategory subject of organisational governance. More often IT governance is wrongfully viewed as an area of study on its own, however, it is a segment of the overall business governance approach of a business.

## **1.2 Background to the study**

There are many constraints facing organisations that try to implement effective governance structures, predominantly when there are substantial IT investments involved. Without effective governance to deal with these constraints, IT projects will have a higher risk of failure (Brisebois, 2014). Each organisation does face its own unique challenges as their individual environmental, geographical, economic, political and social issues differ. Any one of these issues can present obstacles in providing effective governance.

Investments by financial institutions in South Africa in IT projects can conservatively be estimated at billions of rands (Mungadze, 2014). Given such huge investments, it is concerning that there is still a lack of cooperation between various banking institutions in developing unified standards and procedures which will result in successful IT projects management. Unified standards would ensure that the investments in IT generate business value and mitigate the risks associated with IT.

The project management communities are concerned about project performance. Project performance entails project success rates, project failure rates as well as challenged project outcomes (Stretton, 2014). In the past, the banking industry implemented IT projects with mixed success (Robertson & Williams, 2006). An IT project is considered a success once it has been implemented on time, within budget and meeting the needs of the customer. At the opposite end, a project is regarded as a failure if it has not been implemented on time, within budget and does not meet the needs of the cus-

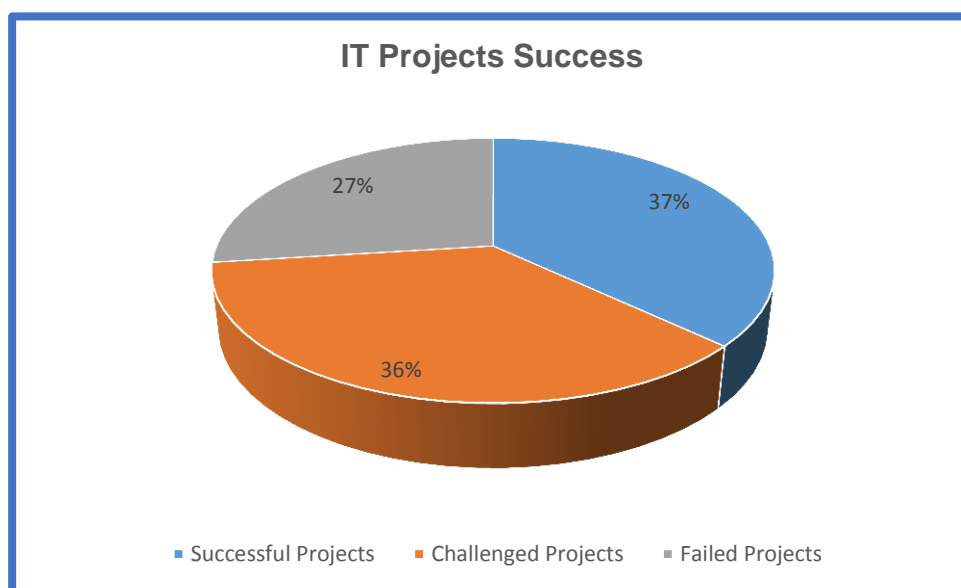
tomers (Rubinstein, 2007). Despite the facts that projects are indispensable for economic development and that corporate and national strategies are implemented by way of projects, the success rate of projects remains dubious (Marnewick *et al.*, 2013). The Prosperous Report - African edition (2013), as depicted in Table 1.1, describes the results of an extensive survey that determined the organisational project management maturity in South African IT organisations, as well as the success of the related IT projects. The report builds on prior work and investigates not only organisations which perform IT projects, but a much wider spectrum of industries.

**Table 1.1: Comparison of results of studies examining project success**

Project outcome	Chaos (USA)							Prosperous (SA)		University of Oxford (UK)	
	1994	1996	1998	2000	2002	2004	2006	2003	2008	2003	2008
Successful	16	27	26	28	15	29	19	22	32	16	27
Challenged	53	33	46	46	51	53	46	35	44	74	36
Failed	32	40	28	28	34	18	35	43	24	10	37

Source: 2013 Prosperous Report - The African Edition

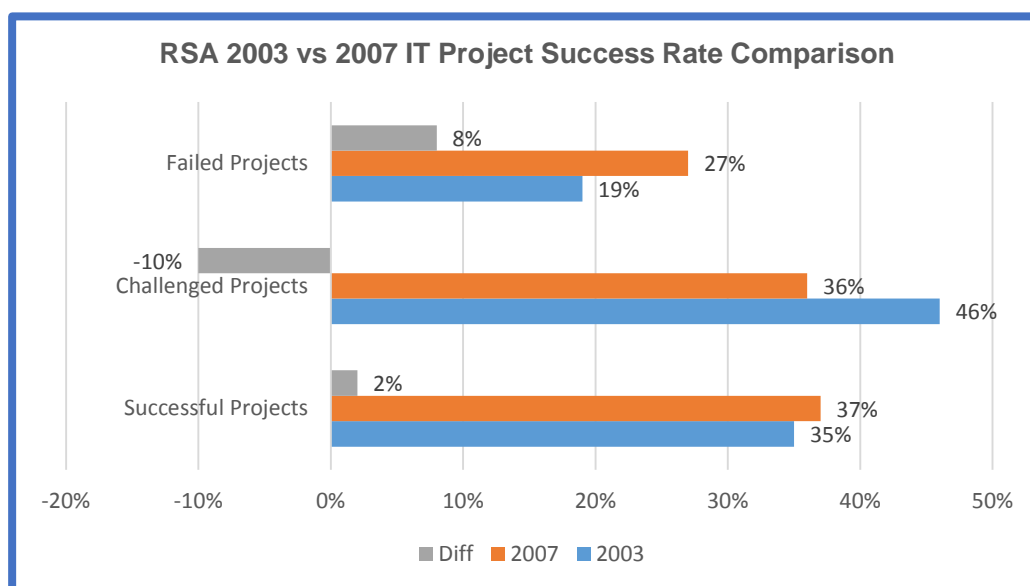
Figure 1.1 is a graphical representation of the results of a survey carried out by Sonnekus and Labuschagne in 2003. As illustrated, only 37% of the 521 IT projects managed between 2005 and 2007 were perceived as successful. Of these projects, 36% were challenged and 27% failed.



**Figure 1.1: Michael Porter's competitive model**  
Source: Gartner, 2011

Figure 1.1 indicates that failed IT projects increased from 19% in 2003 to 27% in 2007, a deterioration of 29,63% in success rate and that 8% more projects failed in 2007 than in 2003. Challenged IT projects decreased by 10% from 46% in 2003 to 36% in 2007. Perceived successful projects increased slightly by 2% to 37% in 2007. The failure rate of almost 30% in IT projects is concerning, especially within the financial industry in general, and the banking sector in particular.

The banking industry receives depositors' money and makes it available to borrowers in the form of loans, mortgages, leases, etcetera under very strict conditions. These conditions are referred to as regulatory governance and describe the mechanisms banks use to ensure that the established processes, procedures and policies are followed (Gartner, 2011). In order to comply with the set regulations, the banking sector has to make huge investments in IT. Given this requirement, effective regulatory project governance becomes a key subset of regulatory governance (Weaver, 2005). Governance practices are essential to achieving well-competent banks, whereas a lack of governance practices may result in serious negative consequences.



**Figure 1.2: RSA 2003 versus 2007 IT Projects Success Rate Comparison**  
 Source: Gartner, 2011

Customers should be the focus of the organisation’s objectives and should be linked to the regulatory governance requirements. IT regulatory governance should, therefore, be incorporated in all IT projects and standards (processes and procedures) developed. Formalising regulatory governance of IT projects is thus vital in enhancing accountability of IT projects and their management.

In developing countries, corporate companies are increasingly deploying IT to solve their expansion and developmental problems. They do so by investing in IT from their own resources, as well as by borrowing from other institutions (Odedra & Kluzer, 1998). A study by Harris & Davidson (1999) shows that significant IT components were present in over 90% of all the loans to developing countries by the World Bank. Worldwide, IT spending is forecast to grow by 2.1% in 2014 and to reach \$3.7 trillion by 2019 (Gartner Worldwide IT Spending Forecast, 2014).

IT projects also create challenges for management (Anandarajan *et al.*, 2002). IT innovations have the potential to change the competitiveness of any organisation. The size of investments injected in IT projects exert a huge burden on managers to evaluate the level value contributed by IT to its overall business value. To enable managers to establish the level of contribution to the organisational value it is critical to have an objective way through which to determine, quantify, appraise and trace IT on productivity contribution to overall objectives of the organisation.

The goal of an IT project in any organisation is to improve performance and efficiency of operations which can only be achieved when IT is accepted and used by employees in an organisation (Venkatesh *et al.*, 2003). In their quest for development, many organisations place high expectations on the use of IT, yet the challenges of IT adoption in organisations are not addressed so as to align with the ultimate goals of the business.

According to Siviya *et al.*, (2005), investing in process improvement in the 21<sup>st</sup> century is crucial for organisations as a way to achieve competitive advantage, and not as a compliance initiative. To avoid an initiative overload it is the accountability of those involved in process improvement within organisations to understand the differences and synergies between the various processes. The challenges faced by organisations in developing countries in hitching the full prospective of IT are not so different from those confronting developed countries (Khan, 2003). Currently, IT is the most chosen choice of all developing and developed countries to advance their economies and become competitive in the global marketplace (Gartner, 2011).

IT-based economies have the best streamlined complex economies in the world. They have enhanced production to levels where their economies equate other great economies, such as that of the United States. The United States has turned around national budget deficits of trillions of dollars to a position where it is difficult to believe. Gartner (2011) indicates that the world economy has moved to a fast, high-value information-based economy from low-value basic industries. Therefore, the successful implementation of IT projects in South Africa and in the banking sector, in particular, depends on adherence to methodologies that fully adopt proper IT project management, regulation and governance frameworks. Kerzner (2005) recommends that both regulation and governance need to form an integral part of methodologies adopted in implementing IT project frameworks within the banking sector.

### **1.3 Problem description**

This research was necessitated by the fact that in progressive organisations, IT has become a key enabler in respect of both competitiveness and business growth, exerting the greatest influence on the global economy (Westland, 2006). South Africa accepted



the 21st century challenge by making serious efforts in the development of the IT landscape. A decade ago IT had a minimum effect on the banking sector, but with efforts from both the private and government sectors, the adoption of IT has become a focus for all South African corporates (Edigheji, 2007). Within South Africa's banking industry, four of the major banks are extensive users of IT for purposes of operational efficiency. The focus of this study is to explore the impact of IT regulations and governance structures on organisational performance and the success rate of IT projects within the South African banking industry.

Even though IT project regulations and governance are receiving attention, a more holistic view is required as governance diminishes beyond the funding approval according to KPMG (2005). When not adhering to governance, projects do not achieve their objectives, resulting in unsuccessful projects. KPMG further elaborates that entrenching good governance over IT projects means establishing an effective framework that extends throughout the life cycle of the project.

In 2005, KPMG undertook a major international survey of IT projects management performance (Global IT Project Management Survey, 2005). More than 600 organisations in 22 countries participated. Analysis revealed that organisations who had benefits management processes in place (less than half of the participants), reported that they obtained only 51 - 75% of the benefits for half of their entire portfolio. This figure would be much higher if where organisations with no benefits management processes could have been included. According to the 2010 Chaos report of the Standish Group, project failure rates are actually increasing: only 32% of IT projects surveyed in 2010 delivered on time, within budget, with required features and functions. The projects' success rate in 2006 was 35%. According to Westland (2006), most project teams start building their deliverables before objectives have been finalised. The project teams have no structured processes for undertaking tasks and, therefore, fail to manage time, cost and quality effectively. This has resulted in the implementation of unsuccessful projects.

## **1.4 Problem statement**

The problem statement for this study is to establish what needs to be done in respect of project management and governance regulations to improve the success of IT projects.

For the purpose of this study, the questions to be asked are what is needed to be done in respect of project management and governance regulations for IT projects to succeed. Furthermore, IT projects need to be understood regarding the relationship between IT project regulations and governance. Perceived successful IT projects must be understood and will give rise to further questions (Westland 2006). What are the elements that constitute poor implementation and failure of IT projects and how can these elements be integrated into governance protocols with which they can comply when implementing IT projects in the future?

## **1.5 Purpose and objectives of the study**

The purpose of this research is twofold. Firstly, to establish the reasons for the increased project management failure rate of IT projects within the South African banking sector. Secondly, to propose a framework to address, or solve, identified challenges resulting in the failure of IT projects. The overall aim of this research study is to determine the success factors that banking organisations should consider to achieve best practices.

With the upsurge in complexity in IT-related risks, Hardy (2006) recommends that with the nominal use of IT best practices, namely IT frameworks, organisations can improve the use of scarce IT resources and produce stakeholder value. IT best practices can aid in plummeting the manifestation of significant IT risks, such as wastage in project investment, security breaches, project failures and not meeting the requirements of the customer.

PricewaterhouseCoopers (2006) argues that investor worth can be generated via multiple factors, such as service quality, cost efficiency, business alignment, reduced IT risks and ability to acclimatise to transformation. Furthermore, Tshinu *et al.*, (2008) mention

that the key to success with technology is not the technology per se, but the ability to manage it well.

Tshinu *et al.*, (2008:40), illustrate that “several tools have been developed to serve best practices relating to the management of IT infrastructure”. These tools include ITIL, Co-bit and CMMI. Arraj (2010) and Xansa *et al.*, (2007) indicated that it is critical that tools are dedicated to specific objectives, for example, ITIL is focused on IT Service Management, and Radovanovi *et al.*, (2010) indicated that CobiT is focused on prescribing IT governance. The CMMI Product Team (2006:12) states that “CMMI is primarily a guideline for process improvement”.

According to the King III Report (2009), essential to IT governance is an effective and efficient IT resource management. IT within organisations is typically an integrated infrastructure that uses both direct and indirect resources, and IT management is influenced by internal and external factors (Tshinu *et al.*, 2008). Also, Tshinu *et al.*, (2008:71) mention that “a common practice in IT is that of outsourcing, but to manage it well, organisations need to ensure governance of the outsourced entity, compliance within the outsourced environment and the capability to interact successfully with the outsource company. Organisations have the option of combining various frameworks to ensure common management practices. Also, they enable efficient integration between organisations that share similar governance models”.

It is emphasised by Pardo *et al.*, (2011:37) that “organisations struggle with the complexity and difficulty of understanding and interpreting several models at the same time”. Due to a lack of agreement between each framework regarding scope, definitions and terminology, processes, approaches, and so forth, remain the primary struggle, thereby creating a problem when organisations attempt to implement multiple approaches.

The objectives of this study are to:

- i) Establish the reasons why IT project management and IT regulatory governance fail within the South African banking industry.

- ii) Understand the frameworks utilised when implementing IT projects within the South African banking sector.
- iii) Ascertain how IT regulatory governance is addressed and integrated into the frameworks.
- iv) Identify the problems experienced in addressing and integrating IT regulatory governance with the frameworks.
- v) Find ways of improving the way in which project management and regulatory governance is implemented so as to address IT project failures in the South African banking sector.

## **1.6 Research question and sub-questions**

The purpose of this study is to identify and investigate how regulatory governance can be integrated into frameworks that enable the successful implementation of IT projects within the South African banking industry.

### **1.6.1 Main research question**

What are the main factors affecting IT governance and the successful management and implementation of IT projects in the South African banking sector?

### **1.6.2 Sub research questions**

- i) What frameworks are utilised when implementing IT projects within the South African banking industry?
- ii) How is IT regulatory governance addressed and integrated into these frameworks?
- iii) What are the problems experienced as regards the addressing and integrating of IT regulatory governance into the IT frameworks?

- iv) How can project management and IT regulatory governance implementation be improved to address IT project failures in the South African banking sector?

## **1.7 Significance of the study**

Given the significant number of failed IT projects within the South African banking sector, it would be imprudent to underestimate the relevance and importance of frameworks that can lead to the successful implementation and management of IT projects in this sector. The importance of this research study is thus, firstly, to establish the reasons why IT project management and IT governance fails within the South African banking industry. Secondly, to understand the frameworks adopted and utilised in implementing IT projects. Thirdly, to find ways of improving and developing industry standards for the successful implementation of IT projects and regulatory governance frameworks to ensure that investments in IT generate business value and mitigate the risks associated with IT.

## **1.8 Format of the chapters**

This research study document consists of six chapters, structured as follows:

**Chapter 1: Introduction:** This chapter introduces the topic, provides background to the study and states the research problem, aim, outlines the objectives and formulates the research questions. It also emphasises the significance of the study and provides the chapter layout.

**Chapter 2: Literature review:** This chapter reviews existing literature with a focus on the contemporary issues and problems found in the research, and shows how a research framework is derived from the reviewed literature. The aim and objectives of the study are linked to other studies to identify the gaps and justify the need for the study.

**Chapter 3: Existing IT Governance and Framework:** This chapter focuses on existing IT governance and framework, clearly articulating the advantages and disadvantages. The objectives of this chapter are to provide a view on the frameworks being used as well as the strengths and weakness of each framework.

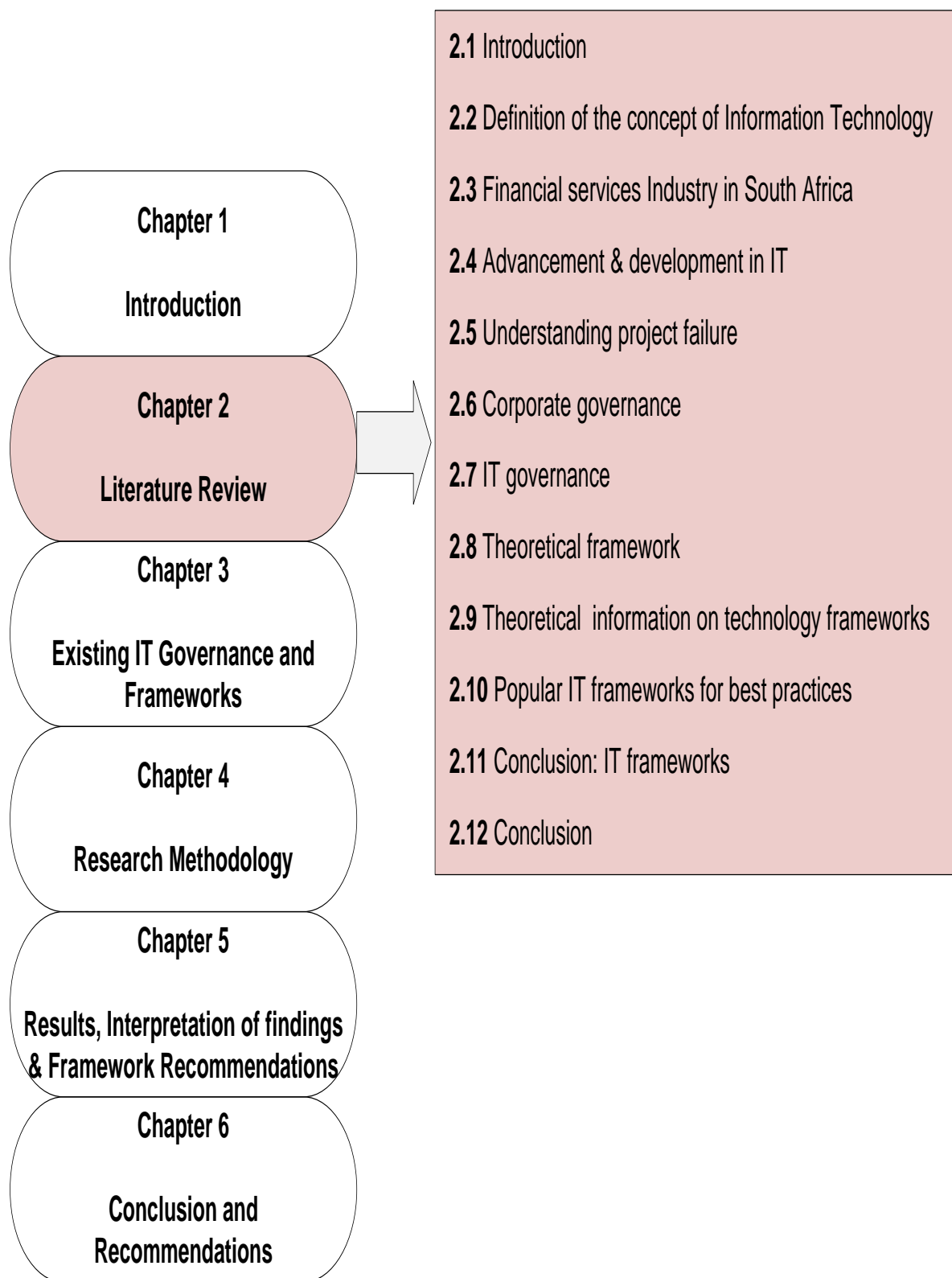
**Chapter 4: The research methodology:** A summary of the theory and concepts surrounding research methodology is provided in this chapter. The rationale for the research methodology adopted is also discussed. Issues addressed in this chapter are research design and strategies, target population, sampling, research instrument, administration of the questionnaire and data analysis.

**Chapter 5: Results, Interpretation of findings and framework recommendations:** The data analysis and interpretation are addressed in this chapter. Statistical methods are used to analyse the data. The results of the study are presented in graphical form, discussed and interpreted. Emerging patterns identified in the study are also discussed. Findings are linked to the reviewed literature to identify similarities to, or divergence from, existing theory. Based on the finding, a new framework recommendation is presented in this chapter.

**Chapter 6: Conclusion and Recommendations:** This chapter presents the conclusion of the research.

## **1.9 Chapter summary**

In this chapter the introduction and background to IT regulatory governance and the unsuccessful implementation rates of IT projects within the banking industry in South Africa are briefly discussed. The chapter also outlines the research aim, objectives, significance and questions of the study. The next chapter focuses on a comprehensive summary of the various literature sources consulted and presents a theoretical framework for the research study.



## **2. CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

According to Mantey (2009:25) “the implementation of sound corporate governance principles in organisations has become very important to management boards. Boards of directors now face accountability demands from stakeholders. Underlying the concept of corporate governance is the notion of information technology (IT) governance, which in most cases, is either ignored or underemphasized”.

In the King III Report on Corporate Governance (King III, 2009) a module was dedicated to IT governance. Weill & Ross (2004) indicate that various definitions of IT governance exist and that they all share the following key principles: create a framework that controls the use of IT and directs management. The embedding patterns of good behaviour needs to be encouraged in administrators and users. Whilst progressing to mitigate IT-related risk, the defining of the organisation’s practices, strategies and objectives must be conducted. Within an IT system, to focus on the implementation of sound structures and sustainable processes.

Dawidowicz (2010) describes a literature review as an examination of scholarly information and research-based information on a particular topic. It is a summary of the various literature sources that were consulted. Naidoo (2010) regards the literature review as an integral part of the research process as it makes an imperative contribution to almost every operational step. Its goal is to create a complete, accurate representation of the knowledge and research-based theory available on a topic.

This chapter presents a literature review and theoretical framework of the study relating to IT project management and governance frameworks within the South African banking industry. It begins with an overview of IT project management, a definition of IT, its role in the banking sector and IT challenges encountered within the South African banking. It further discusses governance issues bedevilling the South African banking industry.



### **2.1.1 Overview of South Africa's banking industry**

According to the Banking Association of South Africa (2012), the country has developed a well-regulated banking system categorised under the South African Banking Sector, which compares favourably with many industrialised countries. Over the past 20 years the sector has transformed through consolidation, technology and legislation. Consolidation through the mergers of various banks was common place in the early 1990s. This was caused by banking sector volatility. For example, Allied Bank, Volkskas Bank and the United Bank merged to form ABSA while the Nedcor and Stanbic merger failed.

The introduction of the Banking Act (94 of 1990) led to industry growth with new banking licences being issued. By the end of 2001 the number of registered banks in South Africa totalled 43. In early 2002, Saambou and Regal Bank were placed under curatorship which resulted in a run on BOE and some smaller banks which were forced to seek financial assistance from foreign shareholders.

Despite the South African banking sector's volatility in the past, South Africa remains a strategic gateway, with a solid democratic and legislative environment. The result has been foreign banks establishing branches, or representative offices in the country, and others acquiring stakes in major South African banks, such as the Industrial and Commercial Bank of China, corporate banks of South Africa.

The legislation, technology, products and the number of participants have changed the sector and created high levels of competition. This is especially true for smaller South African banks that specifically target low-income earners and the previously unbanked market.

According to the latest World Economic Forum Competitive Survey (2012/2013:483), "South African banks are rated second out of 144 countries for soundness, while the country was rated third for financial sector development". "Currently, the South African banking industry consists of 17 registered commercial banks, two mutual banks and 12 local branches of foreign banks, and 41 foreign banks with approved local representative offices", indicates the World Forum Global Competitiveness Report (2012:483).

## **2.1.2 Meaning and working definition of a project**

Several definitions have been put forward to define and explain what a project is and what its aims are. Among many definitions, a popular one is by the Project Management Institute (PMI, 2010), which describes a project as a temporary endeavour undertaken to create a unique product, service or result. The PMI considers a project to be temporary, because, unlike programmes that evolve and are on-going, projects have a definite beginning and an end date, not necessarily meaning short in duration. It further goes on to clarify this definition of temporary as not being related to the product generated from a project but on the contrary, products of projects have a long-lasting outcome (PMI, 2010). Westland (2006) suggests that a project has the attributes of timescale, uniqueness and budget, has limited resources, involves a level of risk because of the element of uncertainty, and brings about beneficial change in the organisation. Gray & Larson (2008) defines a project as being an intricate, non-repetitive, once-off effort limited by time, budget, resources, and performance terms designed to meet the needs of the customer.

It is important to note that projects range in size, cost and schedule, among others. Regarding duration and scope, some projects take a few days to complete, whereas others may take years to complete. Because all projects are unique, it is challenging to define objectives, estimate costs, or determine schedules. Schwalbe (2010) and Dekkers & Forsellius (2007) emphasise that within the construction industry, pricing is done per unit of building costs. For example, square feet or square metre, but in information and communications technology (ICT) projects, there is no history of cost unit frameworks which makes ICT projects unique compared with other projects in other industries. The banking sector is no exception regarding implementation of IT projects.

Many organisations have specific processes and standards for requesting and evaluating projects. Often there are norms for assessing financial benefits, such as payback period, internal rate of return, discounted cash flow, etcetera. There may also be standard procedures for presenting a business case and obtaining approval for the capital investments. Dekkers & Forsellius (2007) advise project managers to ensure that they are aware of any defined standards that apply to their projects.

### 2.1.3 What project management is

The PMI (2010:4) defines project management as “the application of knowledge, skills and techniques to execute projects effectively and efficiently”. It goes further and stipulates that it is a strategic competency for organisations which enables them to tie project results to business goals and thus, better compete in their markets.

Westland (2006) asserts that project management is a complex undertaking, with many stages and processes and should follow the full business lifecycle, from definition and justification of the project through to the delivering of demonstrable benefits for the business. Westland (2006) adds that it should be looked at as an activity of organising and managing project resources and constraints. The aim is to produce the successful completion and achievement of specific project goals and objectives. Westland (2006) further stresses that the project manager's skills are essential from the beginning. The defined approach, and its business case, will rely on a good understanding of the project processes along with reliable estimating and carefully considered planning. The project manager, within the management process, should then possess a set of skills, tools, and processes needed to undertake a project successfully. It must be noted that every project is constrained in different ways by its scope, time and cost goals (Schwalbe, 2010). These constraints are known as the triple constraint. Delivering an IT project on time, and within budget, brings real significant value to the business. In the field of IT project management this is, however, a rarity due to business and IT complexity and the competition for skilled resources (Mobi Consulting South Africa, 2013).

The term “constraint” refers to the activities which need to be addressed to ensure that the project deliverables are achieved. It is a statement that defines the boundaries of the project (Wysocki, 2009). It is paramount that the scope of a project is correct since it defines what the project is really about.

Wysocki (2009) advises that project management processes fall into five groups starting first with initiating, which defines and authorises the project. This is followed by *planning* which defines and refines objectives. In order to attain the objectives and scope, the project was undertaken to address the required course of action plan. Moving onto *executing*, which allows for the integration of people and resources to carry out the project

management plan. *Monitoring* and *controlling* monitors' progress to identify variances from the project management plan so that corrective action can be taken, if necessary, to meet project objectives. The last step is *closure* which formalises acceptance of the product, service or result and brings the project, or phase, to an orderly end.

IT project management, and the successful implementation of strategic plans in an organisation, is done mainly through projects. Examples of this are a new banking product or a new information system. A project manager makes use of a framework to drive a project and is often the key person responsible for ensuring that the project is finished on time, on budget and within scope. According to Cooke-Davies (2002), success criteria of projects have changed significantly over time and have moved from the triangle view of time, cost and quality to a much broader framework which includes not only the scope of work but also the users' satisfaction. Success needs to be defined by the business executive at the start of a project. This ensures that, in the end, the project can clearly be classified as a failure or success.

Dvir, Raz & Shenhar (2003) suggest that there are four dimensions to projects management, namely: impact on the customer, project efficiency, business success and preparation for the future. Project management efficiency refers to the instance where the project meets the time, budget and cost constraints. Impact on customer refers to the level on which the project complies with the needs of the client. Business success refers to the extent at which the project positively impacts the organisation's well-being. Preparing for the future expands to the long-term vision of the organisation. The four success measures (project efficiency, impact on the customer, business success and preparing for the future) are found to be highly inter-independent in the assessment of project management success.

According to Rubinstein (2007), success rates regarding the implementation of IT projects have improved in the last 12 years. However, it is reported that projects still need to improve further as only an average of 35% of projects are successfully completed (meaning they were implemented on time, within budget and met the needs of the customer). On average, 19% of projects are construed as having failed, 46% of projects are challenged (meaning they go over budget or schedule or no longer meet the needs of

the customers). Success factors are inputs used in the management system which directly, or indirectly, lead to the success of a project. Some 80% of project managers informally determine their own success factors, which are not explicitly identified and recorded. As a result, they do not become part of a formal process, nor part of the organisation's historical project data (Cooke-Davies, 2002). Dvir, Lipovetsky & Shenhar (1998) point out that a major barrier to the success of a project is the lack of organisational alignment.

## **2.2 Definition of the concept of Information Technology (IT)**

IT has been defined in various ways by different authors. Over the years, IT has been conceptualised and measured differently by different researchers. Frenzel (1999), for example, defines IT as the term that describes the organisation's computing and communications infrastructure, including computer systems, telecommunication networks and multimedia (combined audio, text and video) hardware and software. Shelly *et al.*, (2005) proposed that the building of information systems comprised IT which includes hardware, software, databases, networks and other related components.

IT is also referred to as anything related to computing technology, such as networking, hardware, software, the Internet, or the people who work with these technologies. Many companies now have IT departments responsible for the management of computers, networks, and other technical areas of their businesses. IT jobs include computer programming, network administration, computer engineering, Web development, technical support and many other related occupations. Since we live in the 'information age', IT has become a part of our everyday lives. That means that the term IT, already highly overused, is here to stay (Information Technology Definition).

According to William & Sawyer (2005), any technology that helps to produce, manipulate, process, store, communicate and/or disseminate information is defined as IT. This definition may be seen as a comprehensive one as it covers all aspects, as discussed by different researchers, and includes all the components and processes needed to carry out information-processing work in the organisation. Therefore, it can be said that the IT concept originated from a merging of computer technology with telecommunications

technology and that when the computer and communications technologies are combined, the result is IT or 'infotech'.

### **2.2.1 IT governance and its focus in a business environment**

Brisebois (2014:31) states that "IT governance focuses specifically on IT systems, their performance and risk management". IT governance's primary goals are to assure that the investments in IT generate business value, and the risks that are associated with IT are mitigated. The implementation of an organisational structure mitigates risk with well-defined roles regarding responsibility for information, business processes, applications and infrastructure. IT governance should be perceived as how IT creates value that fits into the organisation strategy and should never be viewed as a silo. Being collaborative ensures that all stakeholders participate in the decision-making process and this creates a mutual acceptance of responsibility for critical systems and ensures that IT related decisions are completed and driven by business.

IT governance is needed to ensure that the investments in IT generate value rewards and mitigate IT associated risks, avoiding failure. IT is central to organisational success, that is, the effective and efficient delivery of services and goods, especially when the IT is designed to bring about change in an organisation. This change process, commonly referred to as 'business transformation', is the prime enabler of new business frameworks both in the private and public sectors. Business transformation offers many rewards, but it also has the potential for many risks, which may disrupt operations and have unintended consequences. The dilemma then becomes how to balance risk and rewards when using IT to enable organisational change (Brisebois, 2014).

Despite the software industry's efforts to identify and adopt best practices in the development of IT projects, a high rate of failure and missed objectives still prevails. Most IT projects do not meet the organisation's objectives. A key best practice is implementing an organisational structure, including an effective governance framework, with well-defined roles and responsibilities for IT stakeholders. Such a framework ensures that IT investments are aligned and delivered by corporate objectives and strategies. Without this framework, IT projects are more susceptible to failure. However, many organisations fail to consider the importance of IT governance. They take on IT projects without

fully understanding what the organisation's requirements are for the project and how this project links to the organisation's objectives. Identifying organisational objectives for IT is another key best practice for IT governance. Historically, senior managers saw IT projects from the limited perspective of input and output objectives. This inefficient and limited perspective stemmed directly from such managers' lack of technical experience in dealing with the complexity of such projects. In addition, these managers were unjustly blamed for the vast inefficiencies caused by the organisation's failure to integrate the objectives of IT projects with the overall objectives of the organisation (Brisebois, 2014).

Current literature (Hoffman, 2003) promotes IT governance vehemently, but practitioners' perspectives on IT governance might not always concur. Based on the PwC Global Project Management Survey (2012) it was found that an astonishing 76% of various chief executive officers and chief information officers were aware of the benefits offered by IT governance frameworks. No more than 42% of them had any intention of implementing such frameworks.

This research study focuses on regulatory requirements of an IT governance framework applicable to the banking industry in South Africa, and specifically on the benefits IT can provide.

### **2.2.2 Significance of IT project management to the success of businesses**

Information systems perform three vital roles in any organisation. It supports efficient business operations, managerial decision making and strategic advantage. In today's context, managers feel the need for 'technology' to derive maximum benefits from information. Also, their organisations are being buffered on all sides by strong, frequently shifting winds of change. Organisations' strategic objectives (chosen markets, product strategy, expected outcomes) and their business processes (such as research and development, production, cash-flow management and order fulfilment) are undergoing significant and volatile changes. This places greater pressure on business leaders and their managers (Imam, 2002). One of the important constant changes business processes undergo is automation which requires information and communication technology. This makes IT project management an essential ingredient of daily business processes. The result of this process is that skilled IT project managers are in demand

across various industries. Imam (2002) stresses that the rapid change of pace in today's business environment has made information systems and IT, vital components.

Information systems and IT help keep organisations on par with several strategic thrusts initiated to counteract the challenges of change. These include IT projects such as internetworking of computing, internetworking the enterprise, business process re-engineering and using IT to gain a competitive advantage. These are some of the major reasons why today's businesses need successful IT project management.

According to Shelly *et al.*, (2005), IT is reshaping the basics of business. Customer service, operations, product development marketing strategies and distribution are heavily, or in some instances entirely, dependent on IT. Efficient IT structures that support core competencies are among the typical characteristics of high-performance businesses. IT, coupled with IT governance frameworks, aligns the IT framework with the business strategy, increases its efficacy in the medium to long term and facilitates quick reactions to market developments.

### **2.2.3 Information and communication technology developments in South Africa**

Information and communication technology (ICT) infrastructure needs to be regarded as the integration of different components that interact with one another, directly and indirectly, for sustainability of an organisation's objectives. For those organisations that rely intensely on ICT, such as the banking industry, it is a necessity to develop practices and tools, such as integrated ICT management frameworks, that collect best practices found in different ICT management frameworks. These best practices will be combined with business objectives that direct ICT strategies, technologies and management practices for better management of ICT infrastructure (Interdisciplinary Journal of Information, Knowledge & Management, 2008).

The history of ICT adoption in manufacturing in South Africa goes back a long way, with initial installations of mainframe equipment taking place in the multinationals in the oil industry. Then in local growth industries such as beverages (e.g. South African Breweries, Stellenbosch Farmer's Winery), the chemical industry (e.g. AECI) and the fabricated



metal industry (e.g. ISCOR) from the late 1960s and early 1970s (South African Department of Arts, Culture, Science and Technology, 1999).

Imam (2002) indicated that an advanced stage was reached by applications, and in some cases with process-control computers and software installed to monitor the refining of petroleum products and production control. The United Nations International Standard Industrial Classification of All Economic Activities (ISIC) (2008,12) states that “there is no doubt that ICT applications have steadily become more sophisticated, and the manufacturing industry has become increasingly complex”. This is evidenced by its subdivision into over 30 International Standard Industry Classification (ISIC) categories.

The level of efficiency and productivity for international businesses like automotive companies, continuously grow, due to better and improved adoption of robotics in manufacturing plants and supply-chain channels. The greater part of parts used in the automotive industry today, are electronic. The manufacturing, maintenance and servicing of the components are mostly carried out by machines. The web is hugely strategically exploited to attract in likely customers, and gain a competitive advantage over competitors whilst reducing the cost of doing business, thereby improving the bottom line.

Networks, White Paper on Economic impact of the ICT sector (2012) points out that the importance of the manufacturing sector in the economy is highlighted by the fact that it represents about 20% of the gross domestic product (GDP), at over R112 billion (market-related prices), as stated by Rehman & Gill (2005). According to Bitkom (2012), the worldwide ICT market volume increased in 2010 by nearly 5% to about 2 500 billion Euros. The biggest ICT market is the USA with a market share of 28.7%. Attempts were, at one stage, done to analyse the main businesses in South Africa under the groupings of, amongst others: annual budget, server and workstation architecture, local area network architecture and Internet bandwidth. The findings were not thorough and therefore mostly not suitably beneficial.

The process of computerisation in South Africa started during the early 1960s when small companies started using computers, originally in accounting systems (Haynes,

Mckibbon & Walker ,1990). Since then IT usage has gradually increased, although the South African government was slow in the adoption thereof.

However, it is now widely used in all government departments. In the 2000s, the government started placing a significant emphasis on the use of IT. Haynes *et al.*, (1990) indicated that IT professionals were hired to impart IT training to universities and new IT educational institutes were established. To create IT awareness among the populace nationwide, IT seminars, forums, exhibitions and competitions were conducted. Computers, as a subject, were introduced in schools and colleges. To create and galvanise Internet-use awareness, Cyber cafes were opened. Within rural areas, telephone networks were enhanced and introduced; through small exchanges and professional conference organisers (PCOs), telecommunication facilities were provided.

Rehman & Gill (2005:42) point out that “the country’s current IT policy and action plans are intended to be all encompassing involving all”. For example, industry and commerce, banking and insurance, finance, revenue, communication, media, human resources development, defence, etcetera.

IT enabled South Africa in the adoption of the Digital Signature Act (section 45 of Act 25 of 2002), the Intellectual Property and Copyright Act (Act 11 of 1967) and the Consumer Protection Act (Act 68 of 2008) (Kazmi, 2008). The stakeholders concerned with IT and communication are maintaining firmness and viscosity with the policy. There have been huge achievements made in the sectors of IT and telecommunications. Since their inception, they have enabled businesses to cope with today’s modern business challenges. To maintain relevance in the current digital business world, IT and telecommunications policies need to be constantly updated and aligned with business strategies. To provide protection, security and enhance the confidence of users, providers and facilitators of information services, legislation and governance need to be robust.

The government is fully supportive and encourages business to take advantage of the many benefits provided by IT, especially within the banking sector. The government of South Africa invests millions of rands in developing the IT sector through huge spending

in infrastructural development and is leading the IT and ITC revolution in the country. Various ITC projects are aimed at improving infrastructure development, human resources development and easy access and use of IT by both the public and private sectors (Kazmi, 2008).

#### **2.2.4 Information technology within South Africa's banking industry**

Many authors have pointed out that as organisations become more profitable and more competitive, they realise the opportunities created by harnessing the Internet (Singh, 2004; Stichele, 2004). New businesses, without a physical presence, have emerged on the Internet because they have seen that larger markets could be achieved. The financial industry has also caught up with the trend of moving to the cyber world as no physical product needs to be delivered (Singh, 2004) and its customers can easily be swayed to use Internet services (Dombi, 2001). Furthermore, as Singh (2004) explains, customers will not spend hours queuing just to effect transactions that they can do from the comfort of their offices, via the Internet, thus resulting in satisfied customers. As customers can access their accounts online, there is an increased exchange of vital data on the Internet. As a result, instances of cyber or Internet fraud has also increased as hackers take advantage of innocent parties transacting online. In order to curb or stop this, the expertise of IT project managers is crucial in order to design and build more robust and secure systems.

Gow (1997) highlights some of the business benefits emanating from the adoption of IT products and services. They, among others, are the generation known for additional revenue, improvement in customer services, extended marketing and increased cost savings. Many authors agree that the Internet market is on the rise. The implications are that the Internet will continue to flourish and remain one of the most competitive markets where ease of use, customer services and customer satisfaction take priority (Dombi, 2001).

The shift to the cyber world comes with benefits and technical challenges. According to Stichele (2004) some of these challenges include security and safety in e-finance on the Internet, collaboration and coordination between divisions of different software and lastly coordinating, after a merger, the technological integration.

Since the worldwide inception of advanced technologies the financial sector has been, and still is, the leader in the adoption, use and growth of IT. In fact, Mayer (1987) mentions that it was amongst the first to incorporate electronic data processing in its operations, through cheque handlings, bookkeeping, credit analysis and automated teller machines (ATMs).

Initially, computers were used to process cheque transactions through magnetic ink character recognition. With the introduction of the first automated clearing house in the early 1970s, electronic funds transfer (EFT) were made possible and then ATMs, the most significant technological investments made by commercial banks, were introduced. ATMs introduced the power of computer technology to the general public and made banking convenient for consumers. Today, ATMs deliver banking services 24 hours a day, seven days a week and 365/6 days a year to more than 12 million people in South Africa (Nsouli & Schaechter, 2002) and branches staffed by tellers to take deposits and withdrawals (Franke, 1987; Martini, 1999). Presently banks are using IT in the back office, amongst others cheque and accounts processing, mortgage and loan application processing and the electronic funds transfer to more strategic innovations such as automated teller machines and new kinds of securities (Nsouli & Schaechter, 2002). According to the survey conducted by PwC (2013), called 'Shaping the bank of the future', South African banking survey, under the subheading 'Information Technology', the following details were provided:

- i) Innovation is critical in the rapidly changing landscape with the Big Four banks all ranking it of maximum importance.
- ii) Technology is regarded as one of the key enablers of innovation.
- iii) The majority of participants (banks) are expected to invest significantly in technology over the medium term, with the Big Four banks each projecting R3 - R5bn.
- iv) Some banks have already achieved profitable revenue growth in the South African market by encouraging customers to migrate to electronic channels.
- v) Banks are seeking to leverage this experience as they expand across Africa.

- vi) The Big Four banks currently operate 2 877 traditional branches, forecast to reduce by 21% to 2 285 by 2016. This is consistent with their stated intention to the transition of more customers to electronic distribution channels.
- vii) ATM numbers are stabilising at around 20 000.

According to PwC (2013), the survey indicated that Banks are adopting a more holistic approach to customer relationships. In order to identify customer needs and inform more granular pricing decisions, they are analysing extensive data (using IT). Banks' views on the importance of the client onboarding process vary. The majority of the banks agree that service quality and client retention are pressing issues in the highly competitive South African banking market. The survey indicated that, as regards talent, bank executives continue to place significant value on global experience, as well as leadership skills and adaptability. It also pointed out that the lack of qualified staff is a crucial concern for banks looking to improve their business credit lines.

### **2.3 Financial services industry in South Africa**

Van Zyl (2015) indicated that over 6 trillion in assets comprised of South Africa's service industry, employing 3.9% and contributing 15% to corporate income tax, contributing 10.5% to the gross domestic product of the economy annually.

The financial services sector in South Africa can be grouped into banking and non-banking financial institutions (NBFIs). Banking institutions include large public sector commercial banks, private sector banks and foreign banks while NBFIs include development finance institutions (DFIs), private sector investment banks and leasing companies. The banking industry in South Africa has seen great transition during the forty-four years of its history, since the early 1970s.

The financial industry helps a country strengthen its financial systems, grow the economy, restructure and modernise institutions and respond to the savings and financial needs of all people. This is done by providing finance, policy research, advice and technical support (Annual review of transformation in the financial sector, 2005). As there

are different types of businesses and sectors, the industry is complex. According to McDonald & Cosimano (1998) and Ramarapu *et al.*, (1995), the financial industry comprises of three primary types of service namely banking, mutual funding companies and insurance and other financial institutions.

Notably, South African financial institutions that offer banking services are obliged to comply with the Banking Act (Act 94 of 1990) before any other law, regulation, guideline, or standard, to be recognised as banks. This research study focused on South African banks, rather than other financial institutions that do not primarily offer banking services as their core function. It is recognised that banks do not only offer complete banking services, but overlap with services in the mutual funding and insurance categories and vice versa.

Within the financial services industry, IT is gradually assuming a significant and positive impact on both the lives of organisations and standard of life of the populace. IT offers competitive advantages and business opportunities that would otherwise be missed if not adopted. This process supports continuous changes and transitions in organisational processes, implementation of strategies and growth of the business.

The financial services industry has become virtually dependent on, and continues to invest in, IT to gain competitive advantages. IT can enhance differentiation. Rising competition in the banking industry has further widened the scope of IT. Banks are some of the largest investors in research and development of new technologies within the financial sector which is rapidly becoming dominated by service industries. Service industries also thrive on IT to generate competitive advantages. Significant challenges are associated with updating, upgrading and linking the existing diverse computer systems that have evolved in the banks over many years. These systems are often upgraded in a disconnected or disjointed manner and have to be maintained and operated to support day-to-day banking activities. Customer data, in particular, tend to be scattered amongst the various computers in different functional areas and cannot be accessed and utilised by other functional departments that can generate additional income from it.

It is argued in this research study that while the increased use of IT in the banks has undoubtedly improved business capabilities and productivity by automating processes which were previously done manually (e.g. ATMs), the opportunity to utilise IT to instigate more fundamental changes has remained elusive due to high-rate failures of IT development projects. For example, new systems introduced to provide cross-functional management information or new types of service failed to make the expected positive impact on production and only made little improvements to established routine functions.

## **2.4 Advancements and Developments in IT**

Implications of developments in IT have been considered to be so pervasive that proponents claim they could eventually facilitate a new wave of economic growth at a macro level, with attendant rewards for its investors. Traditional and established business mechanisms are likely to be rendered obsolete. Forester (1985) for instance, describes how technological developments have acquired a 'revolutionary tag', representing the most significant change since the early days of the Industrial Revolution. This led to the ambitious idea of the potential applications of technology and hence economic growth. Barras (1990) introduced within the innovation process in the financial services industry a reverse product life cycle framework. This was extended to the macro level with the disclaimer that advances in IT would encourage the process throughout the economy.

Some significant developments could be cited in support of the argument that technology is indeed transforming financial services, notably Direct Lines (Pvt Ltd) innovative telephone-based insurance service and the relentless growth of call centres inspired by First Direct (Pvt Ltd) telephone banking operation. However, Graham (1997) presents evidence which suggests that these services are evolving alongside traditional banking business, rather than replacing it because bank customers are maintaining their existing accounts while opening additional accounts with telephone providers. New direct channels simply add another layer of costs, while older and more expensive ones have to be kept open. Although the leading banks have closed nearly a quarter of their branches over the past ten years, the branches are still not defunct.

Brierley (1997) supports this finding with his analysis of recent research into brand awareness in the financial services industry. He concluded that the actual consumer take up rate was considerably lower and leaned towards supplementing customers' existing arrangement rather than to replace them, while awareness of innovative banking products was high.

Dunne (1998) shows how First Direct has taken eight years to record a small profit. This has been achieved during a period of very limited competition because other banks only belatedly recognised the potential of telephone banking. In comparison, she calculated that the 'Big Four' clearing banks together made over R55 million per day in 1997 and that these profits had invariably come from 'bread and butter' business, e.g. loans and mortgages.

Although the potential of IT to transform the banking industry has been heralded for some years, there appears to be little evidence as yet that South African banks are utilising technological developments innovatively to protect themselves against the threat of new competitors. Banks seem to make huge profits from their traditional core functions as some of the banks' share prices are at an all-time high and as such, it is expected that successful IT projects should be well funded from these profits. The retail banking industry has invested heavily in new technologies over many years, often with disappointing results (Roach, 1991; Berndt & Malone, 1995).

## **2.5 Understanding project failure**

A few definitions of project failure are as follows:

Jones (1996) describes the term 'failure' as projects that are cancelled and incomplete due to budget or schedule overruns, or projects that have exceeded the scheduled date by more than 25%. May (1998) defines failure as any project with quality problems or that suffers outright cancellation severe cost or schedule overruns.

Flowers (1996) defines an information system as a failure if any of these following situations occurs:



- i) When the holistic system solution performs as required with the overall performance being suboptimal.
- ii) When the implementation of the solution does not perform as intended or the customer is hostile and rejects the solution.
- iii) Total cost of the development exceeds overall benefits value.
- iv) Due to issues encountered due to the complexity and management of project, the information system development is abandoned.

Smith (2001) postulates that the definition of a failed project is a project that, from conception through to successful implementation, does not make the journey. It may be concluded that the definitions are not univocal. Some authors are of the opinion that when a project does not achieve successful implementation, it is regarded as project failure. Other authors take this further and include the success of the information system in the organisation regarding user satisfaction and the benefits for the business in their assessment.

Contrary to the above, according to Noordam *et al.*, (2007), a successful project satisfies three factors which comprises: functionality agreed to in advance, project delivered on time and within the agreed budget. Once these three factors adhere to the criteria, the project will be considered a success.

## **2.6 Corporate governance**

According to Stralser (2004) and Hinson (2005) corporate governance is about promoting corporate fairness, transparency and accountability. It is a very important function that aids an organisation in safeguarding its shareholders' interests. In other words, corporate governance's primary concern is business performance understood in a competitive and financial sense (Bloem, Cheung & Rohdeb, 2006).

Hinson (2005) indicates that the core aspects of corporate governance include:

- i) the required management structures and management control frameworks depicting roles and responsibility;

- ii) being ethical in business and social responsibilities;
- iii) structured risk management, handling all risks including operational, financial, market and IT risks and environmental issues;
- iv) management oversight and audit review – making sure that managers and staff comply with internal and external rules, regulations and laws (compliance and audit functions); and
- v) transparency, i.e. open and honest communication by management to stakeholders about state and future aspects of the organisation.

Corporate governance is different from other types of governance such as financial or IT governance. It is regarded as the principal form of governance for organisations (Bloem *et al.*, 2006). Ultimately, corporate governance involves the return of money to those who invest in and own the corporation.

## **2.7 IT governance**

IT Governance Institute (ITGI) (2007:8) states that “IT governance is the responsibility of the board of directors and executive management. It is an integral part of corporate governance and consists of the leadership and organisational structures and processes that ensure that the organisation’s IT sustains and extends the organisation’s strategy and objectives”. IT governance is the organisational capacity exercised by the Board, executive management and IT management to control the formulation and implementation of the IT strategy and, in this way, it ensures the fusion of business and IT. Although the definitions differ in some aspects, they focus on the same issues: achieving the link between business and IT and the primary responsibility of the board of directors (Hardy, 2006). The definition of Van Grembergen (2003) also indicates that IT management must be involved in IT governance processes. However, there is a clear difference between IT governance and IT management. IT management is focused on the effective supply of IT services and products and the management of IT operations. IT

governance, in turn, is much broader and concentrates on performing and transforming IT to meet the present, and future, demands of the business and its customers. The IT Governance Institute defines IT governance as an integral part of the enterprise or corporate governance (ITGI, 2007).

The IT Governance Institute Board Briefing (2005) on IT governance also stipulates that governance is not only of interest to the IT function or just an IT issue. In an overall holistic view, governance is part of the overall governance of an entity, with a specific focus on improving the management and control of information technology for the benefit of the primary stakeholders. Ultimately, it is the responsibility of the board of directors to ensure that IT, along with other critical activities, is adequately governed. Although the principles are not new, actual implementation requires new thinking because of the special nature of IT.

Jonker (2014:1) states that “the Protection of Public Information (POPI) Act, (Act No. 4 of 2013), which was gazetted in November 2013, and which is currently awaiting an effective date, requires widespread reforms that both the private and public sector must introduce to ensure that the personal information and data they collect are protected”. The new Act also provides strict guidelines, amongst other things, on what data can be obtained, how that data can be used and the requirement that it should be kept up-to-date (Jonker, 2014). Furthermore, as security for information becomes a central concern of industry and government, it is essential that good governance exists to ensure proper protection and integration of information security with corporate governance (Conner, Clegg & Barker, 2004). According to Conner *et al.*, (2004) IT governance, which provides for IT management and control, spans across the culture, organisation, policy and practices across five key areas:

- i) Alignment: Provides for the strategic direction and alignment of IT and the business on services and projects.
- ii) Value delivery: Oversees the delivery of value to the business by IT and the assessment of return on investment (ROI). Also confirms that the IT/business organisation is designed to derive maximum business value from IT.

- iii) Risk management: Ensures risks have been adequately managed through the processes that are in place. It includes the assessment of the risk aspects of IT investments.
- iv) Resource management: Provides use of IT resources and capacity view. Oversees the total funding of IT at the enterprise level. Ensures there is an adequate IT capability and infrastructure to support current and expected future business requirements.
- v) Performance measurement: Verifies strategic compliance, for instance, the achievement of strategic IT objectives. It reviews the measurement of IT performance and the contribution of IT to the business (i.e. delivery of promised business value).

IT governance is not a one-time exercise or something to be achieved by a mandate or the setting of rules. It requires a commitment from the top of the organisation to instil a better way of dealing with management and control of IT. While it is an on-going activity that requires a continuous improvement, mentality and responsiveness to the fast-changing IT environment, it can be integrated within a wider enterprise governance approach, thus supporting the increasing legal and regulatory requirements of corporate governance. The Association for Project Management (APM) (2004) succinctly defines the governance of projects as Governance of project management (GoPM) concerns of those areas of corporate governance that are specifically related to project activities.

Effective project governance ensures that projects are pre-empted for success. According to Weaver (2007), a survey in 2005 by the project management office (PMO) found that 87% of organisations do not align projects strategically with governance. Projects deliver new capabilities to organisations that contribute to generating revenue or reduce costs. Significant changes in the cost, risk, requirements or the project's completion date will impact upon the timing of future cash flow into the organisation. Consequently, a key focus of effective project governance is monitoring and forecasting the effects of project performance in the organisation.

The challenges facing the banking industry relies on projects to instigate change and to grow in value by moving from an ad-hoc system of doing a project to one that is robust and meets the regulatory governance requirements. This transition requires an active involvement of all stakeholders who wield authority and have the capability to implement an effective framework (Weaver, 2005).

### **2.7.1 King III report**

As well as being a strategic asset to the company, IT also presents organisations with significant risks. The strategic asset of IT and its related risks and constraints should be well governed and controlled to ensure that IT supports the strategic objectives of the organisation. For South African entities, one of the most vital guiding principles on what constitutes good corporate governance is the King Report, issued by the South African Institute of Directors. The King I and King II Reports (2001; 2002) on corporate governance are leading sources of information relating to the concept of corporate governance in South Africa.

The King I and II Reports provide guidelines and principles relating to best practices for corporate governance in the South African context (Buys, 2009). The King III Report was released in September 2009. For the first time, the report particularly addressed IT governance. King III became operational on 1 March 2010 and applied to all corporate entities, regardless of their size and whether they are listed or not. The previous King Reports (King I of 1994 and King II of 2002) applied only to listed entities and did not address any IT governance issues. For this reason, it is necessary for all entities in South Africa to grasp the implications of King III for IT governance and to understand what they can do to meet these requirements (Buys, 2009).

The King III Report (2009) on corporate governance states that the use of an IT governance framework during process definition could be beneficial. One of the comprehensive frameworks available is Control Objectives for Information and Related Technology (CobiT) issued by ISACA. This report makes mention of the fact that CobiT can be used to assess and implement IT governance, although it does not state how. The King III Report introduces some IT governance concepts that are not covered by CobiT. These are as follows:

- i) The board is responsible for IT governance.
- ii) The audit and/or risk committee must be established by businesses to assist the board of directors, which is likely to lead to improved project management and cost management of IT projects, and to enable the alignment of IT and business in reaching enterprise goals (Nolan & McFarlan, 2005).
- iii) Chief Information Officers (CIOs) must be appointed and charged with the management of the IT function to communicate effectively regarding IT matters with the board of directors, as well as with management.
- iv) Internal audit teams must be employed and must have the duty to report to the audit committee, ensuring that a risk-based internal audit is conducted to evaluate IT risks, IT management and IT governance in particular.
- v) The King III Report (2009) recommends the adoption of eco-friendly IT and sustainability, requiring entities to consider the use of green IT principles and focus on the viability of IT and operations during the strategic alignment of business and IT.

In summary, the King III Report on corporate governance recognises that IT has become a vital ingredient of today's organisations, because it is crucial to the backing, development and continuity of organisations. This report is hailed for cutting across all aspects, components and processes of businesses and is thus not only an operational enabler for an organisation but a crucial strategic asset that can be leveraged to create opportunities and to gain competitive advantage.

At the time of writing this thesis, King IV is currently under review and is to be published at the end of 2016.

## **2.8 Theoretical framework**

The theoretical framework of this research study emanates from the view that project managers are considered effective once they have customised and utilised frameworks

incorporating proper regulations and governance on a project in the correct manner. A framework is a structured, standard set of procedures, processes and guidelines used for one or more phases of the project lifecycle (Harper, 2010). A project framework will be a knowledge base containing guidelines, standard procedures, tools and techniques to support the implementation of successful projects. Without a framework in place, the project team members will not focus on the same goal. If there is no framework, it leads to a despondent team that eventually may lead to project failure.

A framework is a related and complementary component of successful implementation of projects. Organisations' CIOs are being placed under much pressure to ensure that projects are delivered successfully within a project management framework (Dimension Data, 2009).

It is challenging to implement small or extensive complex projects without using a framework. A framework can reduce the project timelines and significantly improve the quality of the systems. Projects implemented with a framework are consistently of a higher quality and have higher success rates (Iqbal *et al.*, 2011).

### **2.8.1 Governance framework for IT projects**

KPMG (2005) recommends that one of the key practices to extract value from IT projects is to establish an integrated governance framework end to end, driven by a senior executive. The framework should enable informed decisions using a consistent approach. This governance framework should influence each project and include consolidated project performance reporting. Agreeing to this approach, Klakegg *et al.*, (2008) advise that the main focus be effective governance of project management to ensure that an organisation's project is aligned to its organisational objective. There are three main goals, namely: choosing the appropriate projects, delivering chosen projects efficiently, and ensuring the projects are sustainable.

The second of these goals, delivering the chosen project efficiently, is paramount and involves establishing a framework around governance. It is, therefore, critical to adopt a framework incorporating governance to deliver the projects successfully. According to Weaver (2007) there is not enough evidence of a framework that effectively incorpo-

rates governance. As such, there is a need to ensure projects undertaken by the organisation are optimised to meet the strategic objectives of the organisation.

### **2.8.2 Information technology as a competitive tool**

Organisations gave some reasons why they have an interest in IT. The most common ones include the need to sustain and improve competitive positions, to increase revenue or reduce costs or to improve flexibility and responsiveness. While these are important, many organisations are driven simply by the need to survive in an extremely competitive marketplace. Thus, while it could be argued that banks install ATMs to increase customer service, the reality is that once one bank had installed ATMs, competitors were left with little choice but to match that investment — the price that has to be paid to stay in the market. While it may be difficult to qualify the benefits of investing in IT, the downside of taking no action is often unpleasant and there for everyone to see. Peppard (1993) identifies the following reasons why IT has become increasingly strategic in nature:

- i) The long-term nature of IT investment and the time it can take to develop a new system demand that organisations strategically plan their requirements. The cost of maintaining existing systems and the significant investment in time and money required developing new systems.
- ii) Within corporate strategy, IT has an increasingly important role to play as it significantly impacts the choice of option open to an organisation and plays a significant role in the efficient implementation of a corporate strategy,
- iii) Through the use of expert systems and executive information systems, IT affects the process of strategy development as it provides more information to managers (for decision making).
- iv) Senior management has greater access to information and reduced reliance on middle management to source that information. IT permeates the way organisations are structured and managed. IT has the potential to integrate different parts of the organisation and provide more useful information to managers.



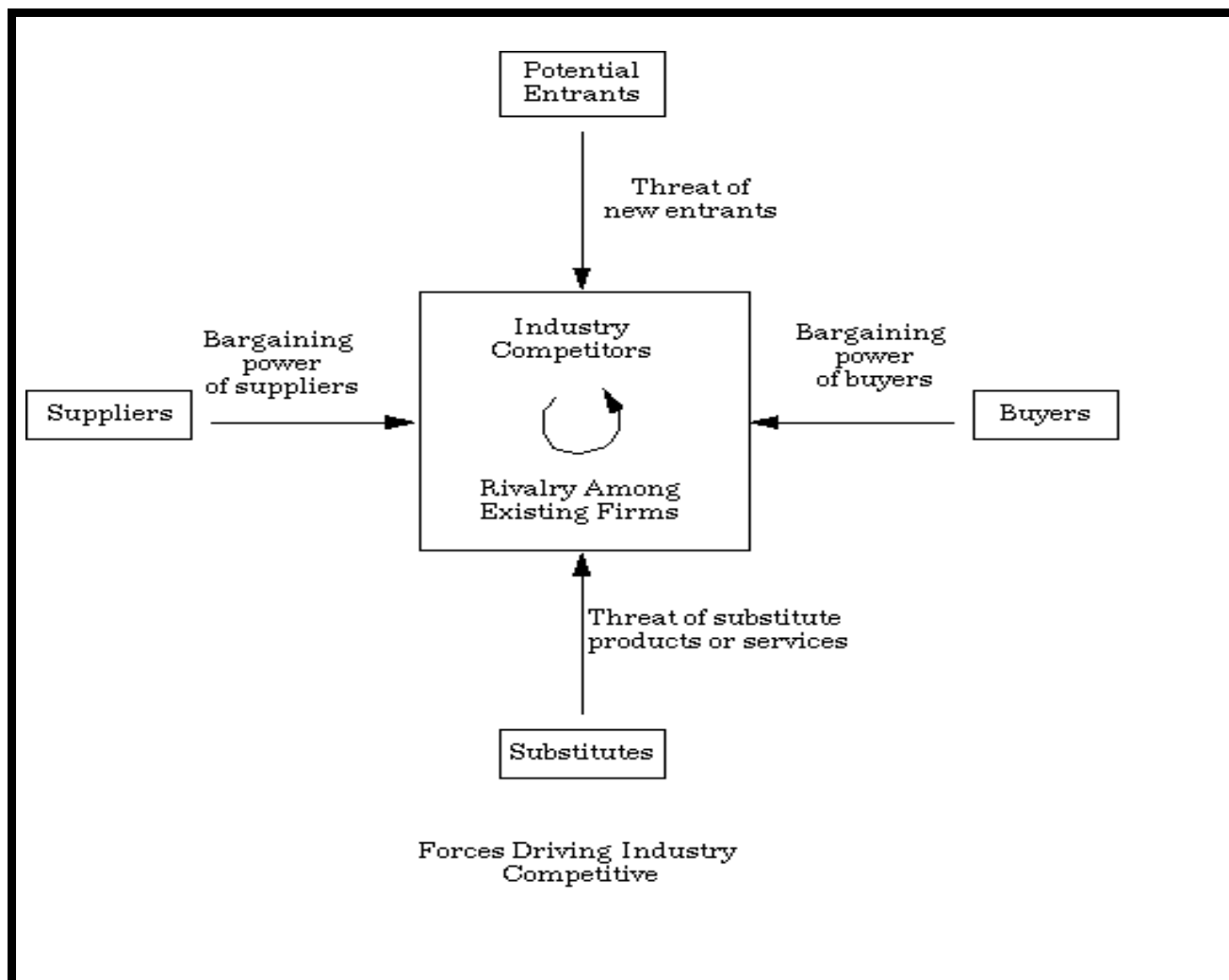
- v) As well as affecting the internal organisation, IT also impacts upon the organisation's interfaces with the external environment. This will have an effect on the organisation's long-term relationship with customers and suppliers.
- vi) IT makes an important investment in people and the way in which they do their work while representing a significant hardware and software investment.

Information is now treated as a corporate asset and competitive weapon and the focus is on exploiting IT for advantageous competitive purposes. Being competitive in the 21st century depends on the effective use and application of IT to manage the information resources. IT helps a business to reshape itself in response to the changing environment. In this role, IT with its strategic perspective, helps an organisation to achieve internal as well as external advantages. By applying IT in a novel way, it is possible to gain a competitive edge over one's competitors. Probably the most widely-cited example of IT application for competitive advantage is the American Hospital Supplies Company (AHS). Direct IT links were established with their customers by giving them terminals which were directly linked to their computer systems. Porter & Millar (1985) proposes that an organisation which is industry competitive, would change fundamentally as the influence of IT has been so far reaching.

### **2.8.3 Frameworks for competitive advantage**

Frameworks provide a structure to analyse the issues and to also understand the relationships between competitive strategies and IT. Some authors put forward several frameworks to help managers identify potential information systems which can give organisations competitive advantages. Many of these have their origins in Michael Porter's work on obtaining a competitive advantage within an industry. A brief outline of some of the frameworks is described in Figure 2.1. Porter (1979) first presented a succinct and clear view of the factors shaping competition. Porter views an industry as consisting of organisations jockeying for preferred positions while being impacted by the bargaining power of suppliers, the bargaining power of customers, the threat of new entrants and the threat of substitute products or services. These forces, while affecting all competitors, must be contented with strategically by the organisation if it is to grow and

prosper. Porter suggests that companies need to address strategic action based on the factors identified in the framework. These actions consist of diminishing customer or supplier power, lowering the threat of substitute products entering the marketplace, discouraging new entrants, or gaining a competitive edge within the existing industry.



**Figure 2.1: Michael Porter's competitive model**

Source: Roger Clark, *The Path of Development Strategic Information System Theory*, 1994

McFarlan, Mckenney & Pyburn (1983) subsequently mapped the competitive application of an information system onto Porter's Five Forces Model. They proposed five questions for assessing the strategic impact of an information system of an organisation. If a particular question is answered in the affirmative, he concluded that a strategic opportunity exists.

According to Mcfarlan, Mckenney & Pyburn (1983), the five questions are:

- i) Can information systems be used to build barriers against new entrants?
- ii) Can information systems be the basis of competition?
- iii) Can information systems be used to generate new products?
- iv) Can information systems be built in switching costs?
- v) Can information systems change the balance of power in supplier relationships?

## **2.9 Theoretical information on technology frameworks**

The success of the implementation of IT frameworks requires one to have a thorough understanding of the various frameworks and the relationships they share (Siviy *et al.*, 2005). The study aimed at providing the reader with a comprehensive understanding of theoretical frameworks of the four selected IT frameworks (ITIL, CobiT, CMMI and PMBOK) whereby objectives, strengths, weaknesses and features were identified. In addition, business cases and risks that drive the decision to adopt a particular framework are discussed.

### **2.9.1 Information technology infrastructure library (ITIL)**

Information technology infrastructure library (ITIL) is a framework of best practices focusing on IT service management (Arraj, 2010; Xansa *et al.*, 2007). According to Arraj (2010) ITIL confirms that service is the direct value added to customers. According to Xansa *et al.*, (2007), the key principles that make up the ITIL service lifecycle, demonstrated in Figure 2.2, include service strategy which provides IT service providers and customers' guidelines, followed closely by service design, which provide guidelines for designing services to meet business requirements. Focusing on the implementation of a service lies within the domain of service transition. Service operations delivers service level agreements, manages application and supports the service being offered to the customers. The continual service improvement will allow for maintaining the value created by the service. Further principles are defined in Figure 2.2.

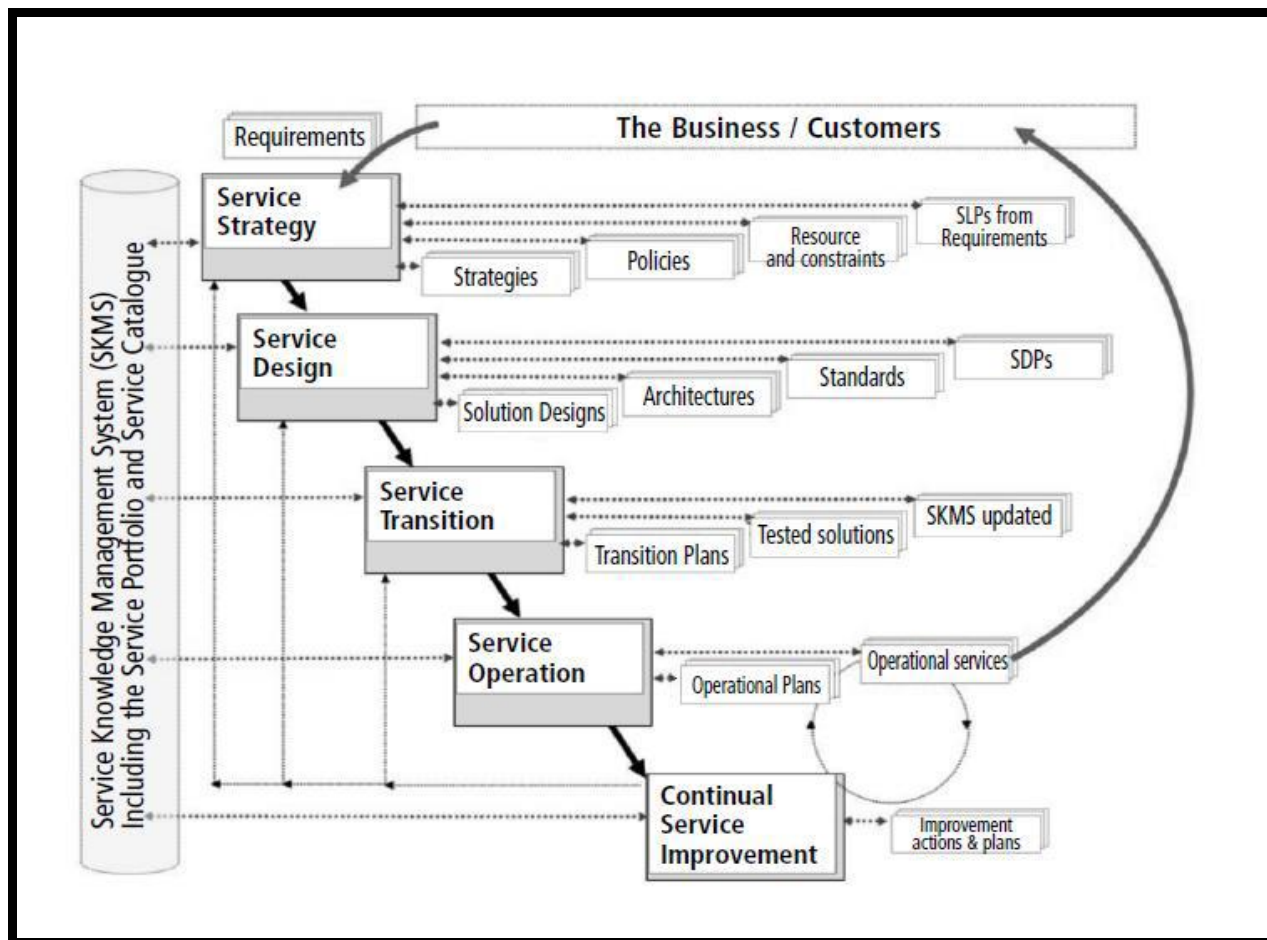


Figure 2.2: The service life cycle defined in ITIL

Source: Xansa, et al., 2007

According to Xansa *et al.*, (2007), each of the principles in the ITIL service lifecycle consists of the features defined in Table 2.1.

Table 2.1: ITIL service lifecycle

Service strategy	Service design	Service transition	Service operation	Continual service improvement
<ul style="list-style-type: none"> <li>• Competition and market space</li> <li>• Service value</li> <li>• Service provider types</li> <li>• Service management as a strategic Asset</li> <li>• Critical success factors (CSFs)</li> <li>• Service oriented accounting</li> <li>• Service provisioning frameworks</li> <li>• Organisation design and development</li> <li>• Financial Management</li> <li>• Service portfolio management (SPM)</li> <li>• Demand management</li> </ul>	<ul style="list-style-type: none"> <li>• Service design package (SDP)</li> <li>• Service catalogue management (SCM)</li> <li>• Service level management (SLM)</li> <li>• Capacity management</li> <li>• Availability management</li> <li>• IT service continuity management (ITSCM)</li> <li>• Information security management (ISM)</li> <li>• Supplier management</li> </ul>	<ul style="list-style-type: none"> <li>• Change management</li> <li>• Service asset and configuration management (SACM)</li> <li>• Knowledge management</li> <li>• Transition planning and support</li> <li>• Release and deployment management</li> <li>• Service validation and testing</li> <li>• Evaluation</li> <li>• Service transition stage operational activities</li> </ul>	<ul style="list-style-type: none"> <li>• Event management process</li> <li>• Incident management process</li> <li>• Request fulfilment process</li> <li>• Access management process</li> <li>• Problem management process</li> <li>• Common service operation activities</li> <li>• Service desk function</li> <li>• Technical management function</li> <li>• Application management function</li> <li>• IT operations management function</li> </ul>	<ul style="list-style-type: none"> <li>• 7-step improvement process</li> <li>• Service measurement</li> <li>• Service reporting</li> </ul>

Source: Xansa, *et al.*, 2007

According to Worthen (2005:119) "ITIL cannot be implemented simply as a project without on-going maintenance". In order to reap the benefits of ITIL, organisations should implement it as an enterprise resource planning (ERP) solution where the process of ITIL within the organisation is tracked over periods of years rather than months. The main benefits of ITIL, according to Arraj (2010) and Xansa *et al.*, (2007), are business and IT alignment. Improved customer satisfaction and customer services. Efficiency and consistency in processes allows for customer expectations to be met. Measurably improved services that can be linked to business revenue and profitability, and a common language across the organisation.

With the majority of organisations, including banks, using ITIL as their primary IT framework, implementing the best practices creates several challenges within an organisation such as staff resistance to change, conflicts with tasks and ambiguous objec-

tives (Sharifi *et al.*, 2008). Herold (2007) mentions several ITIL challenges, which included that ITIL is time-consuming to implement, as it requires sufficient skilled resources and support tools, with time and lack of knowledge being a challenge. Sharifi *et al.*, (2008) further clarify what other challenges organisations will face when implementing ITIL. These include a lack of management commitment, time wastage on complicated process diagrams, no clear work instructions or guidelines, not assigning ownership, too much focus on performance rather than on quality, being too ambitious too soon, losing momentum after initiation and creating silos within the different departments.

Marquis (2006) identifies traits for the successful adoption of ITIL, namely: understanding the politics of ITIL; acknowledging that ITIL is an IT implementation; management commitment; determining the goal; simplifying the implementation and acknowledging that ITIL is a process. ITIL is not a stand-alone process either — it needs to be implemented as a project, preparing for the challenges of change and learning how to use ITIL in the organisation.

ITIL is typically implemented in organisations which have business objectives for defining service processes for the customers of IT and the customers of the organisation, improving the quality of service offered and centralising the help desk operations (IT Governance Institute, 2007). One of the main risks associated with the implementation of ITIL, according to the IT Governance Institute (2007), is erroneous support processes due to a lack of awareness. Table 2.2 summarises the strengths and weaknesses encountered by ITIL users.

**Table 2.2: Strengths and weaknesses of ITIL**

ITIL strengths	ITIL weaknesses
Reputation and maturity by providing detail in terms of quality of the production and operational processes (Wessels & Van Loggerenberg, 2006)	Failure to address the software development life cycle (SDLC) and quality issues related to operational systems (Wessels & Van Loggerenberg, 2006)
The continuous feedback throughout the service lifecycle, ensuring optimisation and business value (Office of Government Commerce 2010)	Governance is the weakest link in the ITIL service sourcing strategy (Office of Government Commerce, 2010)
If ITIL is implemented properly, it has the following impact on an organisation: <ul style="list-style-type: none"> <li>○ Improved quality of service</li> <li>○ Increases system uptime</li> <li>○ Efficient problem resolution</li> <li>○ Improved IT security</li> </ul> (Worthen, 2005)	The ITIL best practices defined do not offer guidance on the actual application of ITIL within the organisation. The organisation must customise their individual best practices based on ITIL principles (Worthen, 2005)

Source: adapted from Worthen, 2005

### 2.9.2 Capability maturity model integration (CMMI)

Capability maturity model integration (CMMI) is based on software development principles and has a generic focus, providing guidelines for process improvement within an organisation (CMMI Product Team, 2006). CMMI is made up of a combination of quality, standards and maturity.

The continuous representation framework comprises four capability levels, whereas the staged representation framework comprises five maturity levels. The maturity standards of an organisation, used to classify its performance in terms of process improvements, include: Initial, Managed, Defined, Quantitatively Managed and Optimised. It is critical to note fewer software defects correlate with higher CMM levels, but the highest CMM rating does not necessarily guarantee the greatest savings for customers. Level 5 CMMI might be excessive (King II, 2003).

Glazer (2008) states that CMMI is not a process standard but a framework. There are several challenges that organisations can face when implementing CMMI. These include:

- i) Resistance to change, primarily due to a lack of knowledge. No official documentation.
- ii) The misuse of CMMI as a standard regarding it being auditable, testable, compliant with work processes, acceptable and verifiable in outputs.
- iii) Inaccurate information about CMMI and its implementation, hence the misuse of the framework.
- iv) Trouble in understanding the terminology used within the CMMI framework, mostly terminologies that have dual meanings. This results in the framework being subject to individual interpretation (Cyran & Cusick, 2006; Glazer, 2008).
- v) The insistence of an organisation to accomplish technology maturity results and the organisation losing focus on its performance. This insistence may also lead to the wrong principles being enforced and strict processes being designed specifically to project needs, rather than processes being designed for long-term strategic use (Glazer, 2008).
- vi) Glazer (2008) also highlights that, nevertheless of the technology maturity one pursues, the maturity framework cannot thwart the effect of an employee's private life on his/her efficiency in his/her job.

Lebsanft (2001:105) mentions that "CMMI does not imply that an organisation must produce piles of documentation. Instead, it specifies that the processes and procedures followed by the organisation must be clearly and adequately defined to avoid misinterpretation. Investing in achieving a particular level of IT maturity in isolation will not be beneficial to the organisation in the long term". Goldenson, Gibson & Ferguson (2004) identified seven benefits of CMMI, including: process adherence, cost savings, impact on the project schedule, increased productivity, improved quality, increased customer satisfaction and improved return on investment.

Business drivers for implementing CMMI usually include: assessing the maturity of current business processes; improving processes within organisational structures; the need for benchmarking processes against other organisations; improving productivity, thereby decreasing project risks and reducing software defects. The outcome of this is usually customer satisfaction (IT Governance Institute, 2007). Risks that can be correlated with the implementation of CMMI include: ineffective and inefficient approaches to process



improvement, the inability of benchmarking the organisation against other organisations and a decrease in project quality primarily due to poorly defined processes (IT Governance Institute, 2007).

Table 2.3 summarises the main strength and several weaknesses encountered by CMMI users.

**Table 2.3: Strengths and weaknesses of CMMI**

CMMI strengths	CMMI weaknesses
Process improvement across the organisation based on maturity and capability frameworks (King 2003; CMMI Product Team, 2006).	Too much focus on levels and ratings, not enough focus on measured results and the interpretation of such data (Staples <i>et al.</i> , 2006).
	Goldenson <i>et al.</i> , (2004) highlight that one of the most critical dimensions of an organisation that CMMI fails to cover is people issues.
	CMMI is time-consuming and costly to implement for several organisations. However, these organisations acknowledge the benefits that CMMI has to offer (Staples <i>et al.</i> , 2006).

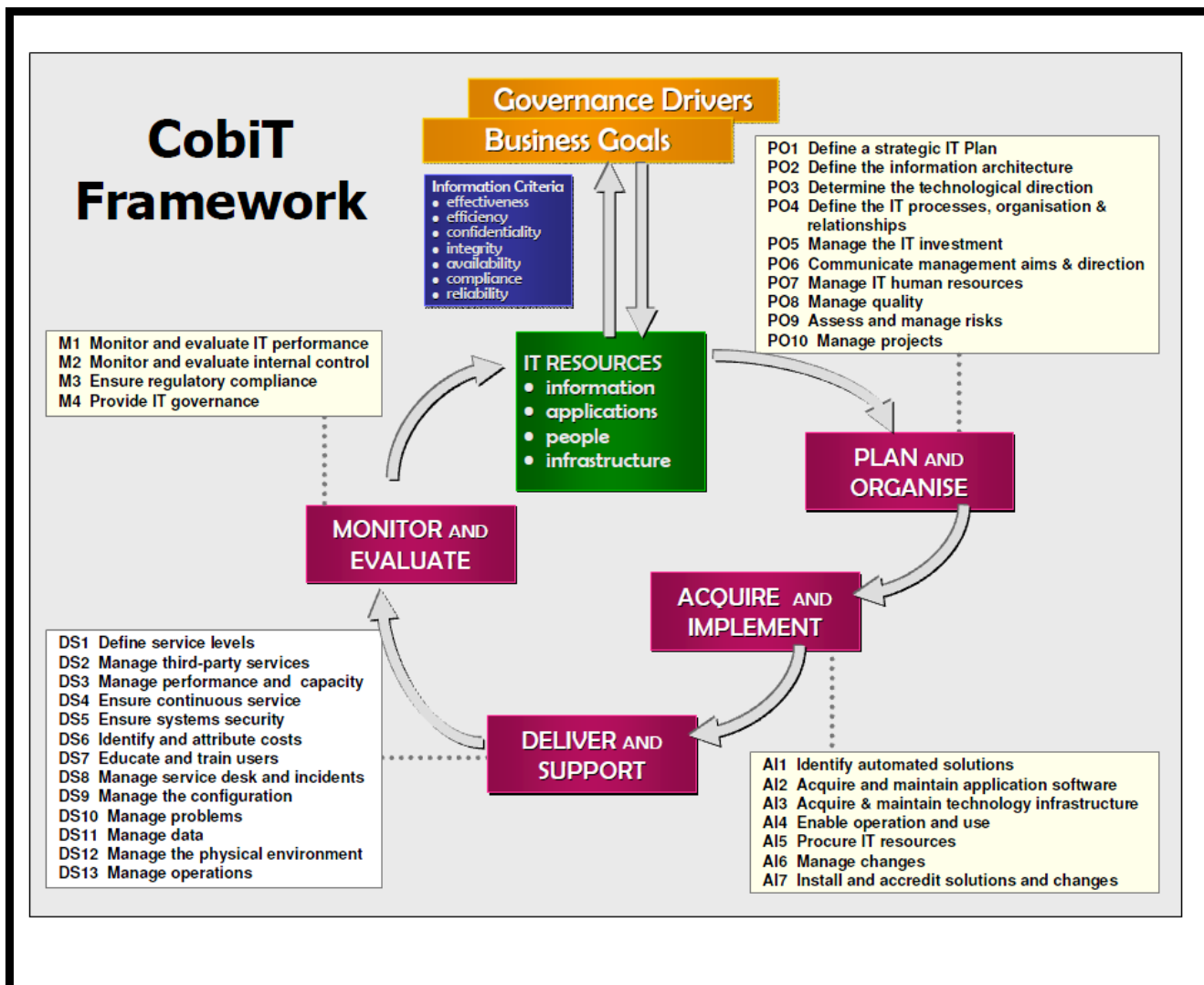
Sources: King (2003) and Staples *et al.*, (2006)

### **2.9.3 Control objectives for information and related technologies (CobiT)**

According to Radovanovi *et al.*, (2010) control objectives for information and related technologies (CobiT) is an international standard, prescribing IT governance. CobiT incorporates business and IT goals in its monitoring of the metric information system (Radovanovi *et al.*, 2010). CobiT encompasses 34 key business processes, over 300 IT controls and four main domains. These domains include: planning and organisation, acquisition and implementation, delivery and support and monitoring and evaluation (Radovanovi *et al.*, 2010). CobiT was initially intended to be used by organisations for benchmarking; subsequently it has been used for internal and external auditing of systems (Tuttle & Vandervelde, 2007).

Tuttle & Vandervelde (2007) describe the conceptual underlying framework for CobiT to meet business needs, which includes seven criteria, namely: effectiveness, efficiency, confidentiality, integrity, availability, compliance and reliability. CobiT focuses on five primary elements, namely: IT functional value, alignment, risk management, perfor-

mance management and responsibility (Rouyet-Ruiz 2008). CobiT, similar to the other IT frameworks, consists of several process areas as illustrated in Figure 2.3 (IT Governance Institute, 2007).



**Figure 2.3: CobiT framework**  
 Source: IT Governance Institute, 2007

The IT Governance Institute (2007) highlights some of the benefits of CobiT, which include: improved alignment between IT and business; clear ownership and responsibilities and sharing of a common language between IT and business. Challenges faced by implementing CobiT include: no inter process relationships resulting in a silo approach to implementation, not addressing sustainable improvement for future enhancements, setting the expectation of technology to overcome business shortcomings and insufficiently skilled resources (Van Bon & Verheijen, 2006).

CobiT is usually implemented when there is a business need for IT governance and alignment of IT goals to the organisational objectives. As well as standardisation of IT processes, a framework for IT processes to be unified, a need for a quality management system, where mergers and acquisitions are in progress, to implement cost control within IT, if aspects of IT functions are outsourced or for regulatory compliance (IT Governance Institute, 2007). However, the corresponding risks as a result of CobiT are misalignment within the IT services, poor business support, wastage or missed opportunities, shortfalls between expectations and performance metrics, excessive IT costs, or dissatisfied customers, either business users or external customers (IT Governance Institute, 2007).

Several of the strengths and weaknesses of CobiT are discussed in Table 2.4.

**Table 2.4: Strengths and weaknesses of CobiT**

CobiT strengths	CobiT weaknesses
CobiT achieves strength in the following elements due to its focus on process improvement and auditing controls: <ul style="list-style-type: none"> <li>○ Performance measurement,</li> <li>○ Value creation,</li> <li>○ Risk management</li> </ul> (Rouyet-Ruiz, 2008).	CobiT has strength in alignment between the IT activities and the IT goals. However, the weakness in CobiT is that it does not show suitable controls to align business and IT goals (Rouyet-Ruiz, 2008).
CobiT focuses on every aspect of IT management and control, ensuring that IT investment maximises the business value obtained (Symons 2006; Wessels & Van Loggerenberg, 2006).	CobiT guides an organisation to where it wants to be but does not guide the organisation on how to get there (Symons, 2006; Wessels & Van Loggerenberg, 2006).
CobiT can be audited and complies with regulatory requirements (Symons, 2006; Wessels & Van Loggerenberg, 2006).	CobiT fails to address the SDLC and continuous process improvement (Radovanovi <i>et al.</i> , 2010).
CobiT is superior regarding ITIL and ISO 27002 by 69% when it comes to IT audit (Radovanovi <i>et al.</i> , 2010).	

Source: Adapted from IT Governance Institute, 2007

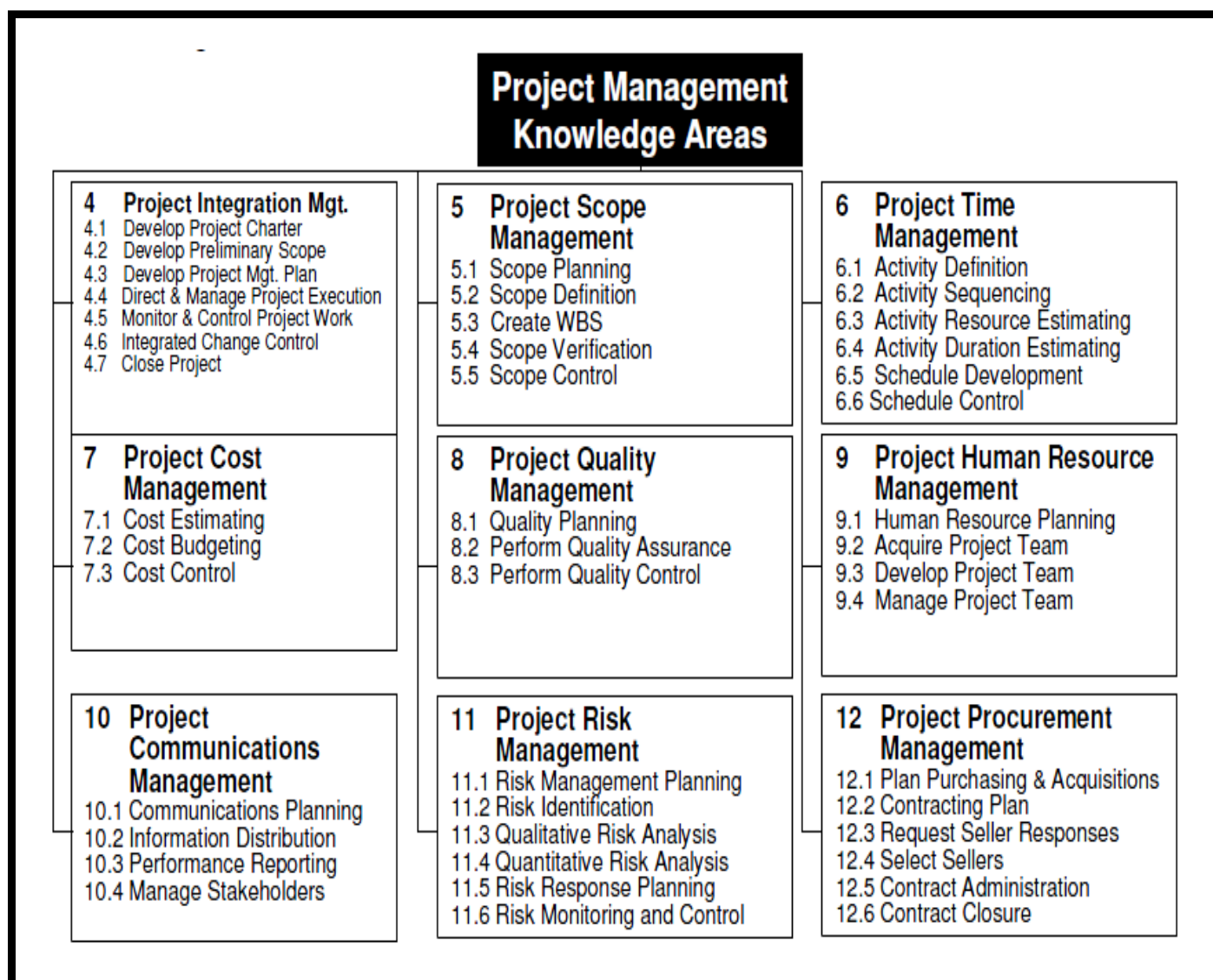
#### 2.9.4 Project management body of knowledge (PMBOK)

The best practices for project management are identified in the Project Management Body of Knowledge Guide (PMBOK) (Project Management Institute 2010). Boyce & Milson (2010) mentioned that the intention of PMBOK is not to be a framework, but rather to be a guide to best practices. PMBOK defines five basic groups namely initiating,

planning, executing, controlling, monitoring and closing. In addition, PMBOK classifies nine main features, as discussed by the Project Management Institute (2010):

- i) **Project integration management:** Encompassing the development of a project charter and project plan, managing the project execution, monitoring and controlling the project work, performing integrated change control and closing the project.
- ii) **Project scope management:** This feature includes ascertaining requirements, defining the extent of the project, creating a work-breakdown structure, verifying the scope with the relevant stakeholders and controlling the scope of the project.
- iii) **Project time management:** Involves defining and sequencing the activities of the project, estimating the resource utilisation, developing and controlling the project schedule.
- iv) **Project cost management** Includes an estimation of the project cost, determining the budget and costs associated with the activities, and controlling the costs.
- v) **Project quality management:** Consists of identifying the quality requirements, ensuring quality assurance, and performing quality control of the activities.
- vi) **Project human resources management:** Identifying the roles and responsibilities of those involved in the project and acquiring, developing and managing the project team, ensuring adequate skilling.
- vii) **Project communications management:** Covers identifying the project stakeholders and a communication plan, distributing information efficiently, managing expectations and reporting transparent performance.
- viii) **Project risk management:** Determines how to conduct the risk analysis, identify risks that could affect the project by performing the risk analysis both qualitatively and quantitatively, defining a risk mitigation plan, monitoring and controlling the risks.
- ix) **Project procurement management:** Determining the procurement requirements for the project, identifying suitable vendors, and conducting, administering and closing off the procurement.

Details of these PMBOK knowledge management areas are illustrated in Figure 2.4.



**Figure 2.4: PMBOK framework**  
 Source: Project Management Institute, 2010

The benefit of PMBOK, according to Boyce & Milsom (2010), is that it creates a uniform set of vocabulary, which presents standard definitions. This is a combination of all project management knowledge which is readily available, and is not strict. Organisations do not need to adjust drastically to accommodate PMBOK. When implementing PMBOK, the most common challenge faced by organisations is the resistance to change by some employees within the organisation. Change can be effectively dealt with provided support is provided from executive management.

In order to define data dictionaries for project management and to gain insight into proven best practices, PMBOK should be implemented. However, mismanagement of the implementation of PMBOK could result in inconsistent project management practices and an increase in the risk of project failure (IT Governance Institute, 2007).

As with other IT frameworks, PMBOK has its strengths and weaknesses, as depicted in Table 2.5:

**Table 2.5: Strengths and weaknesses of PMBOK**

PMBOK strengths	PMBOK weaknesses
Describes the responsibility of a project manager and interaction with project sponsor (Webber & Webber, 2009).	PMBOK can become very complex and excessive for small projects (ur Rehman & Hussain, 2007).
Encourages the use of a monitor process and problem detection process (Webber & Webber, 2009).	It does not prescribe a specific project life cycle. Instead it provides the appropriate phases of the life cycle, thereby creating complexity when it comes to small projects (ur Rehman & Hussain, 2007).
Details issues surrounding people such as team acquisition, training, recognition (Webber & Webber, 2009).	Documentation is too generic and needs to be customised by the organisations that could result in misinterpretation (ur Rehman & Hussain, 2007).

Sources: Webber & Webber (2009) and ur Rehman & Hussain (2007)

### **2.9.5 PRINCE2 as a framework**

Projects IN Controlled Environments (PRINCE) is a project management methodology that covers the management, control and organisation of a project. "PRINCE2" refers to the second major version of this method launched in 1996 and is a registered trademark of the Cabinet Office, formerly with the Office of Government Commerce (OGC). PRINCE2 is currently on its 5th edition/revision which is widely known as PRINCE2, 2009. PRINCE2 has become increasingly popular and is now a *de facto* standard for project management in the UK.

PRINCE2 is defined as a process driven framework using seven PRINCE2 processes as indicated below:

- Starting Up a Project
- Initiating a Project
- Directing a Project

- Managing a Stage Boundary
- Controlling a Stage
- Managing Product Delivery
- Closing a Project

PRINCE2 is a structured approach to project management. It provides a method for managing projects within a clearly defined framework. PRINCE2 describes procedures to coordinate people and activities in a project, how to design and supervise the project and what to do if the project has to be adjusted if it does not develop as planned. In the method, each process is specified with its key inputs and outputs and with specific goals and activities to be carried out, which gives an automatic control of any deviations from the plan (<http://www.projectinabox.org.uk/prince2methodology.asp>) and ([http://www.cio.com.au/article/402347/pmbok\\_vs\\_prince2\\_vs\\_Agile\\_project\\_management/](http://www.cio.com.au/article/402347/pmbok_vs_prince2_vs_Agile_project_management/)).

Divided into manageable stages, the method enables an efficient control of resources. Based on close monitoring the project can be carried out in a controlled and organised way. Being a structured method widely recognised and understood, PRINCE2 provides a common language for all participants in the project. The various management roles and responsibilities involved in a project are fully described and are adaptable to suit the complexity of the project and skills of the organisation.

PRINCE2 is sometimes inappropriately considered for very small projects, due to the work required to create and maintain documents. However, this may often be because of poor implementation.

## **2.10 Popular IT frameworks for best practices**

Symons *et al.*, (2005:4) observed that most IT governance frameworks are complementary to each other. In essence, providing organisations with the 'best of both worlds'. It is important for organisations to 'map' the framework to the process, not the process to the framework (Siviy *et al.*, 2005). There are numerous governance / best practice frame-

works available to the different IT operational intents (Cater-Steel, Tan & Toleman, 2006). The frameworks chosen for this research study are:

- i) Capability Maturity Model Integration (CMMI)
- ii) Control Objectives for Information and Related Technology (CobiT)
- iii) Project Management Board of Knowledge (PMBOK)
- iv) Information Technology Infrastructure Library (ITIL)
- v) Waterfall model
- vi) Agile framework

The rest of this chapter will be dedicated to an in depth discussion of the first four frameworks. Chapter Three addresses the Waterfall framework and Agile framework.

The purpose is to provide insight into the implementation of IT frameworks, as well as to show how to best implement each of the chosen frameworks, resulting in best practices for implementing IT frameworks, as illustrated in Table 2.6.

**Table 2.6: Proposed IT Frameworks for best practices**

Framework	Latest Version	Previous Version
CMMI	Version 1.3 (2010)	Version 1.2 (2006)
ITIL	Version 3 (2007)	
CobiT	4.1 Edition (2007)	
PMBOK	4 <sup>th</sup> Edition (2009)	

Source: own

### **2.10.1 Considerations for implementing IT frameworks**

The King III report (2009) defines IT governance as the effective and efficient management of IT resources to facilitate the achievement of corporate objectives (Liell-Cock, Graham & Hill, 2009). Symons *et al.*, (2005) add to the definition of IT governance by defining it simply as the process by which decisions are made by IT investments.

All organisations have some form of IT governance. However, many of these organisations have governance processes that are ad hoc and informal due to minimal con-



sistency in their decision making and monitoring of outcomes (Symons *et al.*, 2005). According to Symons *et al.*, (2005), good IT governance requires a framework that is made up of three components namely structure, process, and communication. On the contrary, Liell-Cock *et al.*, (2009) claim that measurement, control and direction form the main framework of IT governance. It is further stated in the King III Report that boards of organisations are responsible for IT governance frameworks that are selected for implementation. In support of King III, Hardy (2006) advises that senior management needs to understand IT frameworks in detail - understanding their standards, overlaps and how it can be used to govern the organisations effectively. By involving senior executives, or management, organisations can avoid situations whereby the implementation of IT frameworks is costly, unfocused on business objectives and treated as a technical guidance (Hardy, 2006).

According to literature, in order to successfully implement IT frameworks, the following should also be considered by organisations as critical success factors:

- i) Setting up of the appropriate tools and techniques for processes for both implementation and future maintenance (Neničková, 2011). In addition, the application of these tools and techniques must be aligned to and integrated into organisations' risk management processes and control frameworks (Hardy, 2006).
- ii) Alignment between the business strategy and IT (i.e. the connection between strategic business objectives and striving towards similar goals (Neničková, 2011).
- iii) Most frameworks provide detailed processes regarding tracking incidents, identifying problems, etcetera. However, for employees to benefit from these processes, they need to follow them. It can be an organisational challenge to change the behaviour of workers to adjust to the respective frameworks (Worthen, 2005). Performance management and tracking can ensure a balance between the outcomes expected by business and IT experts (Neničková, 2011).
- iv) Transforming the leadership from being reactive to being proactive: strategic leadership (Neničková, 2011).

- v) Define clear roles and responsibilities for the implementation process and have a conflict-management system in place (Neničková, 2011).
- vi) The implementation of governance frameworks is difficult, can cause disruption in business activities and has a high risk of failure. Particularly, if there is a lack of sponsorship, investment and support from senior management (Heston & Phifer, 2009). Commitment and participation of senior management and other stakeholders are crucial, particularly for decision-making, management leadership and long-term commitment (Neničková, 2011).
- vii) Heston & Phifer (2009) argue that most organisations have limited experience when it comes to implementing governance frameworks. The number of standards that exist are excessive and often redundant, especially as organisations require straightforward frameworks that add value and are effective in terms of delivery and acceptance.
- viii) Awareness and understanding (such as business purpose and benefits, organisational learning, staff involvement, training and mentoring) of the framework that is being implemented will result in the acceptability of the framework (Neničková, 2011; Hardy, 2006). Furthermore, customising the frameworks to suit the organisational needs will make senior management aware of the value that IT best practices contribute to the business (Hardy, 2006).

### **2.10.2 ITIL and CobiT as complementary frameworks**

Literature works of the following authors have been used by the researcher to address the various IT frameworks: Cater-Steel, Tan & Toleman (2006); Hill & Turbitt (2006); Sahibudin, Sharifi & Ayat (2008); Wessels & Van Loggerenberg (2006) and Ehsan *et al.*, (2010).

Cater-Steel, Tan & Toleman (2006) indicate that CobiT and ITIL are complementary and when combined, can provide an organisation with powerful IT governance and best practices in IT support. They state that the primary reason ITIL and CobiT work well is that ITIL focuses on service management and operations in the IT sector, whereas CobiT focuses on governance and control in the IT space. CobiT focuses on IT processes

based on what organisations need, instead of how to achieve what the organisations want. ITIL focuses on best practices on how to get what organisations want by defining comprehensive procedures and processes, i.e. a roadmap on how to get there (Hill & Turbitt, 2006). ITIL aims to guide the organisation with best practices in aligning business and IT, whereas CobiT seeks to guide the organisation in terms of business needs and organisational goals. In addition, CobiT provides management with the direction in terms of control, monitoring, benchmarking of critical success factors, key performance indicators and key goal indicators (Hill & Turbitt, 2006).

Implementing governance frameworks is challenging, Hill & Turbitt (2006) are of the opinion that transition must be managed via business priorities. According to them, ITIL and CobiT are complementary frameworks and can be used concurrently to facilitate management and alignment of the IT and business objectives. A combination of ITIL and CobiT can result in improved quality, better customer services and costs reduction. In a comparison of ITIL and CobiT, undertaken by Sahibudin, Sharifi & Ayat (2008) it was noted that ITIL and CobiT are very similar in terms of defined processes.

According to Hill & Turbitt (2006) the CobiT framework can be used as an integrator between practices and strategic business objectives. Due to the generic nature of the processes defined in CobiT, additional specific processes and standards can easily be attached to the CobiT framework, thereby creating a chain of guidance. The CobiT framework enables organisations wanting to adopt ITIL to have an effective IT governance framework for the successful implementation of ITIL. In addition, CobiT has the capability to measure the organisation's performance in terms of its people, processes and technology (Hill & Turbitt, 2006).

According to Wessels & Van Loggerenberg (2006) the theoretical benefits of ITIL and CobiT include:

- i) reduced risks, enriched efficiency, additional control, pre-eminent practice, clear allocation of roles and responsibilities of IT functions;

- ii) effective management, improved control and standards, lower IT-related costs, prioritised IT initiatives, assurance of anticipated IT benefits;
- iii) improved product or service quality, more satisfied clients, shareholder contentment with the organisation’s success; and
- iv) position between IT and business strategies, return on investment, improved organisational success and value and competitive advantage.

Regardless of this long list of theoretical benefits, in practice, organisations could only identify with some of the benefits that materialise at the end of the implementation. It appears that organisations tended to implement IT frameworks with the aim of solving specific problems rather than as a strategic, long-term IT objective to prevent failures (Wessels & Van Loggerenberg, 2006).

According to the IT Governance Institute (2007), there are several CobiT features which are addressed in ITIL. ITIL addresses these features from a ‘how/who’ perspective, whereas CobiT addresses the ‘what aspect’. These features are illustrated in Figure 2.7.

**Table 2.7: CobiT versus ITIL**

CobiT (“what” factor)	ITIL (“how/who” factor)
<p><b>Plan and organise (PO)</b></p> <ul style="list-style-type: none"> <li>• PO3 determines technological direction</li> <li>• PO4 defines the IT processes, the organisation and its relationships</li> <li>• PO5 manages the IT investment</li> </ul>	<p><b>Service support</b></p> <ul style="list-style-type: none"> <li>• Incident management</li> <li>• Problem management</li> <li>• Configuration management</li> <li>• Change management</li> <li>• Release management</li> </ul>
<p><b>Acquire and implement (AI)</b></p> <ul style="list-style-type: none"> <li>• AI4 enables operation and use</li> <li>• A16 manages change</li> <li>• A17 install and accredit solutions and changes</li> </ul>	<p><b>Service delivery</b></p> <ul style="list-style-type: none"> <li>• Service level management</li> <li>• Financial management for IT services</li> <li>• Capacity management</li> </ul>

<p><b>Deliver and support (DS)</b></p> <ul style="list-style-type: none"> <li>• DS1 Define and manage service levels</li> <li>• DS2 Manage third-party services</li> <li>• DS3 Manage performance and capacity</li> <li>• DS4 Ensure continuous service</li> <li>• DS5 Ensure systems security</li> <li>• DS6 Identify and allocate cost</li> <li>• DS8 Manage service desk and incidents</li> <li>• DS9 Manage the configurations</li> <li>• DS10 Manage the problems</li> <li>• DS11 Manage data</li> </ul>	<ul style="list-style-type: none"> <li>• IT service continuity management</li> <li>• Availability management</li> </ul>
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Source: IT Governance Institute (2007)

### 2.10.3 ITIL and CMMI as complementary frameworks

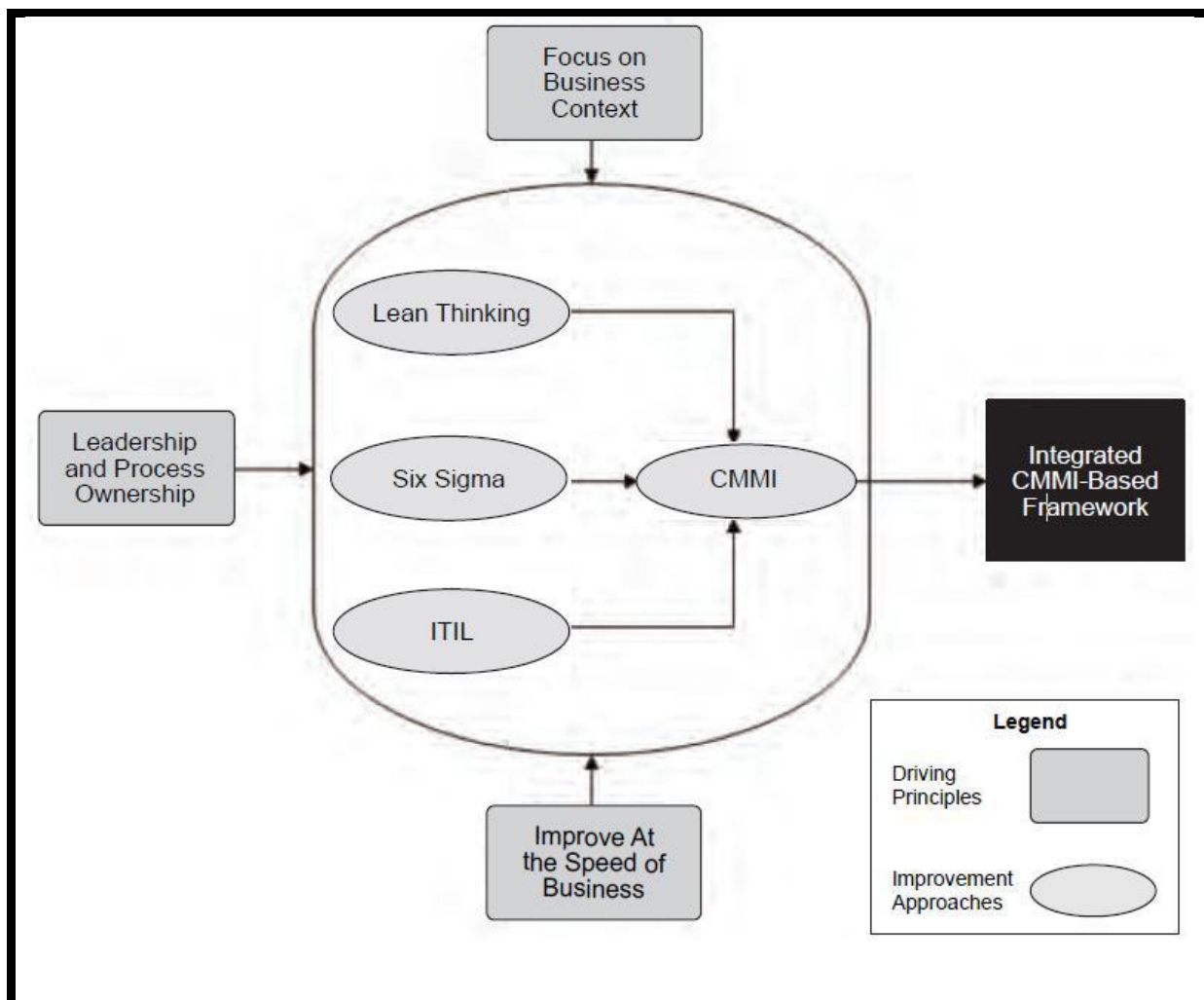
Ehsan *et al.*, (2010) admit that CMMI and ITIL clearly differ from each other. However, they are not mutually exclusive. For example, they differ in that CMMI focuses on continuous improvement and software process maturity, whereas ITIL focuses on infrastructure development. On the other hand, they are similar in that they are both built for continuous improvement and follow a structured approach. ITIL and CMMI can complement each other by implementing the elements of capacity, service level management and release management for hardware from ITIL and items such as release management for software from CMMI. CMMI does not address the hardware life cycle, which is a feature of ITIL version 2 (Ehsan *et al.*, 2010).

Although ITIL and CMMI are very similar in nature, they can still be integrated, providing organisations with an optimal solution (Ehsan *et al.*, 2010). For example, organisations should have ITIL as a framework in areas where ITIL functions well, such as service management, while, in other areas where ITIL is weaker, organisations can build CMMI into these processes, such as release management.

This notion is further supported by Dutton (2010) who mentions three driving principles to improve performance, namely: to focus on the problems and performance objectives of the organisation, to involve the owners of the process and the project and to imple-

ment improvements at the speed of the business. Based on these principles, Dutton (2010) suggests that Six Sigma (*a measure of quality that strives for near perfection*) be incorporated into stable CMMI processes that have been implemented. After this, Six Sigma can be used in the CMMI process to ensure efficiency and quality. This can, however, be a costly and time-consuming process. Hence the most appropriate approach will be to incorporate CMMI and Six Sigma, only when the organisation is at high maturity, (i.e. CMMI level 4 or 5).

Dutton (2010) mentions that the best practices for ITIL v3 should be incorporated into CMMI for services. However, several pitfalls of ITIL have been identified by Dutton, such as guides for improving on infrastructure that is weak in ITIL v3, the framework of ITIL v3 does not provide a basis for long-term process improvement. This is because the certification standard in ITIL v3 is outdated and does not guide continuously improving the IT service management. These pitfalls can be overcome by features in CMMI, hence the advantage of integrating these two complementary frameworks. Dutton (2010) proposes how to integrate CMMI, ITIL and Six Sigma as depicted in Figure 2.5.



**Figure 2.5: Integrating CMMI, Six Sigma and ITIL**

Source: Saxena & Maher, 2011

In a recent white paper by Saxena & Maher (2011) it was concluded that to offer organisations an improved management focus, a detailed service cycle and an effective implementation, CMMI and ITIL can be combined. This was based on the differences between ITIL and CMMI, as shown in Figure 2.5.

Saxena & Maher (2011) suggest that organisations will fulfil their organisational goals if they combine CMMI and ITIL and present three ways in which CMMI and ITIL can be combined to optimise value obtained from these implementations. These options will now be discussed and summarised in Table 2.8.

**Table 2.8: ITL versus CMMI**

	ITIL	CMMI-SVC
<b>Scope</b>	IT services only	Any type of service
<b>Model</b>	Collection of good practices	Well-defined model
<b>Architecture</b>	5 books covering IT service life cycle 4 functions Roles and responsibilities	Has 5 generic goals with generic practices, 24 processes areas with specific goals and specific practices
<b>Maturity model</b>	Some discussion of process maturity framework	Embodies process maturity framework
<b>Institutionalization</b>	Not addressed	Addressed through generic goals and practices
<b>Improvement</b>	Continual unexpected, not defined	Expected benchmark through capacity and maturity levels
<b>Project Management</b>	Addresses through reference to other sources: PRINCE 2, PMBOK, etc.	Explicitly addressed in process areas

Source: Saxena & Maher, 2011

- i) **Option 1:** While process, project and work management processes are used from the Capability Maturity Model Integration for Service (CMMI-SVC), use ITIL as the base framework whereby roles, policies, etcetera, are used from ITIL. The best practices for improvement and evolution should be adopted from CMMI-SVC.
- ii) **Option 2:** As the base where the project and work management from CMMI, and the service processes from ITIL are included, use the Capability Maturity Model Integration for Development (CMMI-DEV).
- iii) **Option 3:** This includes both CMMI and ITIL as a base, where service functions are extracted from ITIL and CMMI is used for addressing process improvement.

#### 2.10.4 ITIL and PMBOK as complementary frameworks

Budiman (2008) describes the complementary relationship that exists between ITIL and PMBOK. Despite ITIL and PMBOK being complementary, Budiman (2008) mentioned some of the differences and similarities between ITIL and PMBOK, which are indicated in Table 10.9. **Error! Reference source not found.** Table 2.9: Differences and similarities between ITIL and PMBOK

	ITIL	PMBOK
DIFFERENCES	Continuous service management	Temporary until projects are delivered
	Runs till the end of life	Services are definitive as projects have a life span
	Operation	Project aimed at achieving defined objec-



		tives
SIMILARITIES	Service strategy	Initiating
	Service design	Planning
	Service transition	Executing
	Service operation	Monitoring and control
	Continuous improvement	Closing

Source: Ehsan *et al.*, 2010

Ehsan *et al.*, (2010) concluded that ITIL and PMBOK have introductory and advanced certifications; both also share tools and techniques. Unlike ITIL, PMBOK certifications have strong educational and experience requirements.

Ehsan *et al.*, (2010) mentioned that ITIL is focused on service management and operations, whereas PMBOK is focused on project management. PMBOK has an explicit code of ethics unlike ITIL, and ITIL places an emphasis on process maturity, whereas PMBOK does not. In concluding, ITIL and PMBOK are similar, as both are aimed at professionalising their respective fields; both are prescriptive rather than descriptive; both are generally well accepted by organisations; both contain a people aspect and both are scalable and adaptable.

As mentioned previously, ITIL should be implemented as a project where PMBOK is the project management approach leveraging off its code of ethics and guidelines. ITIL is the continuous service improvement project (Marquis, 2006; Ehsan *et al.*, 2010). Furthermore, the project selection and change management guidelines can be elicited from PMBOK, whereas operational and service management guidelines can be elicited from ITIL (Ehsan *et al.*, 2010).

### 2.10.5 CMMI and CobiT as complementary frameworks

Praeg & Spath (2011:28) state “CMMI for services and CMMI for acquisitions are complementary to CobiT, in that CobiT does not adequately cover these aspects”. Both CMMI and CobiT include a maturity model. However, the CMMI standards include goals and procedures that are not part of the CobiT maturity model.

Using the IT Governance Institute (2007) comparison, Table 2.10 defines the aspects common to CobiT and CMMI. CMMI covers these aspects in detail, even though it is

focused on system development with limited coverage of IT governance and management issues (IT Governance Institute, 2007).

## 2.10.6 CMMI and PMBOK as complementary frameworks

Ehsan *et al.*, (2010) compares PMBOK and CMMI. Table 2.11 demonstrates their similarities and differences.

**Table 2.10: Differences and similarities between CobiT and CMMI**

CobiT	CMMI
<b>Plan and organise</b> <ul style="list-style-type: none"> <li>• PO7 Manage IT human resources</li> <li>• PO8 Manage quality</li> <li>• PO9 Assess and manage IT risks</li> </ul>	<b>Process management</b> <ul style="list-style-type: none"> <li>• Organisational process focus</li> <li>• Organisational process definition</li> <li>• Organisational training</li> <li>• Organisational process performance</li> <li>• Organisational innovation and deployment</li> </ul>
<b>Acquire and implement</b> <ul style="list-style-type: none"> <li>• AI2 Acquire and maintain application software</li> <li>• AI6 Manage changes</li> <li>• AI7 Install and accredit solutions and changes</li> </ul>	<b>Project management</b> <ul style="list-style-type: none"> <li>• Project planning</li> <li>• Project monitoring and control</li> <li>• Supplier agreement management Integrated project management for IPPD (or integrated project management)</li> <li>• Risk management</li> <li>• Integrated teaming</li> <li>• Integrated supplier management</li> <li>• Quantitative project management</li> </ul>
<b>Deliver and support</b> <ul style="list-style-type: none"> <li>• DS7 Educate and train users</li> <li>• DS9 Manage the configuration</li> <li>• DS10 Manage problems</li> <li>• DS11 Manage data</li> </ul>	<b>Engineering</b> <ul style="list-style-type: none"> <li>• Project planning</li> <li>• Project monitoring and control</li> <li>• Supplier agreement management</li> <li>• Integrated project management for IPPD (or integrated project management)</li> <li>• Risk management, integrated teaming</li> <li>• Integrated supplier management</li> <li>• Quantitative project management</li> </ul>

CobiT	CMMI
<b>Monitor and evaluate</b> <ul style="list-style-type: none"> <li>• ME1 Monitor and evaluate IT performance</li> </ul>	<b>Support</b> <ul style="list-style-type: none"> <li>• Configuration management</li> <li>• Process and product quality assurance</li> <li>• Measurement and analysis</li> <li>• Organisational environment for integration</li> <li>• Decision analysis and resolution</li> <li>• Causal analysis</li> </ul>

Source: Adapted from IT Governance Institute, 2007

The recommendations of how PMBOK can supplement CMMI, as described by Ehsan *et al.*, (2010) are:

- i) In CMMI projects, Project charter can be used.
- ii) Adaption is possible from PMBOK into CMMI processes. Guidance offered on planning, time management, performance and control, change control management, HR planning, skilling of employees, risk management and procurement management.

Conversely, Ehsan *et al.*, (2010) provide recommendations on how CMMI can supplement PMBOK by incorporating the engineering best practices for organisations, process management, and data management and decision analysis from CMMI into PMBOK processes.

**Table 2.11: Differences and similarities between CMMI and PMBOK**

CMMI	PMBOK
Addresses project management of engineering endeavours. Addresses larger organisations composed of engineering projects	Addresses project management without addressing the type of project or directly addressing the larger organisations
CMMI supports organisational process improvement for achievement of maturity/capability models	PMBOK supports training project manager for PMP certifications
Requirement management/Scope control	Requirement management/Scope control
Project planning	Project planning
Managing and controlling project execution	Managing and controlling project execution
Quality assurance	Quality assurance
Supplier management	Supplier management
Risk management	Risk management
Measurement	Measurement
Grey areas in CMMI	Grey areas in PMBOK
Human resources management	Configuration Management
	Casual analysis and General Practices

Source: Ehsan *et al.*, (2010)

### 2.10.7 CobiT and PMBOK as complementary frameworks

According to the IT Governance Institute (2007), PMBOK defines best practices and techniques for sound project management, however, its focus is primarily on IT-related projects. In addition, PMBOK does not cover aspects of IT management and IT governance. CobiT and PMBOK cannot be directly related as there are not many similar objectives. Only a few features are common between CobiT and PMBOK. PMBOK addresses

these characteristics of CobiT relatively well, as illustrated in Table 2.12 (IT Governance Institute, 2007).

**Table 2.12: Similarities between CobiT and PMBOK**

CobiT	PMBOK
<p><b>Plan and organise (PO)</b></p> <ul style="list-style-type: none"> <li>• PO5 Manage the IT investment</li> <li>• PO8 Manage quality</li> <li>• PO9 Assess and manage IT risks</li> <li>• PO10 Manage projects</li> </ul> <p><b>Acquire and implement (AI)</b></p> <ul style="list-style-type: none"> <li>• AI5 Procure IT resources</li> </ul>	<p><b>Knowledge areas</b></p> <ul style="list-style-type: none"> <li>• Project integration management</li> <li>• Project scope management</li> <li>• Project time management</li> <li>• Project cost management</li> <li>• Project quality management</li> <li>• Project human resources management</li> <li>• Project communications management</li> <li>• Project risk management</li> <li>• Project procurement management</li> </ul>

Source: IT Governance Institute, 2006

### 2.10.8 Conclusion: IT frameworks

In the evaluation performed between ITIL, CobiT, PMBOK and CMMI, it is clear that all the frameworks are complementary. Arraj (2010) acknowledges that in conjunction with CobiT, Six Sigma, Togaf or ISO 27000, ITIL can be used. Ehsan *et al.*, (2010) advises that, organisations still face the challenge of inconsistencies, integration, overlap and conflicting demands when implementing the CMMI and ITIL model, even though these frameworks are strong in software and hardware development.

Table 2.13 provides a summary of the complementary IT frameworks:

- i) As discussed in this section, ITIL and CobiT can be integrated as ITIL focuses on service management and operations in the IT sector, whereas CobiT focuses on governance and control in the IT space (Cater-Steel, Tan & Toleman, 2006).
- ii) ITIL and CMMI can be integrated by implementing the elements of capacity, service-level management and release management for hardware from ITIL and elements such as release management for software from CMMI (Ehsan *et al.*, 2010).
- iii) ITIL and PMBOK can be integrated where PMBOK is the project management approach and ITIL is the continuous service improvement project (Marquis, 2006; Ehsan *et al.*, 2010).

iv) Similarly, PMBOK can be integrated with CMMI (Ehsan *et al.*, 2010).

A summary of the complementary IT frameworks is illustrated in Table 2.13.

**Table 2.13: Summary of complementary IT frameworks**

Leveraging of multiple IT frameworks concurrently (ITIL, CMMI, PMBOK, CobiT, Waterfall and Agile)						
	ITIL	CobiT	CMMI	PMBOK	Agile	Waterfall
ITIL	-	X	x	x	X	X
CobiT	x	-	x	x	X	X
CMMI	x	X	-	x	X	X
PMBOK	x	X	x			
Waterfall	x	-	-	-	X	
Agile	x	-	-	-		X

Source: Adapted from various frameworks

## 2.11 Conclusion: IT frameworks

Thus, it can be established that IT frameworks should be selected based on the business drivers, the corresponding risks associated with each implementation, the objectives of the framework and the set of features aimed at supporting their objectives. However, it is important to realise that there are also overlapping objectives and features. A summary of the theoretical frameworks is illustrated in Table 2.14.

Table 2.14: Summary of the theoretical frameworks

Business drivers	Appropriate IT framework
<ul style="list-style-type: none"> <li>• Defining service processes for the customers of IT and the customers of the organisation</li> <li>• Improving the quality of service offered</li> <li>• Centralising the help desk operations (IT Governance Institute, 2006)</li> </ul>	<p style="text-align: center;"><b>ITIL</b></p> <ul style="list-style-type: none"> <li>• <b>Description:</b> A framework that can offer customer best practices to promote quality computing in the IT industry (Worthen, 2005).</li> <li>• <b>Objective:</b> IT service management</li> <li>• <b>Features:</b> Service strategy, service design, service transition, service operation, continual service improvement</li> <li>• <b>Risks:</b> Erroneous support processes due to a lack of awareness (IT Governance Institute, 2006)</li> </ul>
<ul style="list-style-type: none"> <li>• Business need for IT governance</li> <li>• Alignment of IT goals to the organisational goals</li> <li>• Standardisation of IT processes</li> <li>• A framework for IT processes to be unified</li> <li>• A need for a quality management system</li> <li>• If there are mergers and acquisitions in progress</li> <li>• A need to implement cost control within IT</li> <li>• Aspects of IT functions are outsourced or regulatory compliance (IT Governance Institute, 2006)</li> </ul>	<p style="text-align: center;"><b>CobiT</b></p> <ul style="list-style-type: none"> <li>• <b>Description:</b> Consists of a set of IT control objectives which assists users with developing and customising appropriate IT governance and control within the organisation (Worthen, 2005).</li> <li>• <b>Objective:</b> IT service management</li> <li>• <b>Levels:</b> Planning and organisation, acquisition and implementation, delivery and support, monitoring and evaluation</li> <li>• <b>Risks:</b> <ul style="list-style-type: none"> <li>○ Misalignment within the IT services</li> <li>○ Poor business support</li> <li>○ Wastage or missed opportunities</li> <li>○ Shortfall between expectations and performance metrics</li> <li>○ Excessive IT costs</li> <li>○ Dissatisfied customers: either business users or external customers</li> </ul> </li> </ul> <p>(IT Governance Institute, 2006)</p>
<ul style="list-style-type: none"> <li>• Assessing the maturity of current business processes</li> <li>• Improving processes within organisational structures</li> <li>• The need for benchmarking processes against other organisations</li> <li>• Improve productivity thereby decreasing project risks and reducing software defects</li> <li>• Customer satisfaction (IT Governance Institute, 2006)</li> </ul>	<p style="text-align: center;"><b>CMMI</b></p> <ul style="list-style-type: none"> <li>• <b>Description:</b> Provides guidelines for improving organisational processes and guidelines on how to manage development, acquisition and maintenance of products or services (Worthen, 2005)</li> <li>• <b>Objective:</b> Guidelines for Process Improvement</li> <li>• <b>Levels:</b> Initial, managed, defined, quantitatively managed, optimising</li> <li>• <b>Risks:</b> <ul style="list-style-type: none"> <li>○ Ineffective and inefficient approaches to process improvement</li> <li>○ Incapability of benchmarking the organisation against other organisations</li> <li>○ A decrease in project quality, primarily due to poorly defined processes</li> </ul> </li> </ul> <p>(IT Governance Institute, 2006)</p>

	PMBOK
<ul style="list-style-type: none"> <li>• Define data dictionaries for project management</li> <li>• To gain insights into proven best practices (IT Governance Institute, 2006)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Description:</b> PMBOK is not intended to be a framework, rather a guide incorporating all the best practices in project management (Boyce &amp; Milsom 2010).</li> <li>• <b>Objective:</b> Project management guidelines</li> <li>• <b>Levels:</b> Initiating, planning, executing, controlling and monitoring, closing</li> <li>• <b>Risks:</b> <ul style="list-style-type: none"> <li>○ Inconsistent project management practices</li> <li>○ An increase in the risk of project failure (IT Governance Institute, 2006)</li> </ul> </li> </ul>
	PRINCE2
<ul style="list-style-type: none"> <li>• Can be applied to any project regardless of scale, type, organisation, geography or culture.</li> <li>• Comprises a set of principles, a set of control themes, a process life cycle and guidance on matching the method to the project's environment</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Description:</b> (an acronym for <b>PR</b>ojects <b>IN</b> <b>C</b>ontrolled <b>E</b>nvironments) is a de facto process-based method for effective project management</li> <li>• <b>Objective:</b> Provides explicit definitions of roles and responsibilities so that everyone understands what is expected of them and what to expect of others</li> <li>• <b>Levels:</b> It comprises a set of principles, a set of control themes, a process life cycle and guidance on matching the method to the project's environment</li> <li>• <b>Risks:</b> <ul style="list-style-type: none"> <li>○ It is not widely recognised</li> <li>○ It presents a large overhead and thus cannot be applied to small projects</li> </ul> </li> </ul> <p>(Managing Successful Projects with PRINCE2®, TSO 2009 edition)</p>

Source: IT Governance Institute, 2006

## 2.12 Conclusion

This chapter reviewed relevant literature to gain a better and in-depth understanding of the issues bedeviling the South African bank industry regarding IT projects and their management, which at the moment have proved to be a challenge in most South African banks. Other aspects reviewed in this chapter relate to IT governance and whose responsibility it is to drive this aspect; and what can be done to achieve success and competitive advantages from the increased adoption and use of IT.

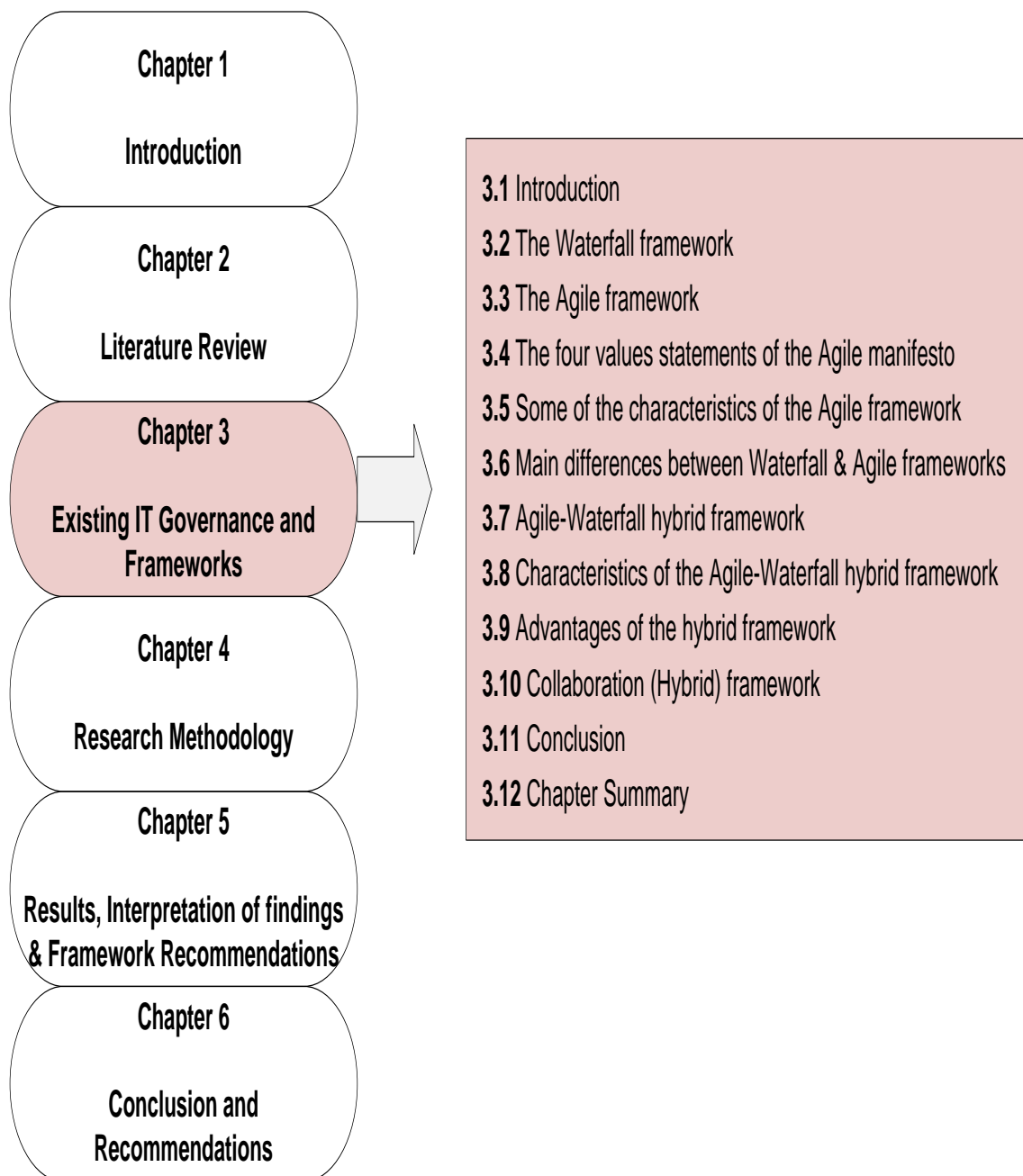
What is clear from the literature review is that IT permeates the way organisations are structured and managed. Senior management needs greater access to all information and reduced reliance on middle management to source and competitively use the information available to them on their computers. IT has the potential to integrate differ-

ent parts of the organisation and to provide more useful information to managers for decision making. IT affects the process of strategy development as it provides more information to managers for decision making through the use of expert systems and executive information systems.

The review has also made it clear that IT governance is as crucial to success in business as corporate governance is, but it should be approached correctly so that it does not become just another document or policy or outsourceable service. The key to effective implementation lies with senior management and their effectiveness in planning. The emphasis on IT has now shifted from technical to managerial issues.

This chapter presents a literature review and theoretical framework of the study relating to IT project management and governance frameworks in the South African banking industry. It begins with an overview of IT project management, a definition of IT, its role in the banking sector and IT challenges encountered within the South African corporate environment. It further discusses governance issues bedevilling the South Africa banking industry. The next chapter focuses on existing IT governance and frameworks clearly articulating the advantages and disadvantages.





### **3. CHAPTER 3: EXISTING IT GOVERNANCE AND FRAMEWORKS**

#### **3.1 Introduction**

“One way of mitigating risk of failure of development projects, is the selection of the appropriate development frameworks” (Hakizabera & Yamada, 2010:85). However, most developers choose to use a framework based on routine or popularity that can lead to serious challenges in the development process (Hakizabera & Yamada, 2010).

The increased software development competition and customer demands has placed the software development industry under immense pressure. In order to cope with this pressure, software and project development industries have developed a variety of tools and methods to improve the quality and success rates of their projects (Kweku, 2003). Different research studies and evaluations have indicated a significant percentage of development projects failing to be completed on time, within budget and to their initial requirements (Kweku, 2003; Standish group, 2005). To increase chances of success in the execution of projects, appropriate tools and correct executing techniques should be selected from the onset. The first step to reduce the risk of failure is to correctly select the appropriate frameworks and tools for the development of a project from the onset of the project. A conceptual framework describes the phases that are involved in project development. The conceptual framework is generally referred to as the Software Development Life Cycle (SDLC). A SDLC comprises sequences of stages that can vary between four to ten and include inter alia requirements, analysis, design, coding, testing and acceptance (Taylor, 2004).

The SDLC is attempted with different frameworks that can be categorised into two main groups, namely linear frameworks and agile frameworks. Linear frameworks are also referred to as traditional frameworks since they have been used from as early as the 1960s to solve methodological problems related to software development (Lewis, 2008). The linear framework or framework was later identified as the Waterfall framework. The next sections will discuss both the Waterfall and Agile frameworks.

For the purpose of this discussion, both Waterfall and Agile will be referred to as a framework.

According to the Software development lifecycle (2016), Agile methods supports a broad range of the entire software development lifecycle. Some organisations focus on the practices, for example pragmatic programming, whilst others focus on managing the flow of work, for example Scrum. There are various popular Agile software development frameworks, a selected few have been mentioned below:

- i) Adaptive software development (ASD)
- ii) Agile modelling
- iii) Agile Unified Process (AUP)
- iv) Crystal Clear methods
- v) Disciplined Agile Delivery
- vi) Scrum
- vii) Kanban
- viii) Scrumban

### **3.2 The Waterfall framework**

In the development of IT software projects, the traditional Waterfall development frameworks were the standard way of application development. While developers continue to investigate methods that are more flexible, the Waterfall framework is still an important and frequently used approach.

The Waterfall development progresses in a linear direction and employs a sequential design process. As each of the phases (requirements, analysis, design, coding, testing, acceptance) is completed, the developers progress to the next phase. The Waterfall framework, a phased linear progression of activities, is thus marked by feedback loops which leads to the release of a software product. The output of a preceding phase acts as the input for the next phase. This allows the process to progress downwards, (just like a river waterfall). Because of its design, this approach does not permit users the flexibility to cycle back and rework the outcome of the preceding phases. Once a step

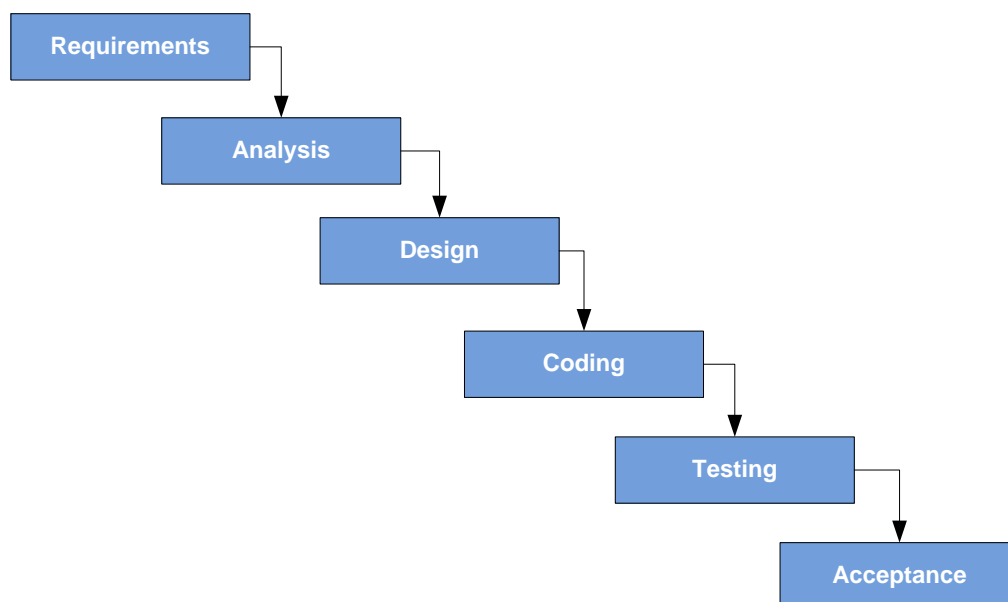
has thus been finished, developers are unable to revert back to earlier phases without dismantling the completed project and starting all over again from inception. There is no room for mistakes, an all-encompassing strategy has to be put in place at the onset and then followed. The Waterfall approach is illustrated in the Figure 3.1.

The Waterfall approach is more preferable if the project process is going to be predictable and if requirements do not change during the course of the development (Johnson, 2013).

### **3.2.1 Advantages of the Waterfall framework**

Advantages of the Waterfall framework are discussed below.

The framework is quite simple and easy to manage, understand and use due to its stringency, each phase has specific deliverables and a review process. It is a framework where process, artefacts and results are well documented. In general, the framework works well for smaller projects where customer requirements are clearly identifiable at an early stage and well understood.



**Figure 3.1: The Waterfall Framework approach**

Source: Adapted from Science & technology facilities council

### **3.2.2 Disadvantages of the Waterfall framework**

The Waterfall framework has a number of disadvantages, some of which are discussed below.

Despite the advantages, there is valid criticism towards the Waterfall framework. The foremost criticism revolves around the fact that very often customers do not really know what their requirements are at the start of the project. Their requirements emerge from repeated two-way interactions over the course of the project. In this situation, the Waterfall framework, with its emphasis on the initial capture of requirements and design, can be seen as unrealistic and unsuitable in the real world. Furthermore, given the uncertain nature of customer needs, estimating time and costs with any degree of accuracy (as the framework suggests) is often extremely difficult.

Another criticism revolves around the framework's implicit assumption that designs can be feasibly translated into software products. Designs that seem feasible during the planning phases can turn out to be expensive or difficult in practice, requiring a re-design. This can destroy the clear distinctions between the phases of the traditional Waterfall framework. Some criticisms also centre on the fact that the Waterfall framework implies a clear division of labour between the role-players, for example designers, programmers and testers; in reality, such a division of labour is neither realistic nor efficient.

### **3.2.3 Waterfall challenges**

The discussion below is based on the challenges, as described by Smith (2001). When the project is constrained for resources, such as time and/or money, testing is normally the only phase that is omitted. This means that projects are compelled by time constraints to skip the testing phase which compromises quality. As the Waterfall framework is sequential and rigid, the product can only be evaluated at the end of the process. No provision is made to identify errors and introduce corrective measures during the process. This has a negative impact on both time and financial resources. According to the Web site, [Agilenitshell.com](http://Agilenitshell.com), the last 20% of a project seems to take 80% of the time. A product using the Waterfall framework is tested only at the end, and any

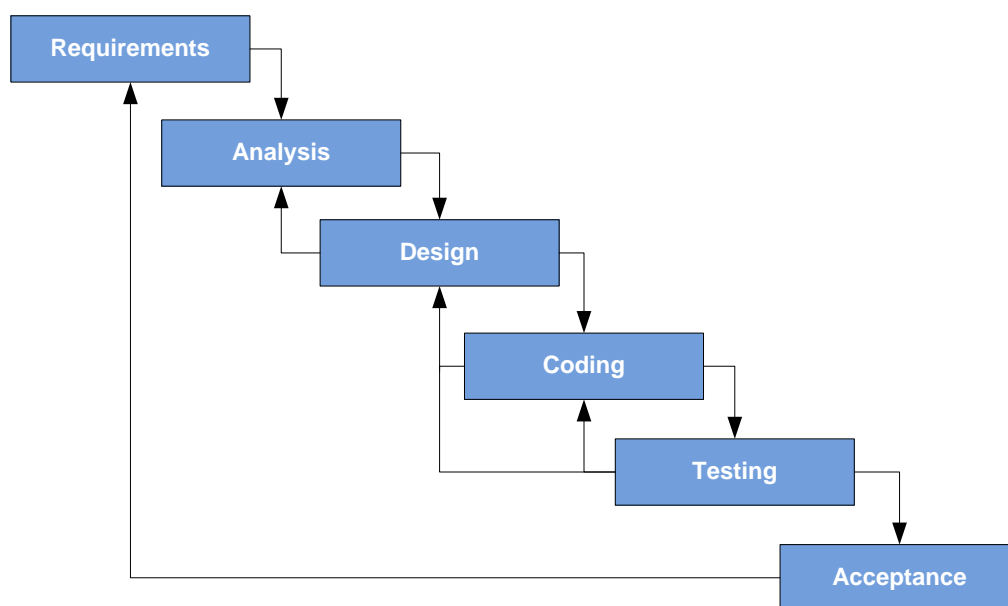
errors found will result in the entire process starting all over again. Errors which might have occurred before the testing stage can only be detected at the end of the project. Furthermore, there is also a technical risk as the testing of the design, or architecture, is accommodated late in the project. These challenges have an impact on the costs and time needed to develop a software project.

### **3.3 The Agile framework**

The Agile framework arose from the need to find a way to address the challenges of the Waterfall framework and is depicted in Figure 3.2. Unlike the Waterfall framework's successive design process, the Agile framework is an iterative and incremental method. Developers commence with a very simple project plan, and then work on small modules. The work on the modules is done in weekly, or monthly, sprints (a sprint is a set period during which specific work has to be completed and made ready for review) and at the end of each sprint, project priorities are assessed and tests are run. These sprints allow for anomalies to be discovered and customer feedback to be incorporated into the design before the next sprint is run. The process, with its lack of initial design and steps, is often criticised for its collaborative nature which focuses on principles rather than process.

An Agile approach to software development covers an array of SDLC styles, but the overarching theme is the same, it is more adaptable and gives developers time to work while requirements are changing. There is flexibility to check for errors during any part of the development stage which makes this approach less susceptible to errors.

This increased flexibility gives more insight as to why it is called 'agile'; developers can make improvements on an ad hoc basis that ultimately reduces the risk of encountering problems. However, teams that take the Agile route for software development may run into the problem of the 'never-ending project' in which developers are constantly circling back to test and make changes resulting that nothing is ever 100% completed. This is the main reason why strong project management needs to be in place to know when something is taking up too much time.



**Figure 3.2: The Agile approach 1**

Source: Adapted from Science & technology facilities council

All Agile frameworks are iterative, team focused, lightweight and provide for continuous or incremental delivery. Iterative development builds the project's ultimate deliverable in small increments, repeating basic steps over and over. Agile frameworks are team focused and the teams are generally employed full-time and persist from project to project. The longevity of the team makes building relationships in the team worthwhile. Relationships make communication easier. The Agile teams are provided with decision-making frameworks to self-organise and self-manage, emphasising the importance of the team. The frameworks are also lightweight and the processes and flow diagrams represent only those activities that are needed to deliver instant value to the client and are generally easy to understand and use. Finally, the Agile frameworks feature continuous or incremental delivery of functionality. The advantage of incremental delivery of functionality provides stakeholders with the time to provide feedback and adjust their requirements much earlier in the flow of a project, reducing rework and increasing client satisfaction (Cagley, 2013).

### **3.3.1 Advantages of the Agile framework**

The Agile framework offers a flexible design framework, promoting adaptive planning and evolutionary development. Agile framework software developers work on small modules at a time. Customer feedback occurs at the same time with development, as does software testing. This has a number of advantages, especially in project environments where development needs must be able to rapidly and effectively respond to changes in client requirements.

The Agile framework is mainly beneficial in situations where the end-goals of projects are not clearly defined. For example, if developers are working with a client whose needs and goals are not clear, it is advisable to employ the Agile framework. The client's requirements will likely gradually clarify as the project progresses and development can thus be adapted to meet these new, evolving requirements. The Agile framework is also a preferred option for experimental software design.

These frameworks also facilitate interaction and communication which makes collaboration important when working with the Agile framework. Because interaction among different developers and stakeholders is important, it is especially beneficial in teamwork oriented environments. Different developers work on different parts of the process throughout the development process and then work to integrate all of the various parts together into a cohesive piece of software at the end of the project.

### **3.3.2 Disadvantages of Agile framework**

The Agile framework, though flexible, does not have the structure that the Waterfall framework has and this does present some disadvantages. Agile framework projects tend to be hard to predict, from timelines to budgets. Without a concrete plan, everything remains unclear. In addition, active user involvement and intense collaboration are required throughout the Agile development process. This can prove highly problematic for a number of reasons. Firstly, this method of development can be quite time



consuming, even more time consuming than the Waterfall framework (Mikoluk, 2013). This means that designers need to be committed for the duration of the project. If a designer decides to leave in the midst of a Waterfall framework development project, it is likely not to be a serious drawback as the project is plan based. However, in the case of the Agile framework, development is much more person or team based. Having a person leaving the project team can have implications.

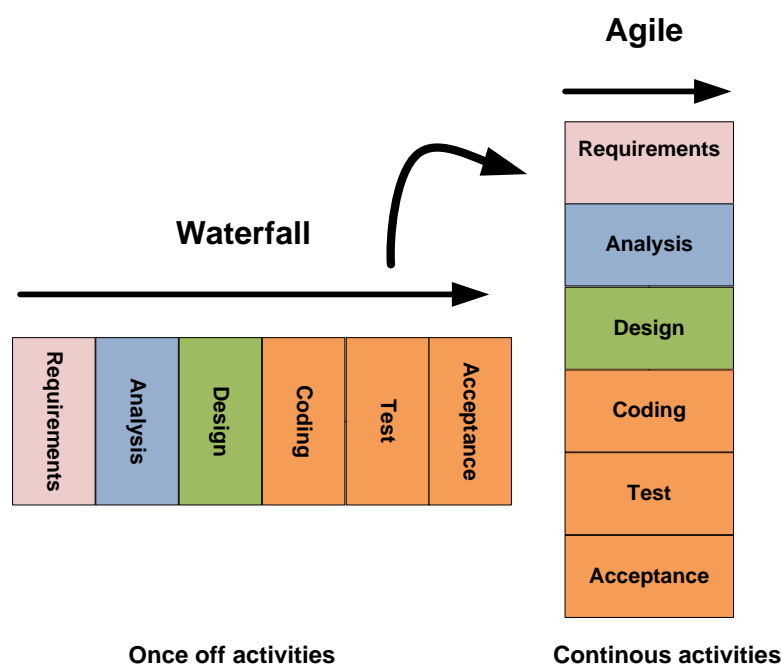


Figure 3.3: The Agile approach 2.

Source: Adapted from <http://www.agilenutshell.com/agile vs waterfall>

Figure 3.3 depicts how, instead of treating the phases as fixed stages, the Agile approach views the phases as continuous activities. By performing the phases continuously, it is believed, quality improves because testing starts from the onset of the software project. The risk posed by the Waterfall framework is reduced because developers receive feedback earlier and customers are satisfied because changes can be made without huge financial and time implications.

### **3.4 The four values statement of the Agile manifesto**

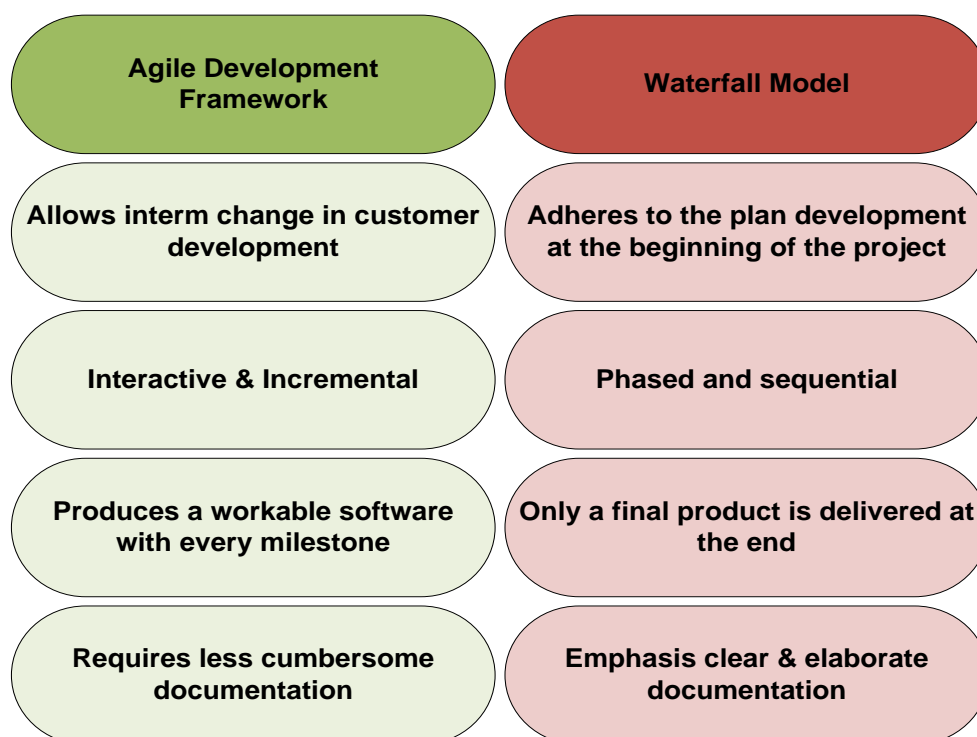
According to Beck *et al.*, (2001:79) the four values statements of the Agile manifesto are discussed below:

A possible way to approach the manifesto is that it defines preferences, not alternatives, encouraging a focus on certain areas, but not eliminating others. The Agile manifesto commences with the value statement of “individuals and interactions over processes and tools” where the emphasis is on teams of people who build software systems and do what they need to do to work together effectively including, but not limited to programmers, testers, project managers, frameworkers and customers. The point is that the most important factors that need to be considered are the people and how they work together because if that is not correctly understood, even the best tools and processes will not be of any use. The next value statement is “working software over comprehensive documentation”. This value statement discourages focusing on documenting the process and rather on building the software in order to supply the clients with what they want. The value statement also highlights the primary goal of software development - to create software, not documents. The third value statement is “customer collaboration over contract negotiation” where the emphasis is on providing what the customer wants. It assumes that working together with customers is difficult, but that is reality. The fourth and last value statement is “responding to change over following a plan” which highlights that adaptation to change is critical in the building of software. It also points out that people change their priorities for a variety of reasons and as project work progresses, stakeholder’s understanding of the problem domain and of what is being built changes, as does the business environment.

### **3.6 Main differences between Waterfall framework and Agile framework**

Agile software development undoubtedly offers advantages that a Waterfall framework approach cannot address. Where the Waterfall framework approach is based on predictability and processes, the Agile framework approach focuses on adaptability and response time to changing requirements. The Waterfall framework completes all the requirements at the beginning, whereas Agile framework development allows users to

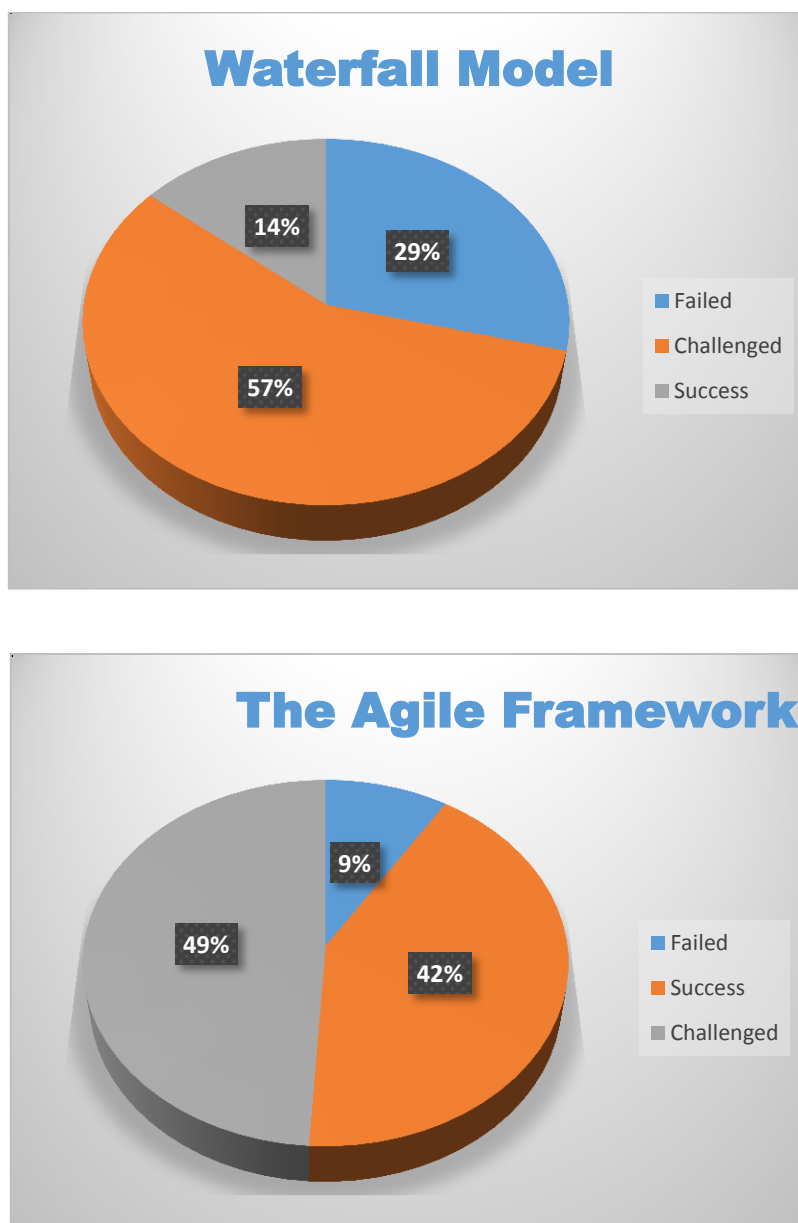
make changes throughout the project. Another important advantage of Agile over the Waterfall framework is the repetitive pattern of the processes. This means that it is possible to make modifications before the completed stage, whereas it is not possible with the Waterfall framework. The Waterfall framework requires descriptive and accurate documentation while the Agile framework concentrates on collaboration and teamwork to produce a software product. Figure 3.4 depicts the differences between the Waterfall and Agile approaches whereas Figure 3.5 depicts success and failure rates between the Waterfall and Agile approaches.



**Figure 3.4: Differences between Agile and Waterfall methods**

Source: Adapted from <http://www.whatissixsigma.net/agile-development/>

Both the Waterfall framework and the Agile development framework philosophies have specific benefits and drawbacks. While choosing the appropriate framework can affect the ultimate success of the product, ultimately it is important to choose a framework that supports the team's processes. Different projects and goals will require different methodologies to be successful. Keeping an open mind and considering how each philosophy will affect the overall application may mean the difference between success and failure.



**Figure 3.5: Success and failure rates between Agile and Waterfall methods**  
Source: Adapted from The CHAOS Manifesto, The Standish Group, 2012

### 3.7 Agile-Waterfall hybrid framework

The Agile-Waterfall Hybrid framework is far from perfect, and it is a compromise. It has many advantages and disadvantages, as is the case with all methodologies. The Agile-Waterfall hybrid is often considered as a smart approach for adapting both methodologies without compromising too much (Johnson, 2013).

The Waterfall framework has been the ideal choice for software development. In this framework, an idea becomes usable software in a sequential process that cascades through the stages of requirements, analysis, design, coding, testing and acceptance. However, the Waterfall framework has some disadvantages.

Agile development evolved to eliminate the issues the Waterfall framework has. It has a whole new framework. While the Waterfall framework has a sequential design, the Agile framework follows an incremental approach. When clients who used to follow the Waterfall framework switched to Agile, the transition brought many issues with it. The reason being inadaptability to a different approach to software development. The end product turned out to be a disaster.

### **3.8 Characteristics of the Agile-Waterfall hybrid framework**

Implementing Agile-Waterfall Hybrid allows software teams to work “Agile” while hardware development teams and product managers can use the traditional Project Management Professional (PMP) Waterfall approach (Johnson, 2013).

The result is tight, continuous integration between PMP and Agile software development processes from product conception until validation and production. As with all software development methodologies, collaboration is key, and Agile-Waterfall Hybrid interface enables teams to define requirements and adapt to changing requirements and provide feedback, from both PMP and Agile sides, allowing for continuous delivery.

The Hybrid framework is best suited for re-use of software code when dealing with a series of similar products and where future products must also be considered. Such situations lead to a quick turnaround, with frequent product releases. Backlog management is a critical area for successful adoption of this Hybrid framework and adoption is best assisted by software version release planning features. As with all hybrid frameworks, both sides must compromise. The Waterfall development must give up some certainty of fixed expectations to embrace the flexibility and freedoms of the Agile world. The Agile compromise is to be creative, but with far less freedom, working against a fixed deadline with cost forecasting and risk assessments.

The Agile-Waterfall framework aims to retain the dependency tracking and clarity of the Waterfall approach while embracing the strengths of the Agile framework, providing the flexibility and transparency necessary to adapt to the fast changing requirements of stakeholders.

### 3.9 Advantages of the hybrid framework

A hybrid framework enjoys the best of each of the separate frameworks and some of the advantages of the Waterfall-Agile hybrid are that the hybrid combines the benefits of both the Agile and the Waterfall framework processes. It is recommended that high-level designs are done by applying the Waterfall framework principles and that the phases of coding and testing are done using the Agile development framework.

### 3.10 Collaborative (Hybrid) framework

An example of the Agile-Waterfall hybrid framework is the Collaborative Framework in Figure 3.6 which aims to combine the best of the Waterfall and Agile frameworks. Leveraging both the Waterfall and Agile approaches ensure the success of the project. It removes the disadvantages of both frameworks, while bringing together the advantages of both (Singh, 2015).

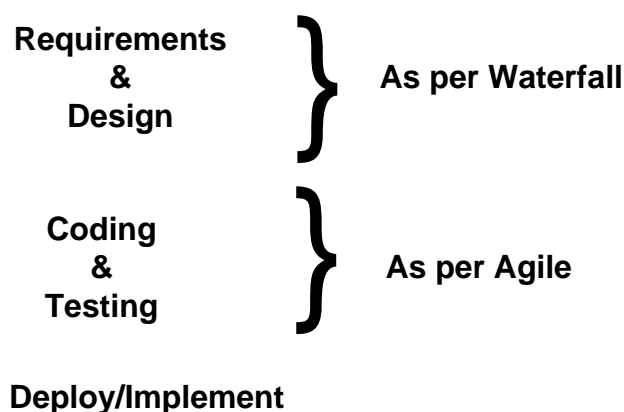
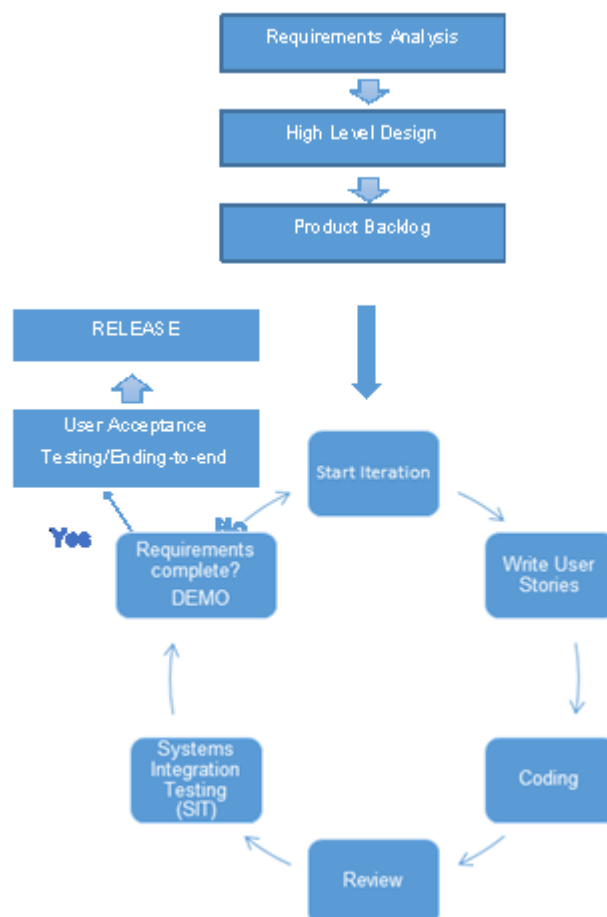


Figure 3.6: Collaborative Framework  
Source: Singh, 2015

The Collaborative Framework can be implemented in a project by executing requirements and design as per Waterfall and coding, testing and deployment as per Agile framework as indicated in Figure 3.7.



**Figure 3.7: The Hybrid framework [Agile/Waterfall Hybrid]**

Source: Adapted from: <http://cdn2.softwaretestinghelp.com/wp-content/qa/uploads/2015/02/Collaborative-Hybrid-Framework-3.j>

### 3.11 Conclusion

Agile is a management philosophy. Adoption of Agile methodologies has become increasingly accepted amongst businesses, as they seek to build applications quickly by iterating fast and testing frequently (Finnegan, 2014). The Agile management philosophy has moved towards mainstream adoption in recent years as businesses seek to assist in building applications quickly by iterating fast and testing frequently.

Experts claim, however, that enterprises realise discarding the traditional Waterfall approach entirely is not the best approach when developing large critical systems (Finnegan, 2014). The Agile world is going into its second phase. This means becoming more realistic about what it takes to build big systems and moving away from the 'religion' of Agile. There seems to be an increase in the number of people who realise that they want to blend the methods for the most business-critical systems (Finnegan, 2014).

CAST, a software analysis United Kingdom organisation, recently (2014) analysed architectural and code quality weaknesses in 186 different enterprise applications built in Java-EE. Their report found that over three-quarters of the robustness, security and changeability scores for applications developed with a combination of Agile and Waterfall methods were higher than the median scores for projects using Agile or Waterfall alone (Finnegan, 2014).

It is quite clear that both the Waterfall and Agile framework has its own pros and cons. It is sensible to use a Hybrid framework, a method which includes the best of both frameworks. The crucial issue to consider before starting a project is which framework the team should adopt and this entails detailed prior preparation. Factors to consider include: budget, time, resource allocation and utilisation, the intricacy of requirements, etcetera.

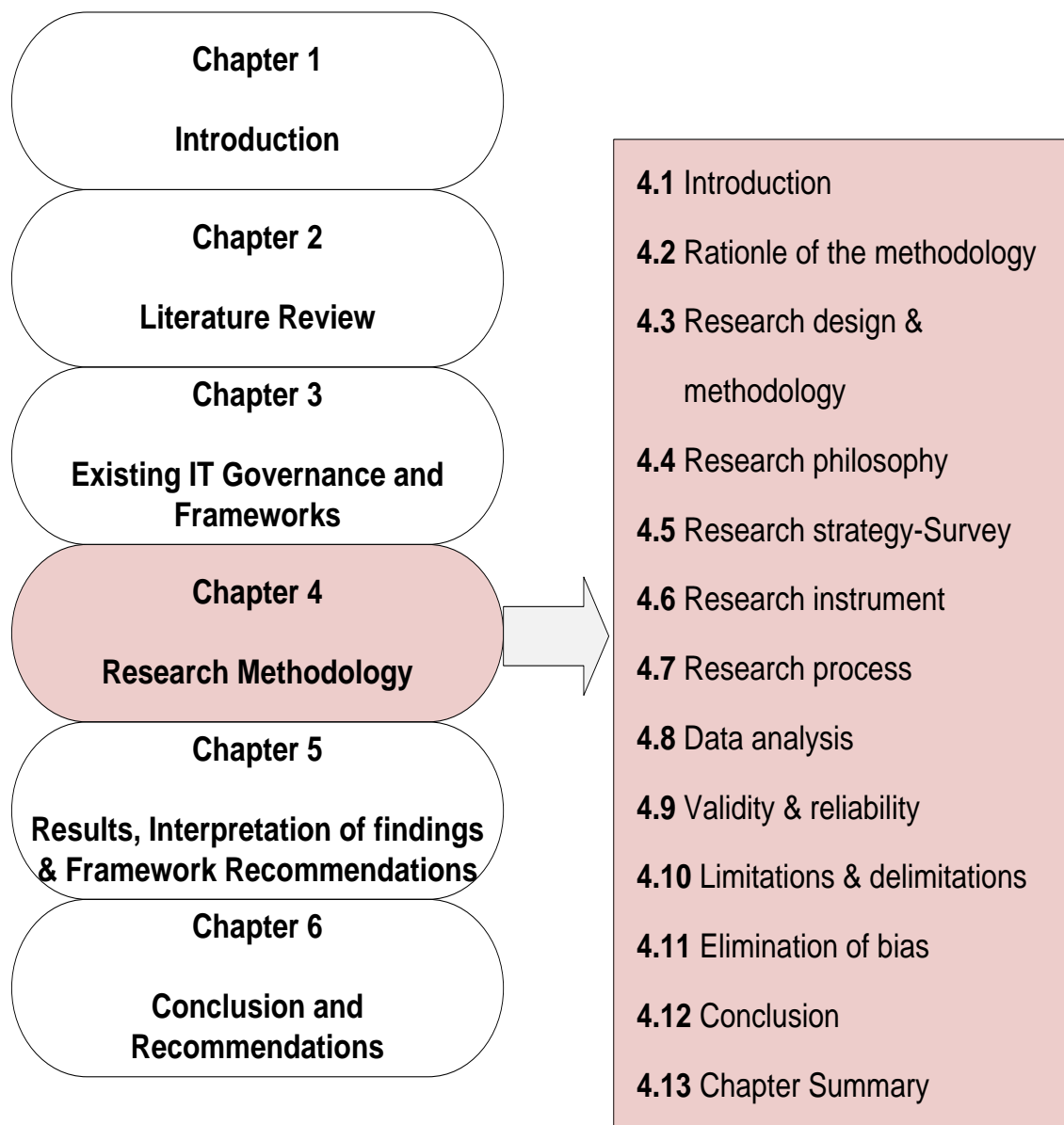
However, the Hybrid framework is still at embryonic phase. As more and more companies adopt it, the more knowledge and learning about this concept is acquired, and the more perfection is achieved. Given the failures of many projects within the banking sector in South Africa, it is proposed that an Agile-Waterfall framework, which leverages the best of the two methodologies, be adopted.

### **3.12 Chapter Summary**

This chapter focuses on existing IT governance and framework clearly, articulating the advantages and disadvantages. The next chapter will provide a summary of the theory and concepts surrounding research methodology. The rationale for the adopted research methodology also discussed. Issues addressed in this chapter are research



design and strategies, target population, sampling, research instrument, administration of the questionnaire and data analysis.



## **4. CHAPTER 4: RESEARCH METHODOLOGY**

### **4.1 Introduction**

This chapter presents an overview of the important areas that need to be considered when undertaking a research study. It outlines the type of research, the rationale for choosing the methodology for this particular research, elaborates on the research philosophy and strategy, defines and describes the target population, sampling, research instruments, administration and collection of the questionnaires, data analysis, validity and reliability, limitations, bias and ethical considerations.

McNabb (2010:13), defines research methodology as “the approach taken to acquire the information”. While Myers (2009) defines research methodology as a strategy of investigation, which moves from the underlying assumptions of data collection research design. The most collective classification of research methods is into qualitative and quantitative. Qualitative and quantitative may also refer to characteristics regarding the nature of knowledge, how one understands the world and the ultimate purpose of the research. The terms may refer to research methods, that is, the whole process by which data are gathered and evaluated, and the type of generalisations and representations derived from it.

Quantitative studies focus on phenomena that are quantifiable (can be counted) and typically represented as statistics (numbers or percentages). Emphasis is usually placed on predicting a hypothesis. Qualitative studies, on the other hand, centre on phenomena that can be qualified (or interpreted) and often highlight lived human experience through personal accounts.

Creswell (2007:6), states that “while data collection procedures for each method can involve interviews as well as direct observation, the main difference is that quantitative data are ‘closed-ended’ while qualitative data are ‘open-ended’”. This means that quantitative observations may include lists of behaviours or multiple-choice surveys while the same procedures in a qualitative study yield audio-recorded interviews and lengthy descriptions written by the researcher.

There is a misconception that qualitative research is easier to conduct because it involves working with smaller populations and with words, rather than numbers. However, there is a greater amount of data to analyse in a qualitative study. Qualitative research also requires a deeper level of interpretation while quantitative research requires skill in computing and reading statistics. Neither one is easier than the other, but researchers should consider their strengths in the areas of data collection and analysis before making a decision.

When deciding whether to conduct a quantitative or qualitative study, not all researchers consider what sort of publishing options the method will give them. For those who wish to build a career in academia, this is worth thinking about. Since each field has its own preferences and biases, one may want to investigate the most notable journals in a particular field to see which methodology they tend to lean towards. For example, while the disciplines of communication and anthropology value the comprehensive descriptions included in the qualitative study, the fields of psychology and biology give preference to the generalisability of quantitative work.

## **4.2 Rationale for the methodology**

For this research study, a quantitative methodology has been adopted. This methodology was preferred because quantitative methods emphasise objective measurements and numerical analysis of data collected through polls, questionnaires or surveys (Babbie, 2010). Quantitative research focuses on gathering numerical data and generalising it across groups of people. The results of this research shall be assumed to apply to the entire South African banking industry.

Furthermore, quantitative methodology is used to obtain the primary data. According to Johnson and Christensen (2008:33), “a quantitative methodology is concerned with the development and testing of hypothesis and the generation of frameworks and theories that explain behaviour”. Quantitative research is a formal, objective and systematic process in which numerical data are utilised to obtain information about the world, according to Burns & Grove (2001). Therefore, objectivity, generalisation and numbers are often associated with quantitative research. When an approach is selected to investigate a problem, it should be the most suitable approach available. However, it is also

reasonable to expect that it reflects the bias of the researcher. Quantitative research is inclined to be deductive. In other words, it tests the theory. However, since statistical analyses, often used in quantitative studies, involve investigating a sample to generalise a population, it is also considered deductive. This is in contrast with qualitative research, which tends to be more inductive. Bennett (2003) explains that quantitative research makes use of quantitative data which uses numbers that can be analysed by statistical techniques, if drawn from a large sample. Thakur (2005) states that quantitative research is achieved through the utilisation of the questionnaire method, structured interview, or any other systematic method.

This research study is concerned with establishing and understanding why there is a high failure rate of IT projects. The research study adopted a positivist philosophy as it advanced existing theories, developed research questions from theory and used an instrument to measure variables (Saunders, Lewis & Thornhill, 2007:103). The research instrument, a questionnaire, was compiled to collect the primary data for this study. This method was considered suitable because it critically analyses the role of governance in IT and the strategic importance accorded to IT governance issues within the South African banking sector. A survey questionnaire was also chosen because it is considered to be inexpensive, less time consuming and provides good quality data (Babbie, 2010).

### **4.3 Research design and methodology**

The research design is the critical process that transforms an idea, interest or question from 'just a thought' into a meaningful and purposeful investigation of a social or physical process (Gatrell, Bierly & Jensen, 2005:1). The selection of research components in this study was done to (or 'intending to') the objectives of the study. Most research objectives can be achieved by using one of the three types of research design: exploratory, descriptive and explanatory or casual research (Hair, Bush & Ortinau, 2000).

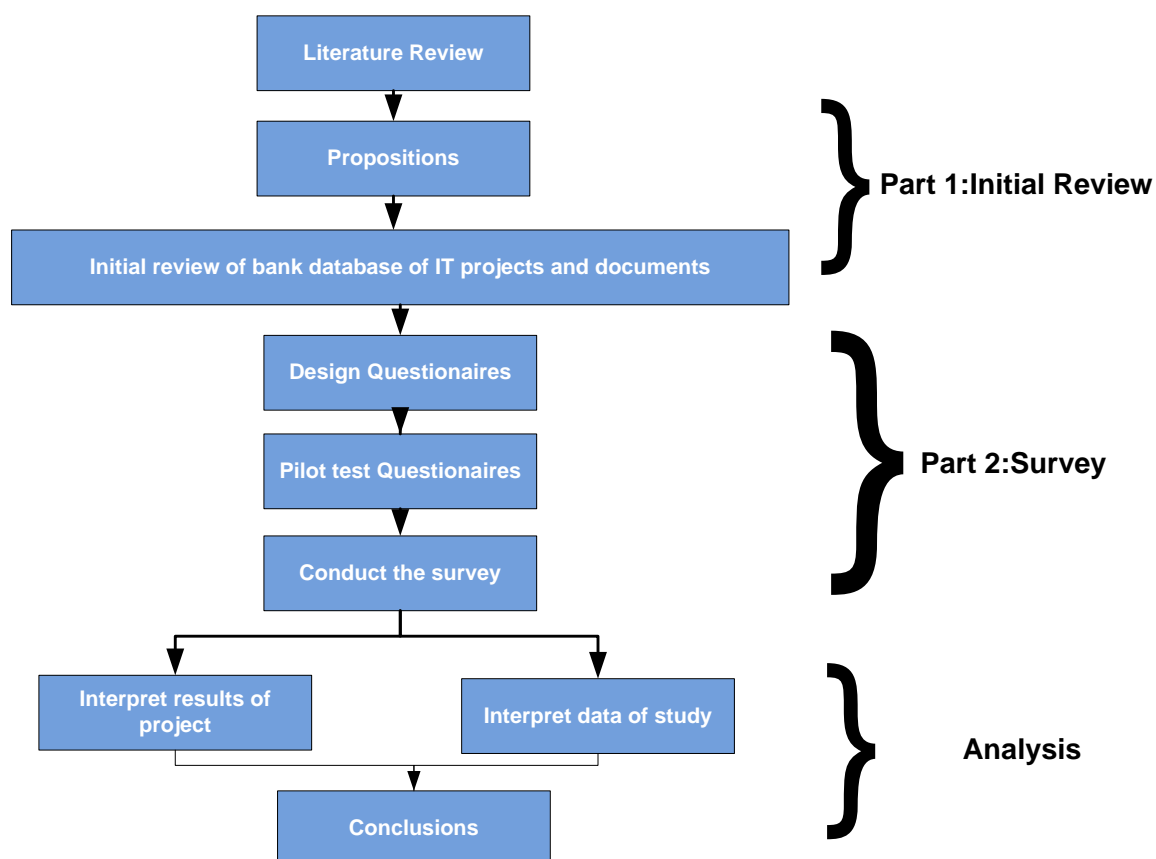
A descriptive (quantitative) research was used in order to establish major factors and reasons that contribute to most failures of IT project management in the South African banking sector. Further, it was chosen based on the interaction process in gathering the

data and mainly because there will be an investigative process about what has taken place.

Descriptive research design is a scientific method that involves observing and describing the behaviour of a subject, without influencing it in any way (Kothari, 2008). The purpose of descriptive research is the exploration and description of phenomena in a real-life situation, according to Burns & Grove (2005). Descriptive studies tend to provide accurate information and helps to form the basis of simple decision making by setting out to provide answers to what, how, when, who or where questions. Figure 4.1 is a graphic representation of the framework used.

#### **4.4 Research philosophy**

A research philosophy is a belief about the way in which data about a phenomenon should be gathered, analysed and used. In this study, a research process, which Saunders, Lewis & Thornhill (2007) describe as the 'research onion' with different layers, was adopted. As shown in Figure 4.1, the approaches in the different layers have dependencies. It is suggested that a research design should be developed from the top down, starting with the outside layer (adopting a research philosophy) and then peeling away each layer until the fifth layer is reached (defining data-collection methods).



**Figure 4.1: Adapted roadmap for research framework**  
 Adopted from Saunders, Lewis & Thornhill, 2005

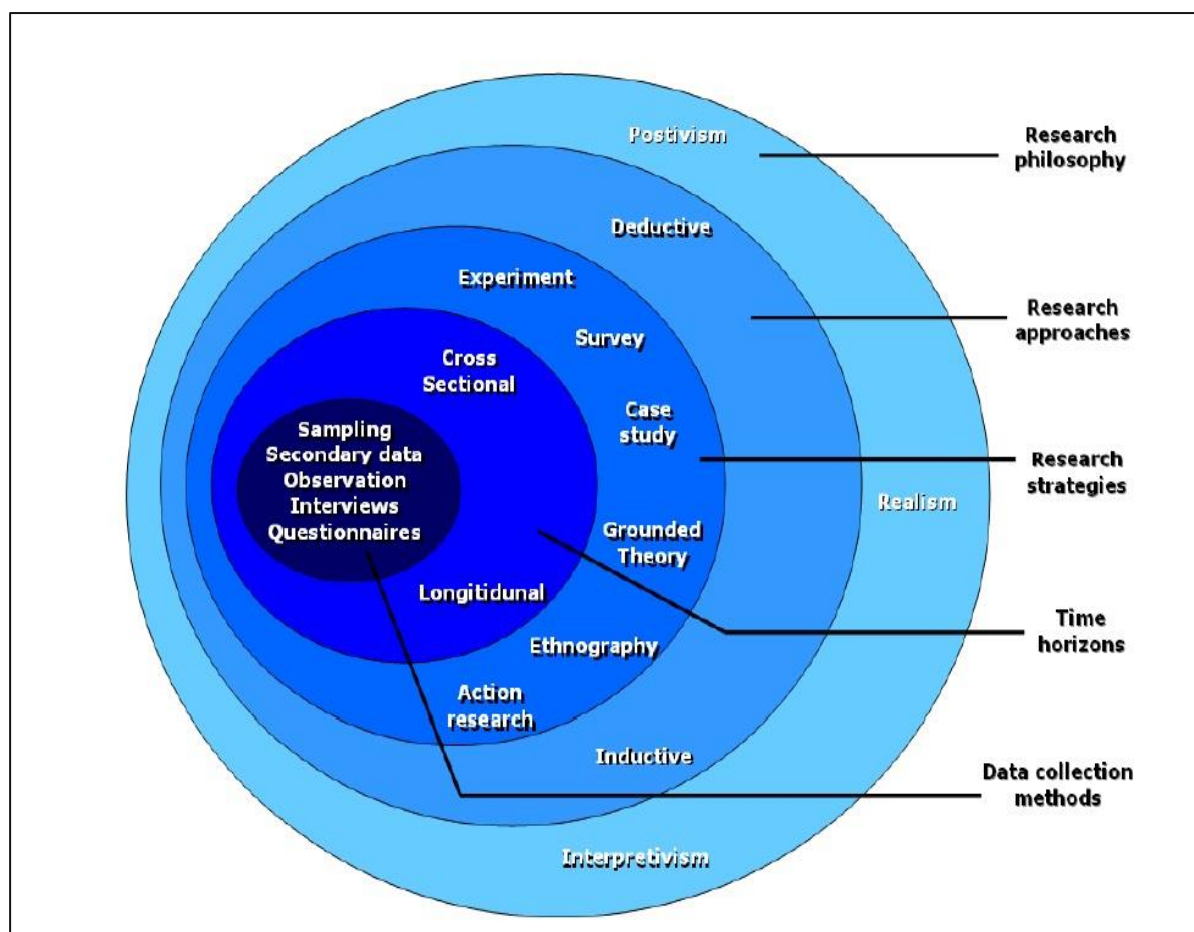
#### 4.4.1 Explanation of the concept of “research onion”

Research methodology refers to the various sequential steps adopted by a researcher in studying the problem with certain objectives in mind. It is an explanation of the method of systematic and critical investigation into an identified subject of study. With an explanation of the elements in the concept of “research onion” (Saunders, Lewis & Thornhill, 2007) the researcher will describe the steps adopted to do this research. In summary, a research methodology is the description, explanation and justification of various methods of conducting research (Saravanavel, 2006).

#### 4.4.2 Understanding the research process

The concept of ‘research onion’ will be used to understand the research process used by the researcher (Saunders, Lewis & Thornhill, 2007). The main layers of the research onion are: research philosophy, research approaches, strategy, choices, time horizon and techniques and methods of data collection. An explanation of some of these ele-

ments of the research onion will provide the researcher with the required knowledge to conduct this study (Saunders, Lewis & Thornhill, 2007).



**Figure 4.2: The Research Onion**  
Source: Saunders, Lewis & Thornhill, 2007

According to Saunders, Lewis & Thornhill (2000:85) “research philosophy can either be positivist (quantitative) or phenomenological (qualitative) or a combination of the two”. The positivism philosophy aims at the derivation of laws or law-like generalisations similar to those in the physical and natural sciences (Remenyi, Money, Sherwood-Smith & Irani, 2000). Contrary to this, the phenomenological approach pays particular attention to understanding how individuals make choices on the basis of their unique biographies, the particular features of the situations in which they do so and in relation to individuals’ interactions with others (Hyde, Lohan & McDonnell, 2004).

The primary objective of this research study was to explore “why” questions concerning failures and challenges encountered in IT regulation and governance. The researcher



has little control over the actual proceedings taking place and the questions being asked about contemporary events. The phenomenon under study, IT regulation and governance, is not easily distinguishable from its context. The context can be defined as the process undertaken by the organisation to implement IT projects.

#### **4.5 Research strategy - Survey**

Saunders, Lewis & Thornhill (2003) point out that research strategy refers to the general plan of how a researcher will go about answering research questions. There are various strategies from which a researcher, guided by research objectives, can select a strategy. A survey research strategy was employed in this study. Survey research is projectable research, which means that the results can be generalised to the population as a whole (Kaden, 2006). Surveys are a common approach to research in business and management, offering an opportunity to collect large quantities of data or evidence (Saunders, Lewis & Thornhill, 2003). This survey method was chosen because of its versatility, efficiency and generalisability (McMillan & Schumacher, 2006).

#### **4.6 Research instrument - Interview and Questionnaire**

The research instrument is defined as a measurement tool for research which has to be reliable and valid (Saunders, Lewis & Thornhill, 2007). In this research, the questionnaire instrument was chosen as a means of collecting the primary data. A questionnaire is most frequently a very concise, pre-planned set of questions designed around the research questions to yield specific information to meet a particular need for research information about a pertinent topic. The research information is attained from participants, normally from mutual interest. The dictionary gives a clearer definition: a questionnaire is a written or printed form used in gathering information on some subject or subjects consisting of a list of questions to be submitted to one or more persons. A questionnaire collects precise and unbiased information, state Saunders, Lewis & Thornhill (2007). The questionnaire is the favoured tool of many of those engaged in research, and it can often provide an economical and efficient way of collecting data in a structured and manageable form (Wilkinson & Birmingham, 2003). In a self-administered questionnaire, attached as **Appendix A**, participants were expected to read the survey ques-

tions and choose their preferred answer and then record it in the absence of the interviewer (Hair, Bush & Ortinau, 2003).

#### **4.6.1 Questionnaire construction**

Questionnaire construction is an important practical skill for a researcher. The questions were designed with the aim of answering the research questions and meeting the research objectives. The order and flow of the questions were logically presented to the participants. The questionnaire consisted of closed-ended questions as they were quicker and easier to answer, and readily amenable to coding and quantitative analysis. The Likert scales were extensively used to allow participants the opportunity to indicate their level of agreement, or disagreement, with a statement or how they considered the importance of an aspect, as well as indicating their most preferred option.

Babbie (2008) identifies key advantages for using questionnaires such as: easy to distribute to many participants (use of electronic mail), easy and quick to answer, answers across participants are easy to compare, answers easier to analyse on computer and response choices make question clearer.

Data collection for this study was done through in-depth interview questions (**Appendix A**) conducted face-to-face. In-depth interviewing is a qualitative research technique that involves conducting intensive individual interviews with a small number of participants to explore their perspectives on a particular idea, programme, or situation. An interview guide was prepared to guide the researcher. In the process of preparing the interview guide a list of open-ended questions to be used for applicants were crafted in such a way that they collected information that would answer the research questions and objectives. After a process of reviewing the open-ended questions the final set was reduced to 21 questions.

The next stage was to pilot whether the questions were correctly structured for collecting the wanted information. The researcher consulted practitioners and colleagues working in the IT industry to pilot the questions. After a series of pilot tests and adjustments to the wordings of questions, it was decided the questions would elicit the appropriate information.

## **4.7 Research process**

The research process clarifies the way in which the research instrument was utilised to obtain primary data. The aim to gain access to the sample was an attempt to maximise the response rate. The research process is elaborated as follows:

Some of the key ethical issues that should be considered in any project are as indicated below.

### **i) Informed consent**

Speziale, Streubert & Carpenter (2011) indicated that informed consent is a prerequisite for research involving identifiable subjects. Speziale *et al.*, (2011:61) describes informed consent “as the provision of adequate information regarding the research to the research participants”. The researcher ensured this by explaining the rights of the participant and so ensuring that every research participant who took part in the research did so of his or her own free will. Each participant was requested to sign a consent form that explained the purpose of the research and the participant’s rights.

### **ii) Ensuring no harm to participants**

The researcher ensured that no harm occurred to any of the participants by conducting the interviews at work, with the permission of their senior managers. According to O’Leary (2010:41) researchers must ensure that no physical or emotional harm occurs to participants. Should such risks be carelessly allowed, it can lead to legal challenges. By conducting the research interviews at work, it was intended to give the participants a sense of security and relaxation, thereby minimising the risks of potential psychological harm and maximising the quality of responses. To ensure that no psychological harm occurred (such as stress, anxiety, loss of reputation or fear of job loss), consent forms were signed indicating that, *inter alia*, all information shared was not to be used anywhere else without their permission.

### **iii) Confidentiality and anonymity**

The researcher explained to the research participants that the confidentiality of all who were participating in the research was paramount and would be respected. Information relating to the participants’ names, or any piece of information that would be deemed

confidential, or would result in the participants being personally identified, would not be solicited in the research. Confidentiality and anonymity were ensured as no names or any identifying information was requested of the participants. According to Babbie (2014:67), a research project ensures confidentiality when the researcher can identify a given person's responses, but promises not to do so in public. On the other hand, anonymity refers to concealing the identity of the participants in all documents resulting from research, therefore actively protecting the identity of research participants (King & Horrocks, 2010). Private contact numbers and names would not be recorded during the interviews. Hence, the confidentiality and anonymity of participants would be highly regarded. Importantly the study would abide by the rules of the Data Protection Act 1998, which states that information must be processed fairly and lawfully at all times (Burchell, 2009).

#### **iv) Permission to conduct study**

Permission to conduct the study was sought from management of the organisation which was sanctioned. According to Hennink, Hutter & Bailey (2010:12), one of the core ethical issues in research is obtaining permission to conduct the research. Failure to obtain such permission may lead to legal complications.

The key advantage of in-depth interviews is that they extract and elicit much more detailed information than what is available through other data-collection methods, such as surveys and questionnaires. The researcher has the ability to probe for more information by following up on a question, or answer, and providing yet another question so as to clarify responses given. They also provide a more relaxed atmosphere as participants feel more comfortable having a conversation as opposed to filling out a survey questionnaire.

#### **4.7.1 Target population**

A population is a group of elements or cases, whether individuals, objects, or events, that conform to specific criteria and to which we intend to generalise the results of the research (McMillan & Schumacher, 2006). Bryman (2008) defines population as the universe of units from which a sample is to be selected. Katzenellenbogen, Joubert & Karim (2001) describe the study population as the source population from which cases

and controls are selected. The study population consisted of all IT personnel working in the four major banks in South Africa, including the chairperson of the board of directors of the banks. The sampling frame comprised of at least ten senior IT personnel of each of the four major South African banks. These people can comprise managers and senior staff of IT departments of the banks.

Sampling is the process through which a representative subset or part of the total population is selected and studied so that researchers will be able to draw conclusions, regarding the entire population (Altinay & Paraskevas, 2008). Bryman (2008) also defines a sample as being the segment of the population that is selected for research; it is a subset of the population. The advantages of sampling are that the smaller number of elements to be studied makes the research more manageable and time efficient, less costly, and potentially more accurate (since it is easier to maintain control over a small number of elements). Saunders, Lewis & Thornhill (2003) state that it is not easy to survey the entire population. Therefore, it is necessary to survey a sample of the population as an alternative and to then generalise about the entire population. Participants were selected from a population of IT personnel working in the four major banks in South Africa.

Sample sizes are determined by three factors: the level of precision, confidence level and degree of variability (Zikmund & Babin, 2007). Zikmund and Babin add that the sample size depends on the variability within the sample, that is, heterogeneity or homogeneity. The population for this study was deemed to be homogenous and only IT decision makers were selected as research sample. Given the limitations and delimitations of the study (for instance, time and financial resources), a sample size of 21 participants was decided upon.

According to Saunders, Lewis & Thornhill (2007:207) “sampling methods are grouped under probability or representative sampling, and non-probability or judgemental sampling”. Table 4.1 lists the different types of sampling design.

**Table 4.1: Types of sampling designs**

Probability sampling	Non-probability sampling
Simple random	Convenience
Systematic	Quota
Stratified	Purposive/Judgemental
Cluster	Snowball

Sources: Burns and Grove (2005) and McMillan and Schumacher (2006:119).

Based on the above, participants were sampled through non-probability sampling techniques. In a non-probability sampling a particular group, with the full knowledge that it does not represent the wider population, was targeted (Cohen, Manion & Morrison, 2007). Among different non-probability sampling techniques, convenience sampling was employed. Cohen, Manion & Morrison (2007:113) mention that “small-scale research often uses non-probability samples because, despite the disadvantages from their non-representativeness, they are far less complicated to set up. They are considerably less expensive, and can prove adequate where researchers do not intend to generalise their findings beyond the sample in question”. In convenience sampling, the participants are ‘in the appropriate place at the right time’ when the sample is drawn, making it convenient for the researcher to use them (Cant *et al.*, 2003).

Even though convenient sampling contains limitations in terms of its ability to be generalised, it was logically assumed that the sample represented the whole population of IT knowledgeable people and decision makers in the major South African banks. There is sufficient similarity among the elements within the population to conclude that a few of the elements will sufficiently represent the characteristics of the total population. Time and cost constraints also justified the convenience sampling technique. Thus, the survey questionnaires were distributed to IT people in the four major banks, including the chairpersons of boards who should drive the governance aspect.

#### **4.7.2 Ethical Issues**

In carrying out structured (open-ended) interviews, it is important that the researcher refrains from asking any questions relating to age, sex, ethnic origin, race, religion or political beliefs, medical conditions/disabilities and avoids discussing issues that could be considered ethically inappropriate.

It is crucially important for a researcher to prudently consider the environment in which he or she will be working, the objective of the research and how delicate the topic might be. All the ethical undertakings and guarantees were given in a covering letter (**Appendix B**). Considering that the questions that would be put to participants might be alarming, or might make the participants feel distressed/worried about the results, this was an essential step. A researcher must always remember that asking a person to talk about experiences that were frightening, humiliating and painful can cause or increase anxiety. It may not only create distress during an interview, but may also emerge after. It is therefore very important that researchers take care in how they ask questions and where they choose to ask questions.

Ethics is rooted in the ancient Greek philosophical inquiry of moral life. Johnstone (2009:34) defines ethics as “a system of principles which can critically change previous considerations about choices and actions”. A researcher has certain responsibilities to the research participants and the people to whom the findings will be presented. One starting point in considering ethical concerns is the four principles of Beauchamp and Childress (1983).

#### **4.7.3 Data collection administration and process**

Electronic mails containing an attached letter of Introduction and Informed Consent (**Appendix B**) were sent out to the participants. All participants were given three days to respond and indicate their willingness to participate in the study. All those who responded by end of the third day were confirmed as participants. Those who responded after the deadline were not considered.

All participants were given the opportunity to prepare for the interviews and the researcher confirmed the interview times and the place of the interview in writing. A sum-

mary of the questions was provided to the participants a week ahead of the interview date. The interview process was very methodical, paced, and focused on the participant to the exclusion of everything else. Any external influences that could distract from the interview process, such as telephones, were switched off. The actual interview commenced after introductions had been made and the researcher had briefed each participant, once again, regarding the general purpose of the research, the role that the interview would play, the approximate time required to complete the interview and the fact that the information would be treated with utmost confidence. In an effort to remain objective and focused, the researcher ensured that the questions were asked in the same order for each interview.

The responses were written down, as opposed to being recorded, as many participants had indicated that they were not comfortable with being audio-recorded. Writing down the interviewee responses provided the interviewer with something to do while the respondent formulated answers. It also slowed the pace of the interview, allowing the interviewer to ensure that all the key points were covered. The process of taking notes also sent a message to participants that their responses were important.

#### **4.8 Data analysis**

To ensure a successful project enterprise, it is important to handle the combination linking business processes and information systems effectually. The project management procedures should comprise of maturity frameworks, critical success factors, key goal indicators and key performance indicators. These project management procedures assist in answering concerning queries to all who have an interest in achieving an increased success rate in projects.

Ader, Mellenbergh & Hand (2008) stated that once data was collected, it must be organised and analysed. Data analysis is a way of gathering, frameworking and transforming data with the intention of emphasising information. According to Connaway & Powell (2010) the basic steps of data analysis include the categorising of data, coding of the data and calculating appropriate statistics. Data collected from the survey were entered into an Excel spreadsheet for analysis, discussion and presentation of the results of this research. Before the data were analysed, it was properly prepared. This process includ-



ed identifying each respondent's questionnaire by a unique identification number, properly defining the variables and entering the data. Frequency tables were drawn and this data were presented in bar graphs, line graphs and pie charts (**Appendix D**).

Van Blerkom (2009) states that often frequency distribution can be interpreted more easily when converted into a graph. The mean was used as a measure of the central tendency of variables because it displays the greatest stability from sample to sample (Van Blerkom, 2009). Additionally, the standard deviation was used to measure dispersion from the mean. Part of the reason for choosing the quantitative approach was because it provided easy and effective ways to apply the above measures. Gravetter & Fornazo (2009) explain that a low standard deviation would imply that most observations cluster around the mean whereas a high standard deviation would imply that there was much variation in the answers.

## **4.9 Validity and reliability**

Validity and reliability are important concepts used to establish whether a research study should be regarded as accurate, credible, valid and reliable and can be generalised to other areas in its field of study. According to Rowley (2002), validity and reliability determine the basis on which other thinkers in the field should regard a piece of research as knowledge and can be added to the knowledge base of the field of study. Gravetter & Forzano (2009) also state that the validity of a research study is the degree to which the study accurately answers the question it was intended to answer. The reliability of a research instrument is the degree of consistency with which the instrument measures the attributes it is supposed to be measuring.

### **4.9.1 Validity**

Validity refers to the accuracy, meaningfulness and credibility of the research project. It has two elements to it: internal validity and external validity. External validity refers to the extent to which the results of the research study apply to situations beyond the study itself. Because the research is done in only one organisation, it is therefore not possible to generalise the findings to all South African banks.

Internal validity refers to the extent to which the design and data of a research study allow the researcher to draw accurate conclusions about cause and effect relationships within the data.

#### **4.9.2 Reliability**

This refers to the extent to which another researcher would draw the same conclusions on the same research project. Rowley (2002) points out that reliability is achieved through the documentation of procedures and appropriate record keeping. Although the term 'reliability' is a concept used for testing or evaluating quantitative research, the idea is most often utilised in all kinds of research.

#### **4.10 Limitations and delimitations of the study**

A discussion of the research study limitations demonstrates that the researcher understands that no research project is perfectly designed; consequently, the researcher will make no overweening claims about generalisability or conclusiveness about what has been learned (Marshall & Rossman, 2011). This study was limited to evaluate and understand the factors and reasons why IT project management fail within the South African banking industry. In fact, considering resources and time constraints, the research was limited to only the four major banks in South Africa. Some of the limitations originated from the tool that was used. The use of the closed-ended questionnaire meant that it was not possible to ask follow-up questions which would help in determining the reasons why IT projects fail.

According to Ledez (2008) "the delimitations of a study are those characteristics that limit the scope of the inquiry and define boundaries for the study". This study focused only on four major South African banks. Furthermore, the delimitations of this study also related to the use of a singular research design as opposed to triangulation. The research instrument and the number of test items were also limited.

#### **4.11 Elimination of bias**

Cooper & Schindler (2003:378) mention that the forms of bias in a research study are gender, racial or ethnicity references, language use, stereotyping and any form of as-

assumptions. Written questionnaires, which eliminates bias that may arise from phrasing questions differently for different participants, were used. In addition, the language used was simple, clear and understandable. Moreover, part of the reason for choosing a quantitative approach was to eliminate bias as it requires the researcher to keep some distance from the participating subjects.

## **4.12 Conclusion**

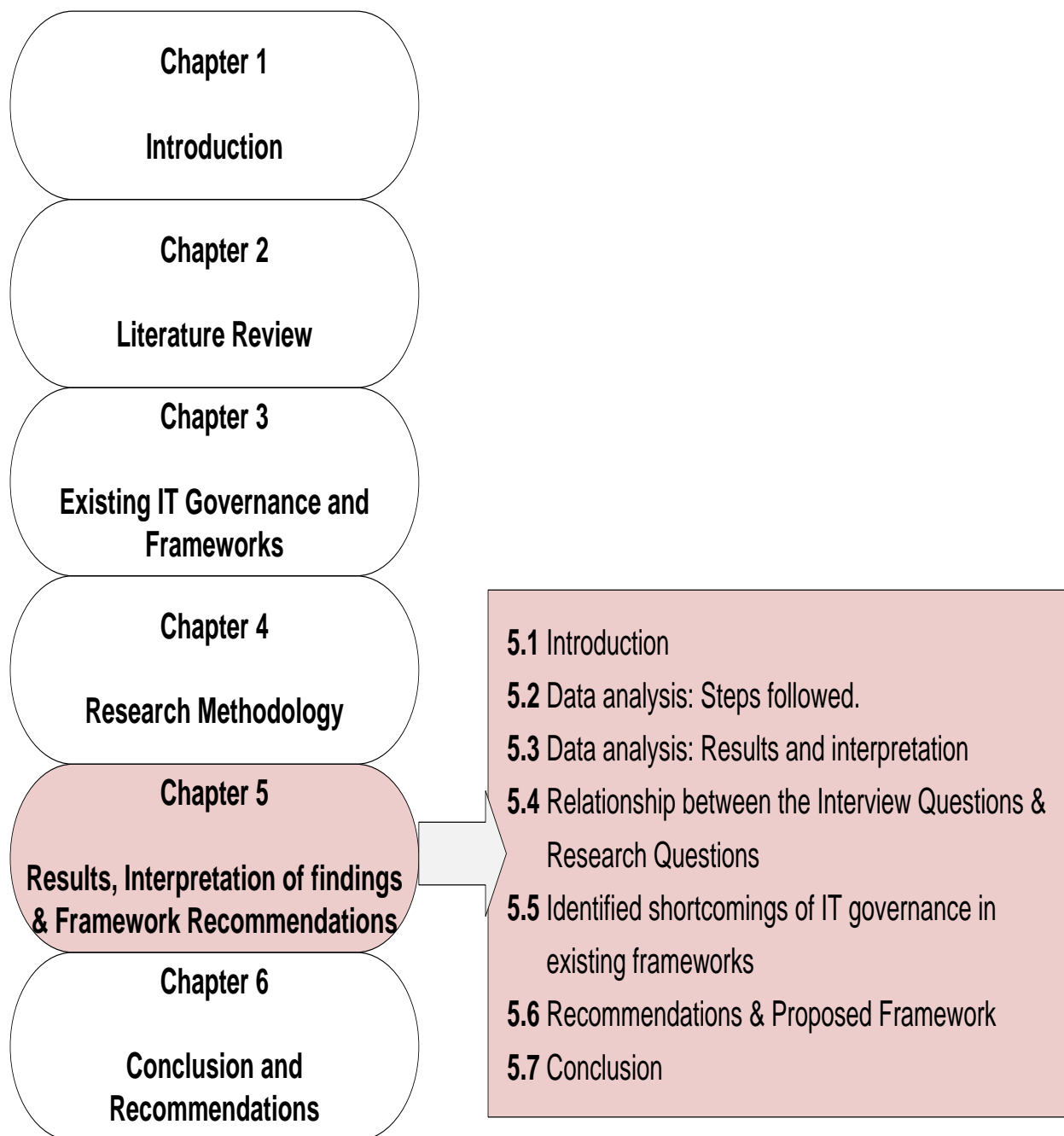
The overall research design and the underlying research philosophy, the research approach and the research strategy were discussed in this chapter. The study adopted a positivist research philosophy and can be best classified as following a deductive research approach. The study used a quantitative, descriptive survey design.

A questionnaire was administered by the researcher to collect data from a conveniently selected sample of 21 participants. The sample included all IT decision makers and board chairpersons of the four major South African banks who had agreed and were willing to participate. Reliability and validity were addressed by defining appropriate tactics and some considerations on the activities. Consent was obtained from the subjects themselves. Anonymity and confidentiality were maintained during the administration of questionnaires and report writing. The next chapter presents the findings of data collected, utilising descriptive statistical analysis tools.

## **4.13 Chapter Summary**

This chapter presents an overview of the important areas that need to be considered when undertaking a research study. It outlines the type of research, the rationale for choosing the methodology for this particular research, elaborates on the research philosophy and strategy, defines and describes the target population, sampling, research instruments, pilot study, administration and collection of the questionnaires, data analysis, validity and reliability, limitations, bias and ethical considerations. The next chapter discusses the results, interpretation or findings and framework recommendations. The data analysis and interpretation are addressed in this chapter. Statistical methods are used to analyse the data. The results of the study are presented in graphical form, discussed and interpreted. Emerging patterns identified in the study are also discussed.

Findings are linked to the reviewed literature to identify similarities to, or divergence from, existing theory. Based on the finding, a new framework recommendation is presented in this chapter.



## **5. CHAPTER 5: RESULTS, INTERPRETATION OF FINDINGS AND FRAMEWORK RECOMMENDATION**

### **5.1 Introduction**

This chapter analyses the responses and presents the research findings from the surveyed data. The results are presented in this chapter according to the layout and sequence of the interview questions. The responses most common amongst the respondents have been selected as the key themes emerging from the data. The results of each question are stated and discussed immediately. The findings are then linked to literature review discussed in Chapter 2 of the study.

### **5.2 Data analysis: Steps followed**

As identified in Chapter 4, after data has been collected it must be organised and analysed. According to ([www.pdx.edu/studentaffairs/sites/www](http://www.pdx.edu/studentaffairs/sites/www)) data analysis can be conducted in five steps:

- Step 1:** Organise and prepare the data for analysis.
- Step 2:** Read through all the data to obtain a general sense of the information and to reflect on its overall meaning.
- Step 3:** Begin detailed analysis with a coding process. Coding is the process of taking text data, segmenting sentences (or paragraphs) into categories and labelling these categories with a term, often a term based on the actual language of the participant.
- Step 4:** Use the codes to generate a description of the setting categories, or themes for analysis. Description involves a detailed rendering of information in a setting.
- Step 5:** Evaluate the lessons learned from the data and make interpretations or meaning of data.

### 5.3 Data analysis: Results and interpretation of Interview Questions

This section will address each question according to the layout and sequence as it appears in the questionnaire.

#### 5.3.1 Question 1

The first question attempts to gain an understanding of some demographic Information. Though the demographic information does not answer any of the specific research questions, or sub-questions, it facilitates a clear understanding of the research problem.

The respondents were requested to complete the table below.

Your age range [e.g. 30 – 35 or 36-40 etcetera.]
Your job title
How long have you been working in IT-related areas?
For how long have you been employed in your current position?
What is your highest qualification?
What IT project management methodologies have you worked with? Please name them below.

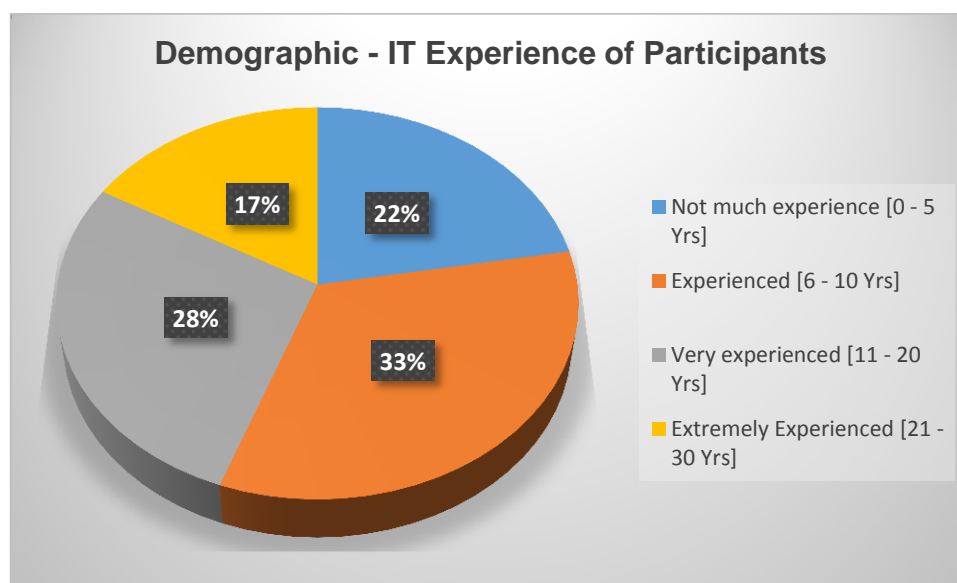


Figure 5.1: Demographic – IT work experience of participants  
Source: Saunders, Lewis & Thornhill, 2007

Figure 5.1 indicates that from a demographic viewpoint, 33% of the participants had between 6 to 10 years IT working experience. This is fairly good IT experience, however, with the fast changing field of technology even this experience may not be that solid as the participants may still be novices to the new methodologies. Those participants who had IT experience between 11 to 20 years constituted 28% and 22% of the participants indicated that they had between 0 to five years' experience of IT work. Three participants, constituting 17%, had IT work experience of between 21 and 30 years. The above statistics changed when compared to the length each participant had held his current position at his/her current employer. For example, one person, or 5.56% of participants, had the longest IT work experience of between 21 and 30 years in current position. Ten participants had been in their present positions for periods between zero and five years.

Overall, this indicates that there is a lack of solid IT work experience within the South African banking industry as evidenced by the number of IT projects that fail. Most IT people seem to change careers within 5 years of occupying a position. This is demonstrated by the fact that while there were 33% of participants with IT work experience of 6 to 10 years, the percentage went down to 22% of IT work experience of holding the current position.

### **5.3.2 Question 2**

Poor or unsuccessful projects were deemed to be those below 50% delivery success rate. Those participants who indicated that there was a poor project delivery success rate at their various banks constituted 16.67%. Evidence quote 1: *“Only 40% of the projects were successful and 60% were unsuccessful”*. Evidence quote 2: *“A huge 90% of the projects were unsuccessful and only 10% did succeed.”*

Figure 5.2 indicates that 44.44% of the participants stated that they had a good success rate. The participants who indicated that their success rate was neutral constituted 11.11%, indicating they successfully delivered the same number of projects as they failed to deliver. One participant specifically indicated that the first IT projects they dealt with were a disaster due to poor planning and leadership. The same participant further indicated that they then learnt from the mistakes that they had made and the other three



projects were successfully executed and delivered on time within both budget and cost. Evidence quote 1: *“We used the initial failures as a learning curve and we came right from thereon. The success was mainly due to good project management techniques like monitoring timelines and ensuring the project team perfectly understands correct requirements”*. One participant (5.56%) did not answer the question and 22.22% of the participants indicated that they had a moderate success rate, meaning they successfully delivered slightly more projects than those which failed.

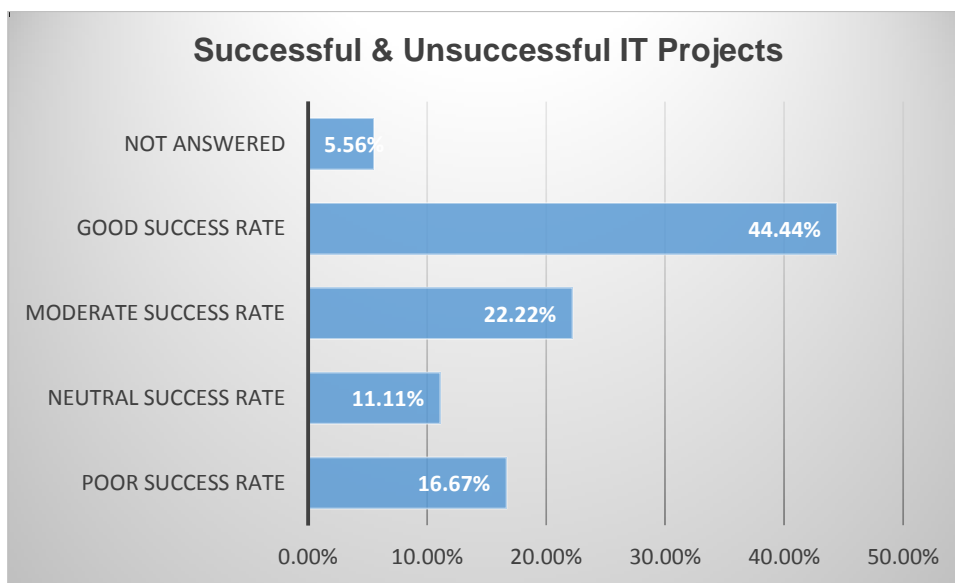


Figure 5.2: Successful and unsuccessful IT projects

### 5.3.3 Question 3

As indicated in Figure 5.3, 44% of the participants stated that the most commonly used frameworks within the South African banking sector are a Hybrid of Waterfall and Agile methods. In particular, the Waterfall method is the most common framework utilised by banks in the South African banking industry, with 11% of participants indicating that it is the framework they use in their banks. Evidence quote 1: *“Generally Waterfall approaches are utilised (even when they are labelled Agile)”*. Of the remaining participants, each (5.56%) stated a different framework, or a Hybrid of two methodologies. Various Hybrids were indicated with Agile and Prince2 methods mentioned as other individual frameworks and not Hybrid.

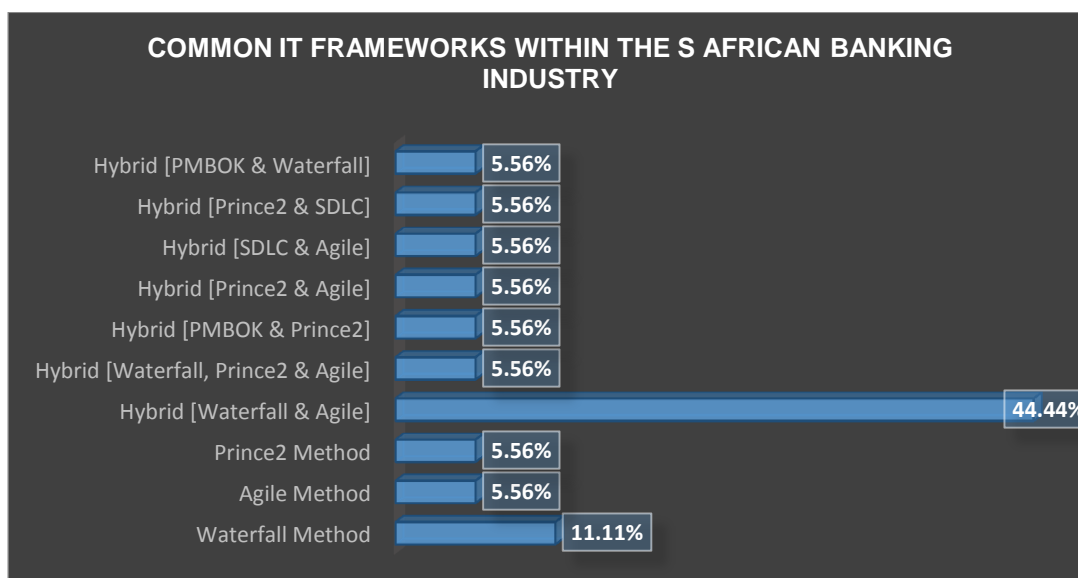


Figure 5.3: Common IT Frameworks within the South African banking Industry

### 5.3.4 Question 4

Figure 5.4 indicates that 27.78% of the participants stated that the most frequent addressed IT governance issue relates to risk and issue management. Evidence quote 1: *“We usually make use of governance to monitor risks and to control scope creep.* Evidence quote 2: *“Release, production, issues, risk, change requests”.* Evidence quote 3: *“IT governance issues commonly dealt with relating to all forms of risks, to make correct decisions, scope budgets time and ensure good quality of work”.* Those participants that indicated that the IT governance issue commonly dealt with at their banks relates to documentation management constitutes 11% with a similar percentage indicating that IT governance issues commonly addressed relate to technical aspects of the business and not proper IT governance challenges. Evidence quote 1: *“The commonly addressed IT governance issues relate to business and technical changes that have to be documented and agreed upon by all parties”.* Evidence quote 2: *“Systems development life cycle (SDLC) - documentation is a must and less strict governance adherence. Agile - focus is on quick delivery of small streams of work rather than documentation”.*

The remainder of the participants each indicated different IT governance issues commonly addressed within their banks. Some of the problems managed include aligning the bank standards worldwide, treatment of customer data and records and resource

allocation and managing scope creep. Three participants, constituting 17%, did not answer the question.

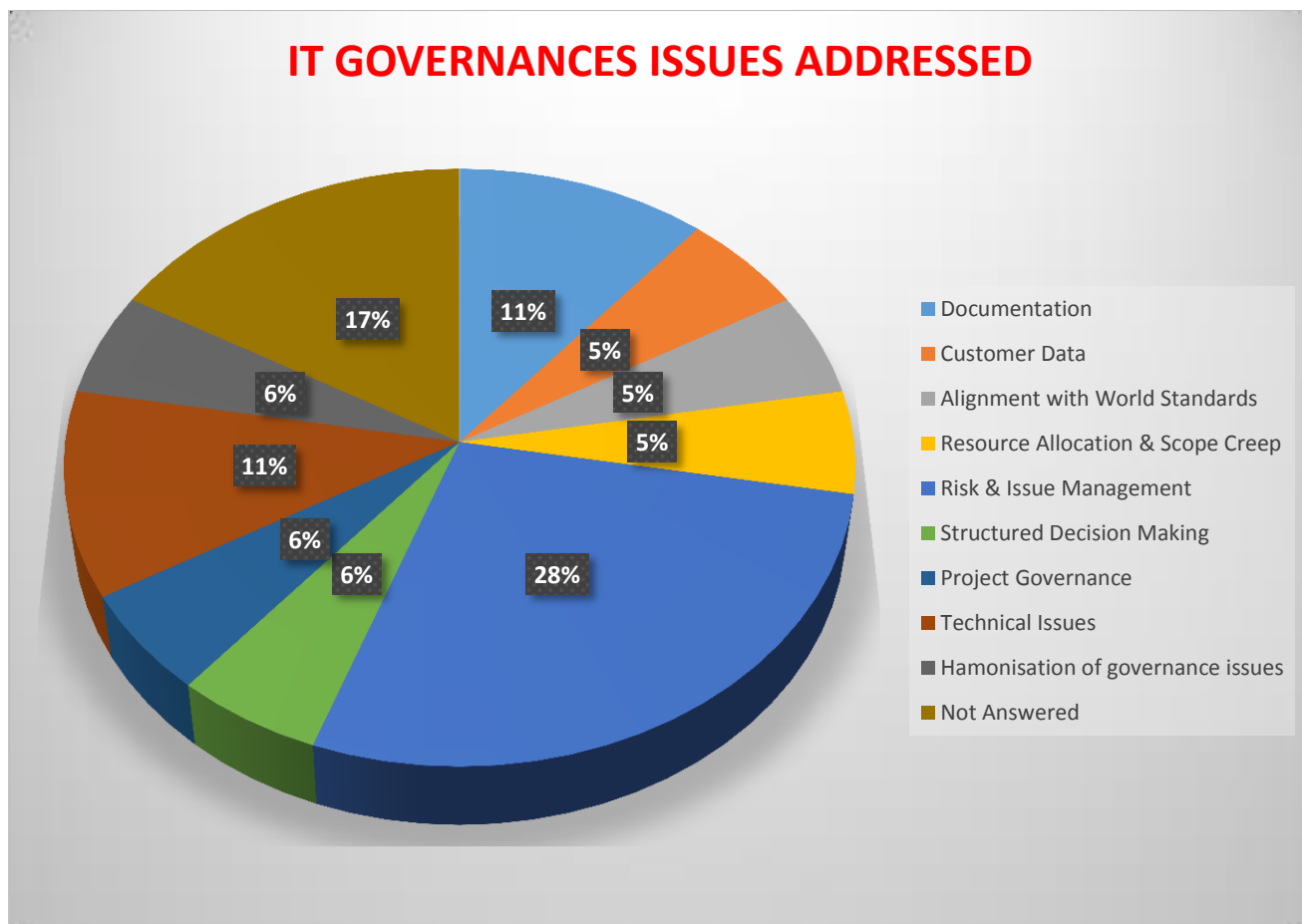


Figure 5.4: IT governance issues that are addressed in the IT frameworks

### 5.3.5 Question 5

As indicated in Figure 5.5, 39% of the participants indicated that a Hybrid of Waterfall and Agile methodologies are most commonly used within the banking sector. This is followed by 11% of the participants who stated that they use the Rational Unified Process (RUP), which is a version of the Agile framework, in their banks. A similar percentage (11%) of participants indicated that they use a Hybrid of System Development Life Cycle (SDLC) and Agile methods. Figure 5.5 also indicated that four groups constituting 6% each of the participants stated that they make use of the Prince2 framework, Waterfall methodology, Hybrids of the Prince2 & Waterfall and Prince2 & SDLC.

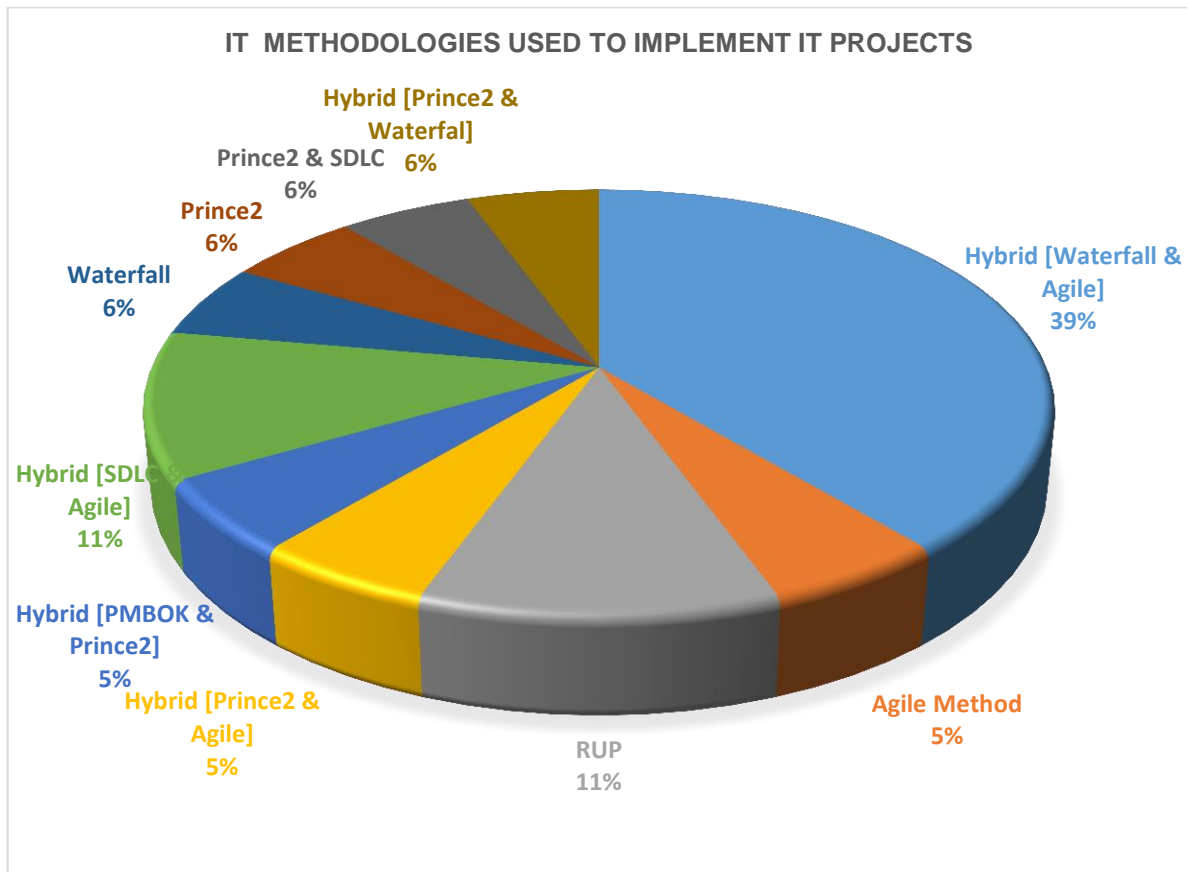


Figure 5.5: IT frameworks used to implement projects

The remainder of the participants, three groups of participants each constituting (5%) indicated different Hybrids and one non-Hybrid framework, namely, Prince2 & Pmbok and Pmbok & Prince2 and then Agile methods.

### 5.3.6 Question 6

Good leadership has been indicated as one of the most significant contributors to the success of IT project delivery by 33% of the participants that were interviewed, as shown in Figure 5.6. Three participants, constituting 17%, indicated IT skilled and experienced manpower as an important contributor to the successful delivery of IT projects. Two sets of participants, each constituting 6%, indicated the following as important contributors to the successful IT projects: first delivery of effective communication, followed by thorough planning and constant communication. The remainder of the participants each indicated different important contributors to the success or failure of delivery of IT projects. One success factor indicated is the timely delivery of quality work. On the other

hand, a contributor to IT project delivery failure is a weak project management skillset. One participant did not answer the question.

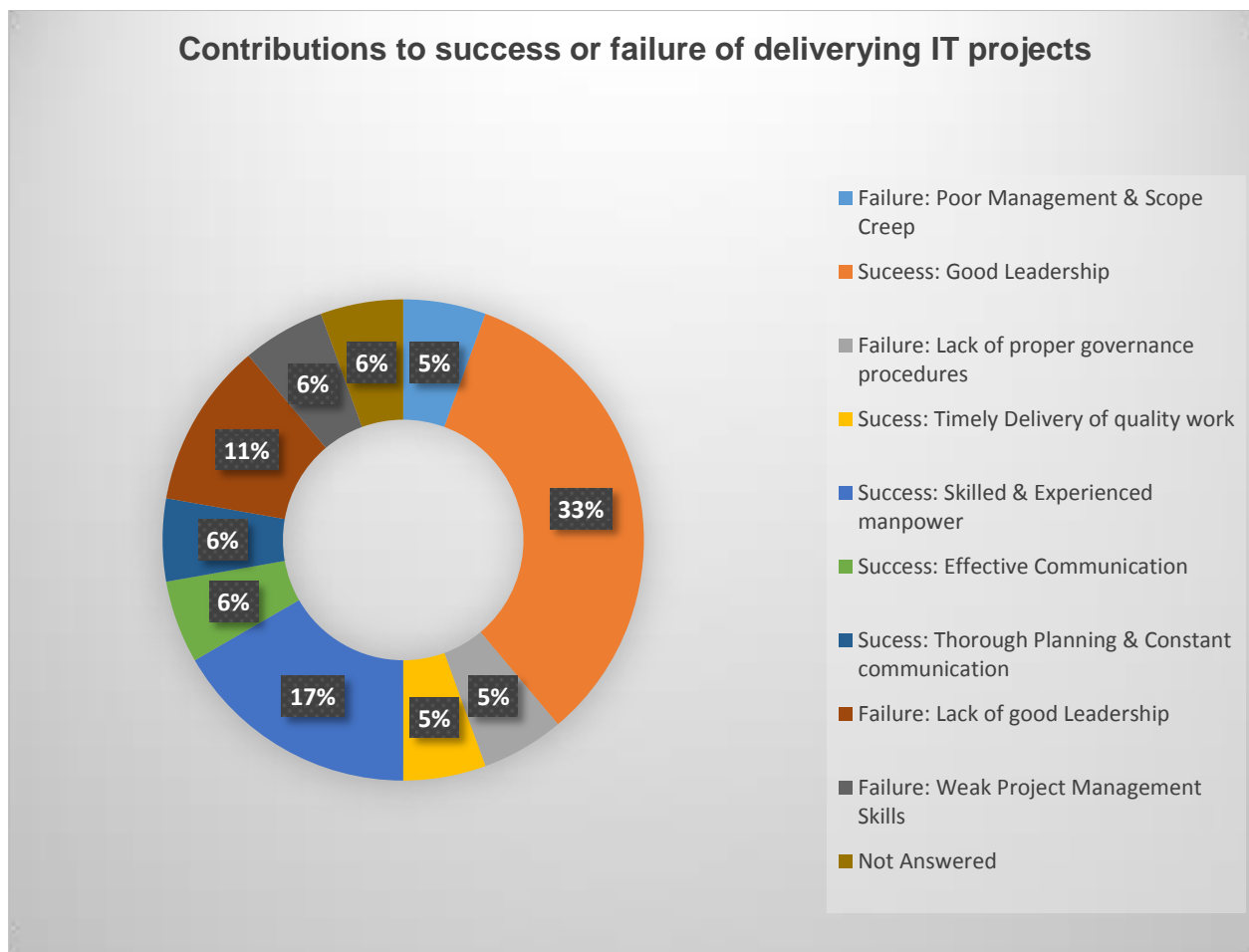


Figure 5.6: Contributions to the success or failure of the delivery of IT projects

### 5.3.7 Question 7

Figure 5.7 indicates that 44% of the participants stated poor leadership and project management skills as the main factor that negatively impacts on IT regulatory governance and the successful management and execution of IT projects within the South African banking industry. Those participants who indicated short implementation timelines as the main factor impeding IT regulatory governance and successful management and implementation of IT projects in the banking sector constituted 17%. Figure 5.7 also indicates that 11% of the participants stated that project management skills are critical to the success of IT regulatory governance and proper execution and management of IT projects.

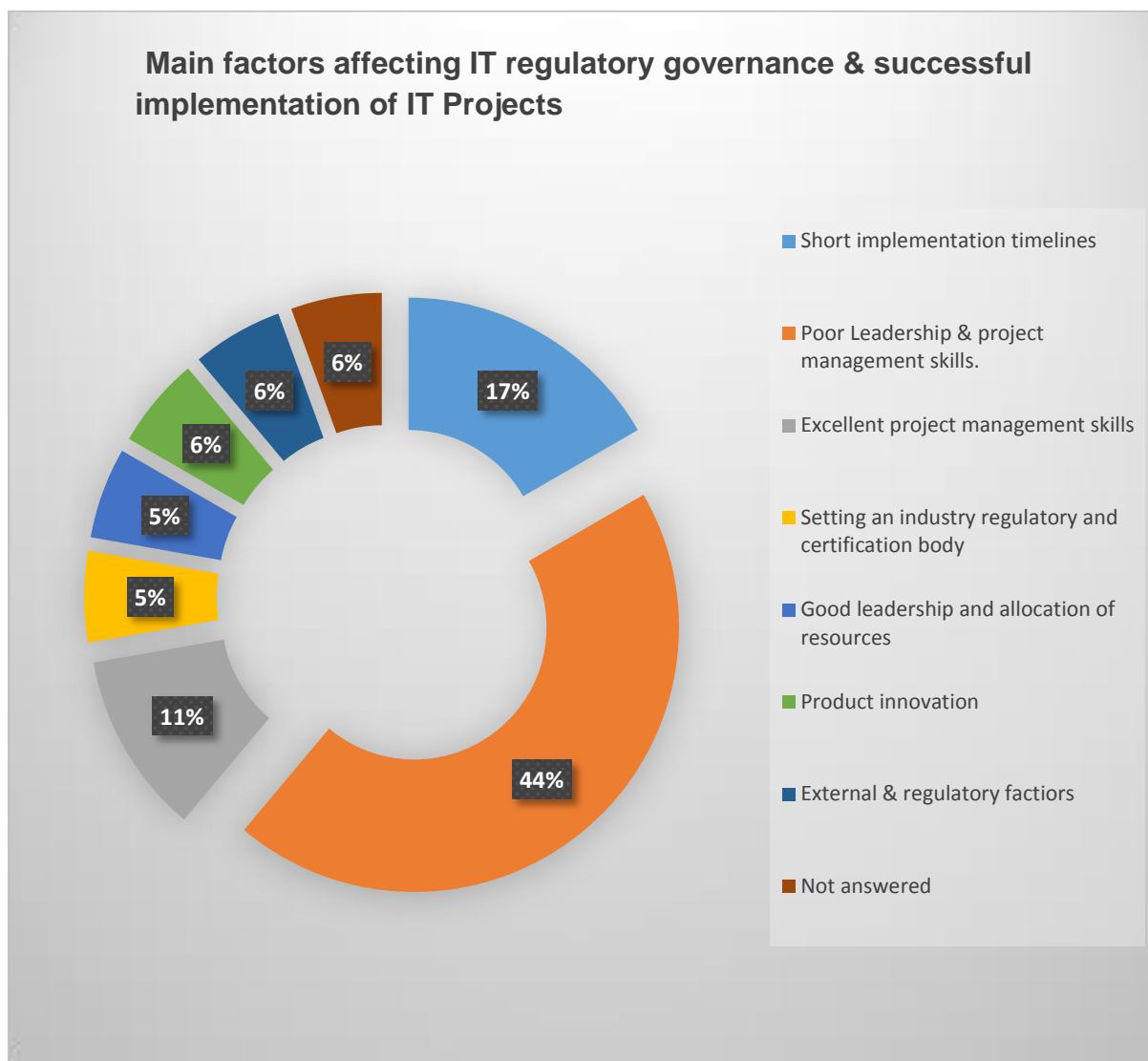


Figure 5.7: Main factors affecting IT regulatory governance and successful implementation of IT Projects

The remainder of the of the participants (6%) each indicated a different factor as being important to the success of a robust IT regulatory governance and execution and management of IT projects. Some of the main factors indicated are as follows:

i) Setting an industry regulatory and certification board. Evidence quote 1: *“The industry struggles to keep up with regulatory governance as this has been largely a reactive process. Too many interfaces and legacy systems cause complexity and outrageous costs for seemingly simple”*. Evidence quote 2: *“Complete and precise definition of the project i.t.o. its goals, objectives and scope”*.

ii) Good leadership and adequate allocation of resources lead to successful IT regulatory governance and implementation of IT projects. Evidence quote 3: *“Institution of proper requirements engineering practices to ensure that the problem is properly understood and that the solution aligns with real business need. Complete and precise definition of the project in respect of its goals, objectives and scope, active management of the projects against its definition, which requires an executive steerer and not an administrator”*.

ii) Product innovation leads to proper and robust IT regulatory governance and successful execution of IT projects. Evidence quote 4: *“The IT industry is highly competitive with dynamic customer demands of product innovation and availability”*.

One participant constituting 6% did not answer the question.

### **5.3.8 Question 8**

Figure 5.8 indicates that 33% of the participants indicated that proper strategic leadership is the solution to integrated governance protocols and that IT project management and implementation hinges on proper strategic leadership. Strategic leadership ensures adequate resources recruitment of skilled manpower and efficient communication. Those who indicated skilled manpower as the solution to the challenges constituted 28% of the participants. Others (11%) stated that proper and detailed planning should improve the hurdles caused by challenges.

The remainder of the participants indicated adequate resource allocation, the adoption of Agile methodologies and that banks be less reliant on Waterfall methodology as the main framework. One participant (6%) did not answer the question at all.

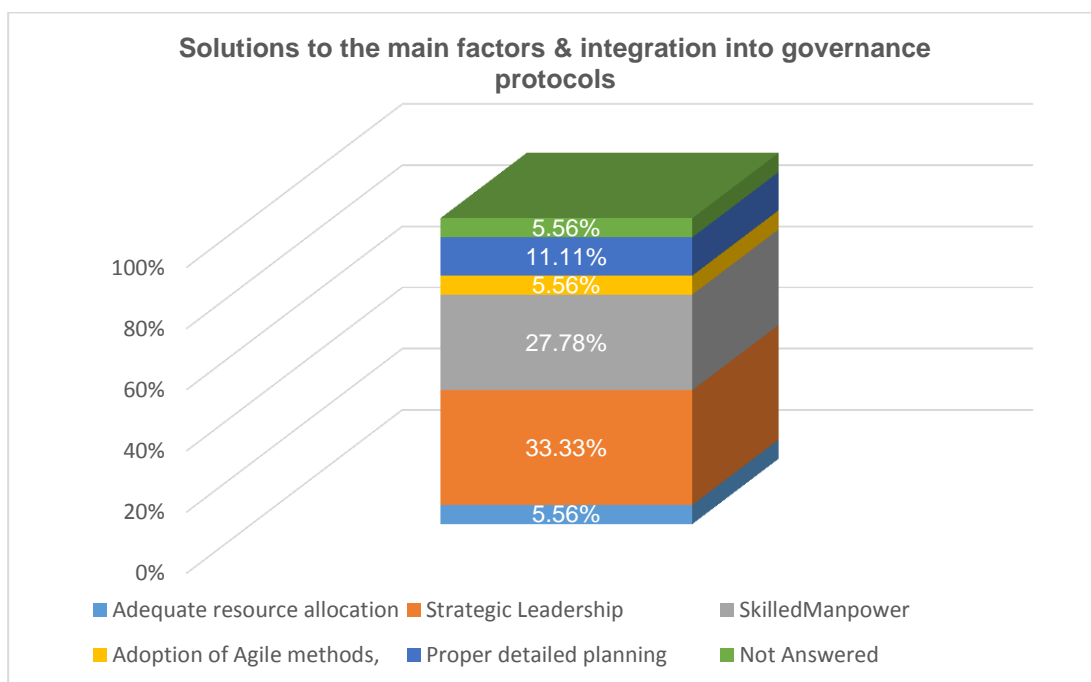


Figure 5.8: Solutions to the main factors and integration into governance protocols

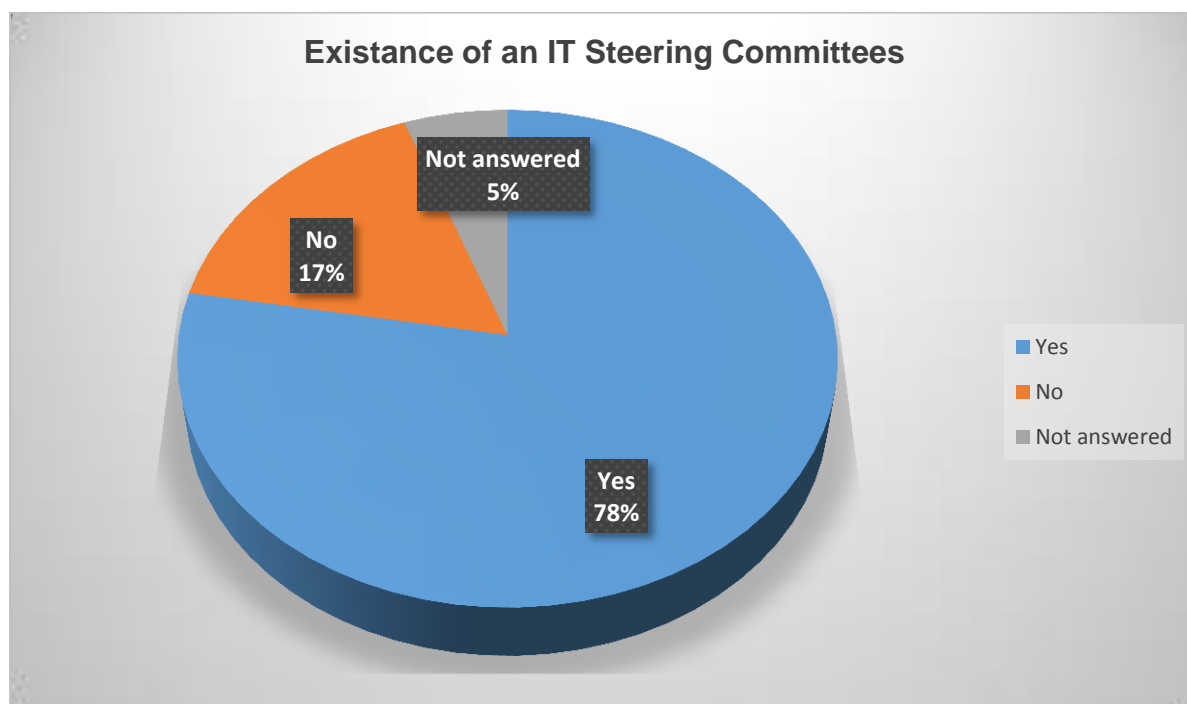


Figure 5.9: Existence of IT Steering Committees within the banks



### 5.3.9 Question 9

As indicated in Figure 5.9, 78% of participants indicated that their banks do have an IT steering committee. However, it was interesting to observe that not all IT steering committees had the ultimate responsibility for establishing IT strategies and policies. This responsibility lay elsewhere. Those who responded 'No' constituted 17% with 5% of participants not answering the question together.

### 5.3.10 Question 10

Of all the participants, 56% indicated that members of their IT steering committees met on a monthly basis, as shown in Figure 5.10. Those participants who indicated that the meeting frequency of their IT steering committees is weekly constituted 11%. One participant indicated that the IT steering committee in his/her bank met only once a year. Also, one participant indicated that they did not have an IT steering committee at all at their bank and yet another participant indicated that he/she was not sure whether such a committee existed at their bank. Two participants, constituting 17%, did not answer the question.

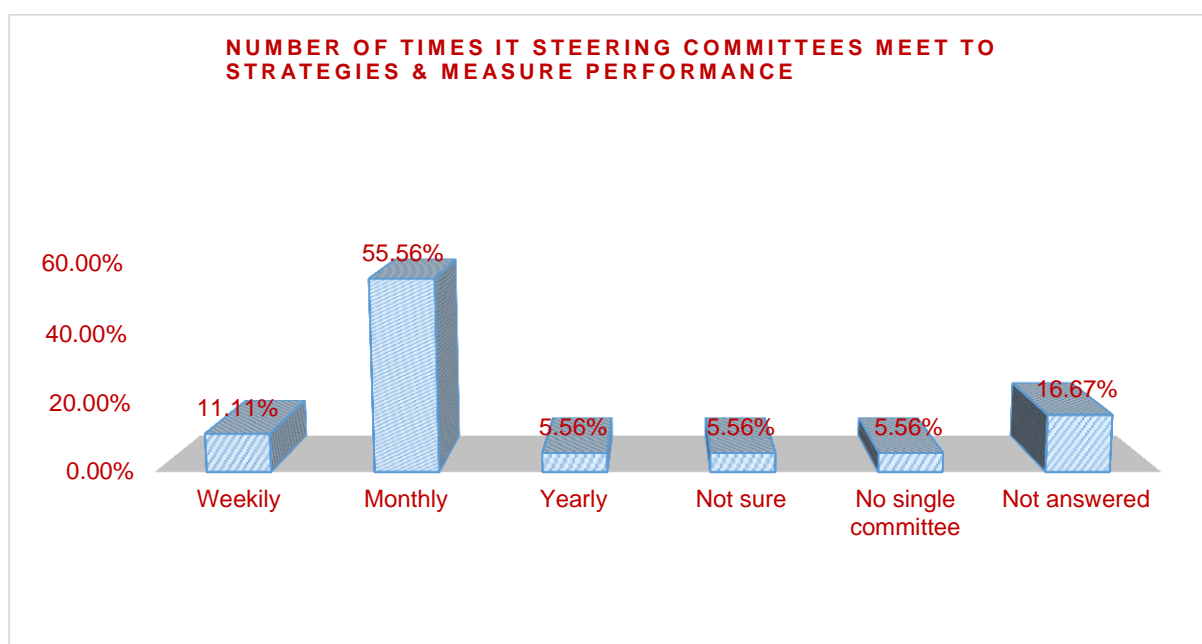
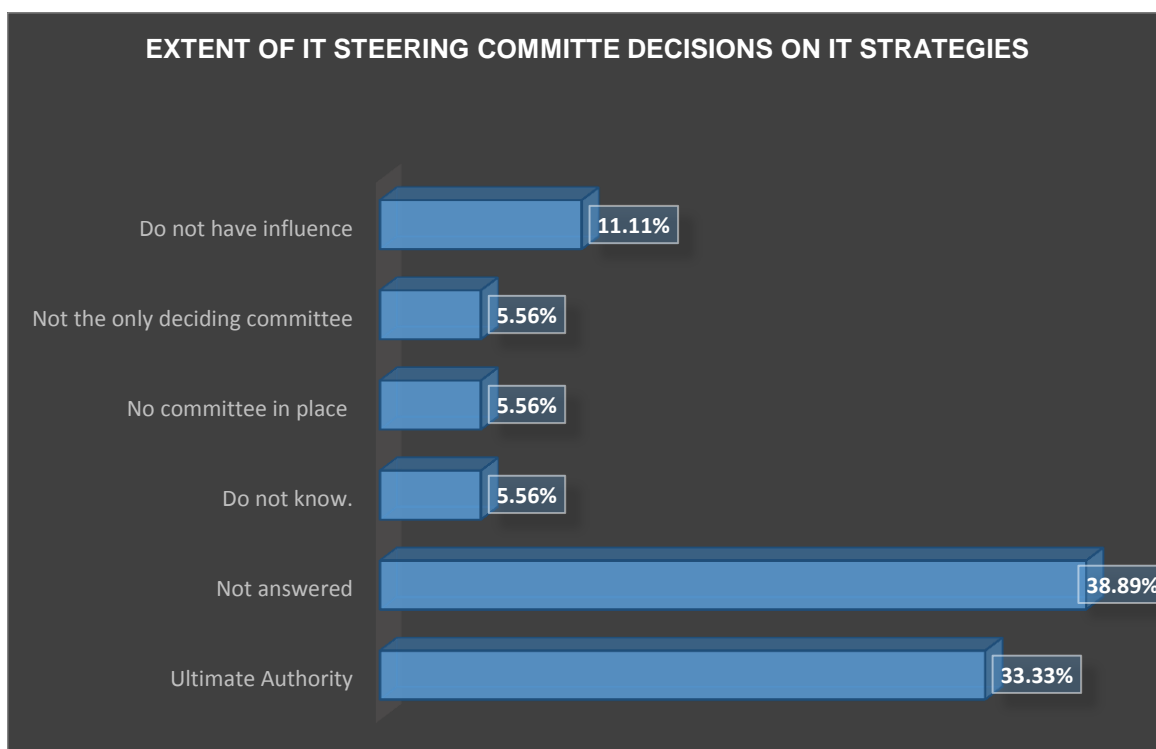


Figure 5.10: Number of times IT Steering Committees meet to strategise and measure performance

### 5.3.11 Question 11



**Figure 5.11: Extent of IT steering committee decisions on IT strategies**

Figure 5.11 indicates that 39% of the participants did not answer this question. However, 33% of the participants indicated that the IT steering committee at their banks has ultimate authority when it comes to setting IT strategies and policies including governance control and selection of methodologies. Evidence quote 1: *“The IT steering committee plays an important role, as they decide on the processes, policies and strategies to implement”*. Evidence quote 2: *“The steering committee 100% sets up policies as well as timelines and deadlines”*. Evidence quote 3: *“The committee governs all aspects of IT, be it strategy, policies and methodologies”*. On the other hand, 11% of the participants indicated that their IT steering committees do not have an influence on decisions on IT policies, strategies and selection of methodologies adopted by the bank. Evidence quote 4: *“The IT steering committee does not have influence; the Committee is only there to ensure projects deliver on time. Policies, strategies methodologies are directed to the Project Management Officer for decisions”*. Evidence quote 5: *“The steering committee only ensures delivery of mandated initiatives only”*. Some participants (6%) indicated that the IT steering committee is not the only deciding committee that influ-

ence IT strategies, policies and methodologies. There are other committees. Evidence quote 6: *“The IT committee has only 50% influence on IT strategies and policies. Other committees look into this aspect, e.g., the IT Risk committee.”* One participant indicated that he/she did not know whether the IT steering committee had or had no ultimate control and yet a further single participant indicated that there was no steering committee at the bank.

### **5.3.12 Question 12**

The majority of the participants (28%) indicated that the bank’s Executive Committee (Exco) has full responsibility for deciding on IT regulatory governance and framework systems for their banks, as indicated in Figure 5.12. Evidence quote 1: *“All project resources are the responsibility of executive management and accounted for by them”*. Evidence quote 2: *“Framework and governance issues are the sole responsibility of executive management and is driven by the executive management committee. Two participants indicated that the responsibility lies with several committees”*. Evidence quote 3: *“Project Management Officer and other various IT governance forums, e.g., architecture, release management, etcetera are responsible”*. Evidence quote 4: *“Several different authorities share these IT responsibilities. A further two participants said the IT regulatory governance and methodologies responsibilities lie with the IT Executive Management”*. Evidence quote 5: *“The responsibility lies with IT leadership at executive level”*. Three participants, constituting 17%, did not answer this question. The remainder of participants each indicated that the responsibility lies with different entities. The following were the people or committees indicated: Chief Information Officer, change and release management teams, group risk and compliance.

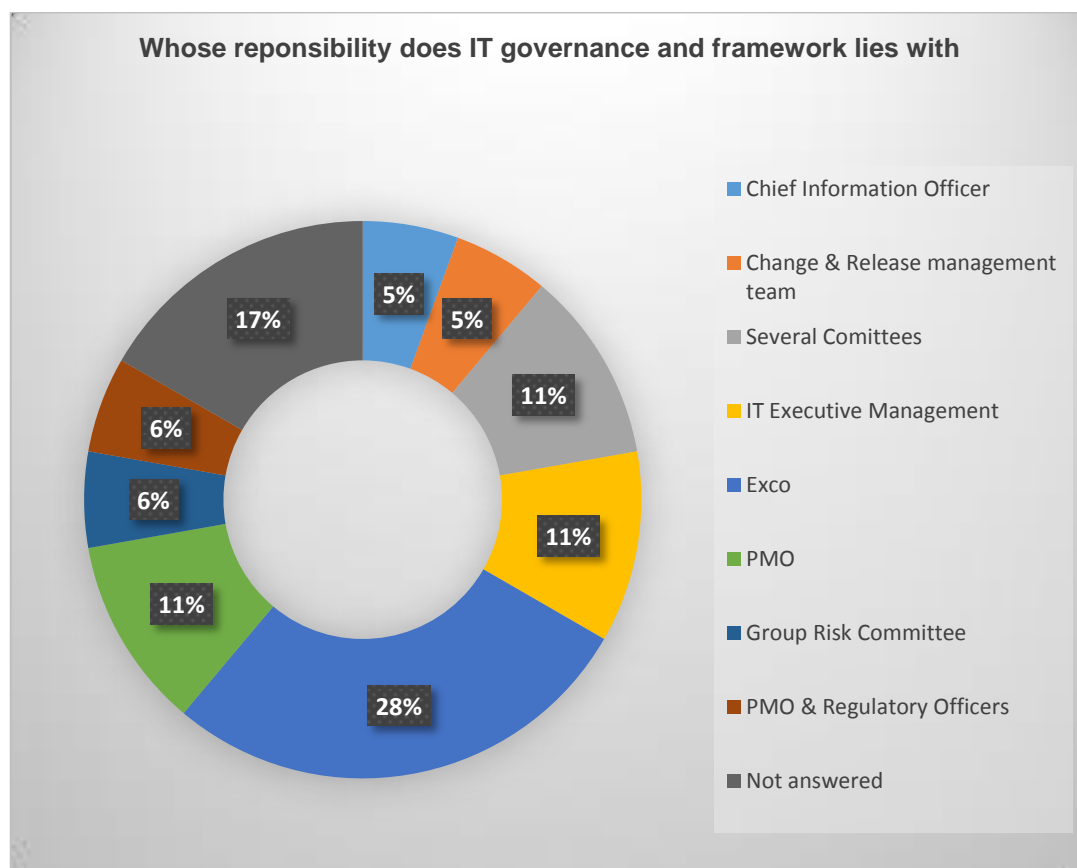
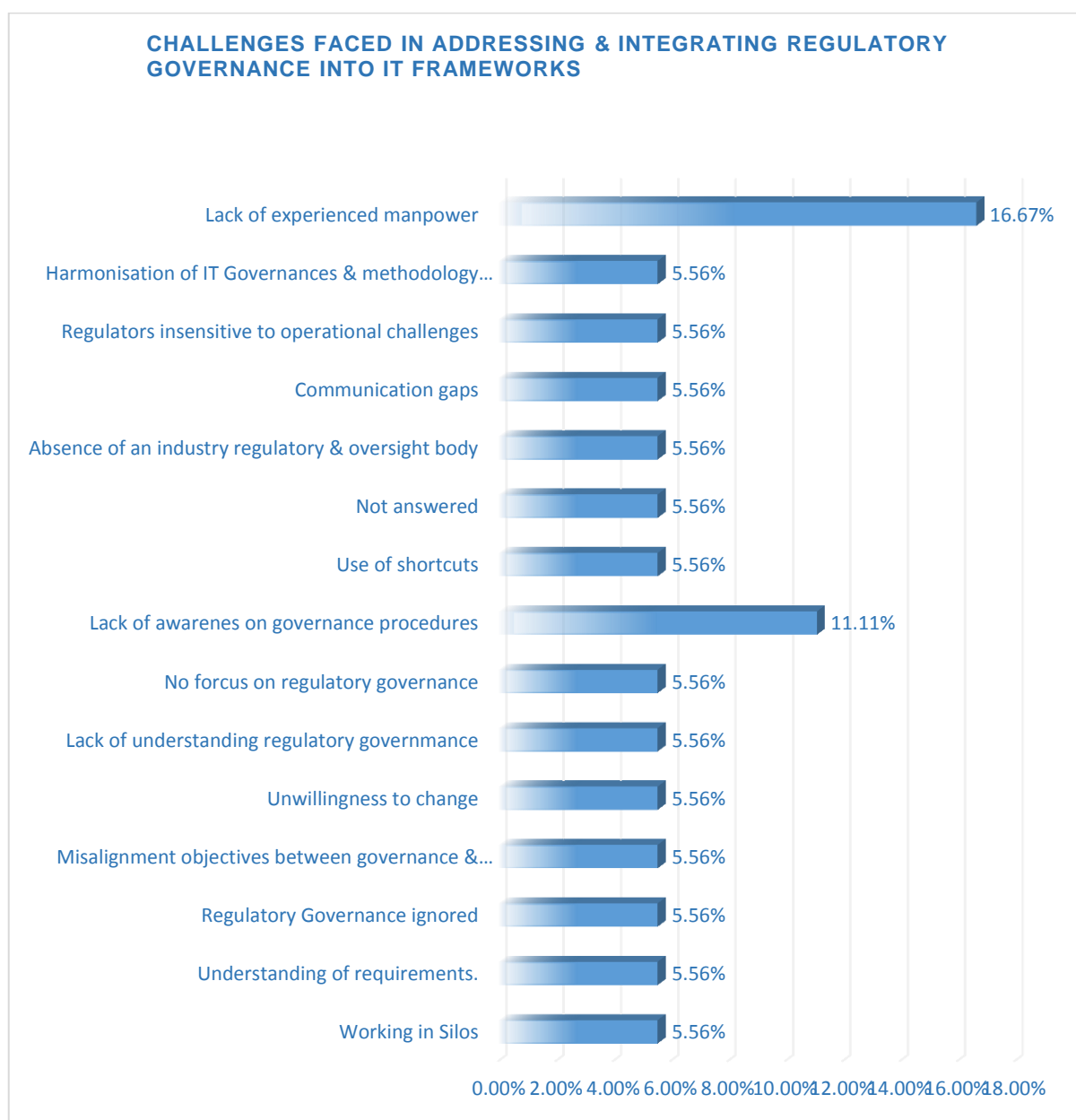


Figure 5.12: Who has the responsibility for IT governance and framework in the banks

### 5.3.13 Question 13

As indicated in Figure 5.13, 17% of the participants indicated a lack of experienced manpower as one of the main challenges encountered in integrating IT regulatory governance into the IT methodologies. Evidence quote 1: *“Lack of experienced people who understand governance issues and setting of unrealistic timelines”*. Evidence quote 2: *“Compliance monitoring of governance issues is done by external people, like auditors as such internal IT people have no understanding of and skills to do this”*. Those participants who indicated that lack of awareness of IT governance processes and procedures is the challenge encountered most often when attempts to integrate regulatory governance into the methodologies are made, constituted 11%. Evidence quote 1: *“Lack of awareness of the governance procedures and lack of knowledge regarding the IT policy and procedures and lack of integration between IT areas and various other projects (silo approach)”*. Evidence quote 2: *“Adherence to correct IT regulatory governance principles needs to be put in place. Use of short-cuts if the system allows”*.



**Figure 5.13: Challenges encountered in addressing and integration of IT regulatory governance**

The remainder of the participants each named a different challenge, amongst them the following: communication gap and time constraints, the absence of an industry regulatory and oversight body, working in silos and no focus on IT regulatory governance. Evidence quote 1: *“Time constraints, communication gaps, dynamic internal and external environment”*. Evidence quote 2: *“IT methodologies tend to focus on technical and technical management processes rather than engineering process. There is usually a push back from industry when calls to form an industry regulatory and oversight body and the certification of practitioners. This is exacerbated by the lack of skills and experi-*

ence”. Evidence quote 3: *“Too many people work by themselves ‘solos’ and they fail to communicate with each other effectively”.*

#### **5.3.14 Question 14**

As indicated in Figure 5.14 most of the participants (39%) think that if banks adopt Agile methodologies there will be some improvement to IT projects successful delivery rates. Evidence quote 1: *“Adoption of Agile methods can be one of the powerful solutions to IT projects failure since all teams are aligned very closely and, therefore, governance can be managed closely and on a daily basis”.* Evidence quote 2: *“Iterative methodologies (Agile) are the best. However, it is not the methodologies that are an issue. The issue is the people that operate within the methodologies, e.g., Agile methodologies require very mature teams and environment to be successful”.* Three groups of participants, constituting 11% each, indicated different solutions to IT project failures.

One group of participants indicated that banks need to develop their own frameworks from scratch, based on their experiences and business prognosis. Evidence quote 3: *“A one size fit all or common denominator is not the answer. IT methodologies must be inherently adaptable rather than prescriptive. Methodologies should contain within themselves processes to define the most suitable approach to the task at hand. Frameworks should always comply with a fundamental set of principles such as risk, incremental and iterative, collaborative business driven, etcetera”.* Another group indicated that it is not the methodologies that are creating challenges, but it is the people who do not have requisite knowledge and understanding of the frameworks and how best to utilise them. Evidence quote 4: *“All frameworks lend themselves to achieving success. However, it is mainly the people factor and buy-in and circumventing laid procedures that are a challenge.”* The third group of participants, constituting 11%, recommended that a Hybrid of Waterfall and Agile should be the standard framework for the South African banking industry. Evidence quote 5: *“Organisations needs to be flexible around Waterfall and Agile methodologies and use the frameworks that deliver the best results. Waterfall and Agile have the best complimentary yet they focus on different objectives and deliver very well”.* Two members did not answer the question at all.

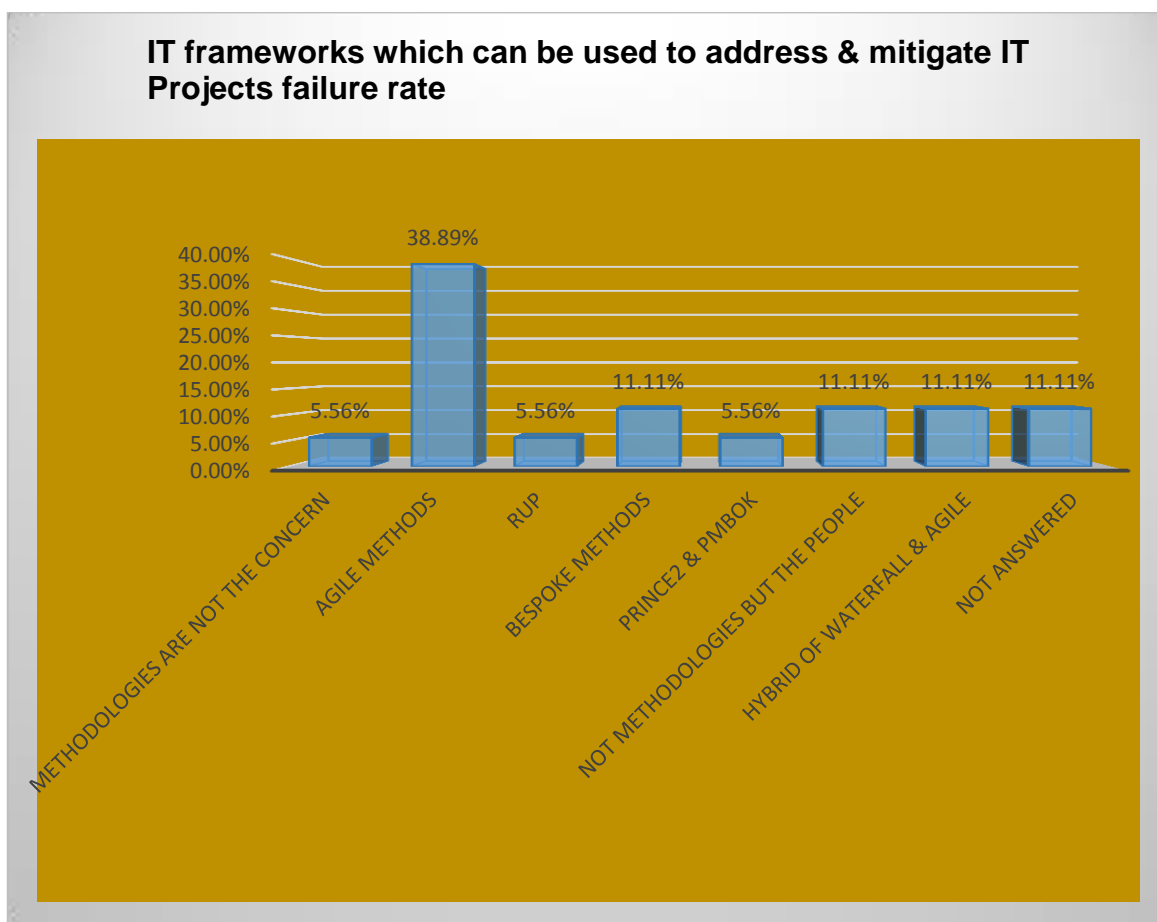
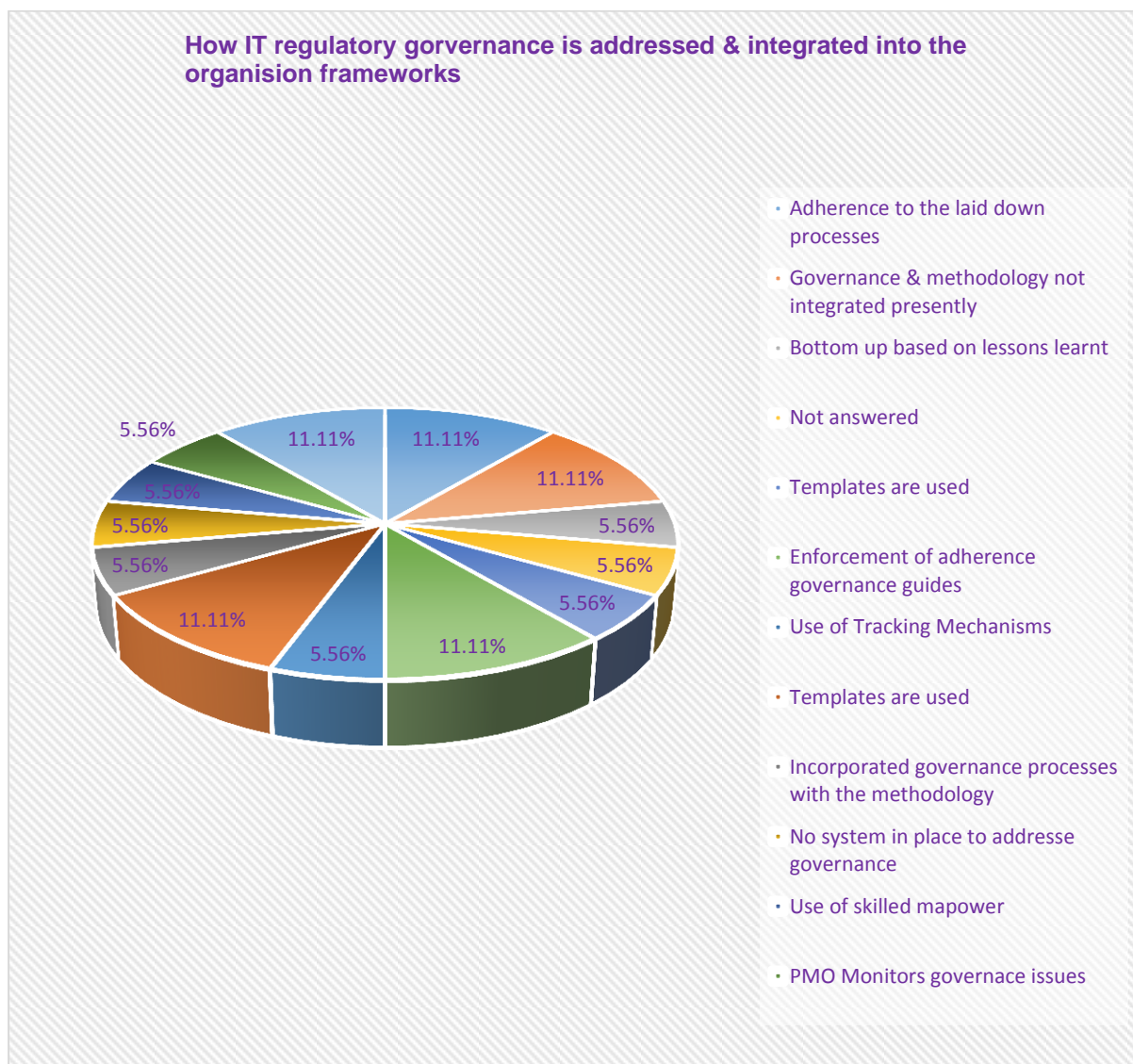


Figure 5.14: IT frameworks that can be used to address and mitigate IT projects failures

### 5.3.15 Question 15

Figure 5.15 indicates that there are four groups of participants, constituting 11% each, who answered the question. However, each gave a different way of how IT regulatory governance issues are addressed and integrated into the frameworks.

One group of participants indicated that they follow strict adherence to the laid down IT regulatory governance procedures and process. Evidence quote 1: *“We strictly insist that proper processes laid down be followed to the letter. Sign-off processes should be put in place”*. The other group of participants stated that in their banks IT regulatory governance and framework are not integrated at present. Evidence quote 2: *“The two are not integrated yet”*. The third group of participants indicated that their banks enforce and monitor adherence IT regulatory governance guides. Evidence quote 3: *“Strict adherence to IT regulatory governance guides by Project Managers is insisted upon and rated by senior management”*.



**Figure 5.15: How IT regulatory governance is addressed and integrated into the organisation Frameworks**

The final group of those participants that constitute 11% indicated that their organisations have created templates to address IT regulatory governance as well as how they should be interfaced with the methodologies. Evidence quote 4: “*Templates approaches and lifecycle structures are used to incorporate IT regulatory governance requirements*”. The remainder of the participants constituting 6% each gave a different response as to how their banks are addressing and integrating IT regulatory governance into the methodologies. Some of the responses suggest using a bottom-up management where the people involved meet senior management and highlight their



opinions. Evidence quote 5: “Bottom-up once lessons are learnt from previous deployments, most being reactive”. Use of skilled manpower. Evidence quote 6: “Skilled people in the right jobs ensures a common understanding of IT regulatory governance and how they should be interfaced with the methodologies”.

### 5.3.16 Question 16

Figure 5.16 indicates that 56% of the participants stated the people tasked with implementing IT projects possess the requisite knowledge, experience and a thorough understanding of IT regulatory governance and methodologies used in managing the projects within their respective banks. Evidence quote 1: “Yes, because I have seen many successful projects being implemented within the organisation before and in record time too”. Evidence quote 2: “Yes, though with varying degrees of skill sets. Often governance is completely left out. Where there is a direct correlation between passion, incentive and personal achievement and desire, the success seems to be higher”.

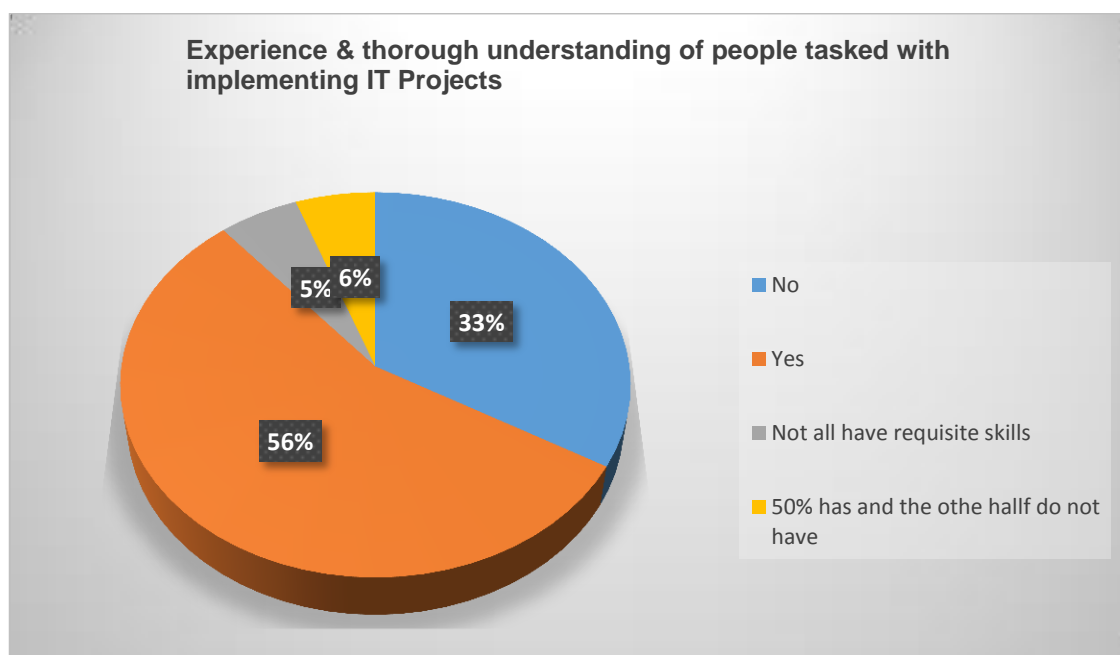


Figure 5.16: Experience and thorough understanding of people tasked with implementing IT Projects

However, 33% of the participants said, ‘No’ those tasked with implementing IT projects within their organisations do not have the requisite knowledge, experience and a thor-

ough understanding of IT regulatory governance and methodologies adopted and utilised in managing the projects. Evidence quote 1: “No, there is a lack of resources and skill set of team member”. Evidence quote 2: “No, there will always be a high dependence on secondary supporting roles, regulatory and governance requirements are far too complex for the IT team we have”. There are those who said about 50% of the people tasked with IT do not have a deep understanding of what sometimes is required of them, such as IT regulatory governance. Evidence quote 3: “Some of them, their skills levels and work experience is 50/50 meaning half the people have requisite knowledge and understanding of IT issues but the other half does not”.

### 5.3.17 Question 17

Figure 5.17 indicates that 28% of the participants stated that their banks encourage employees to comply with laid down IT regulatory governance and framework principles by training them and explaining why certain procedures ought to be followed to the letter.

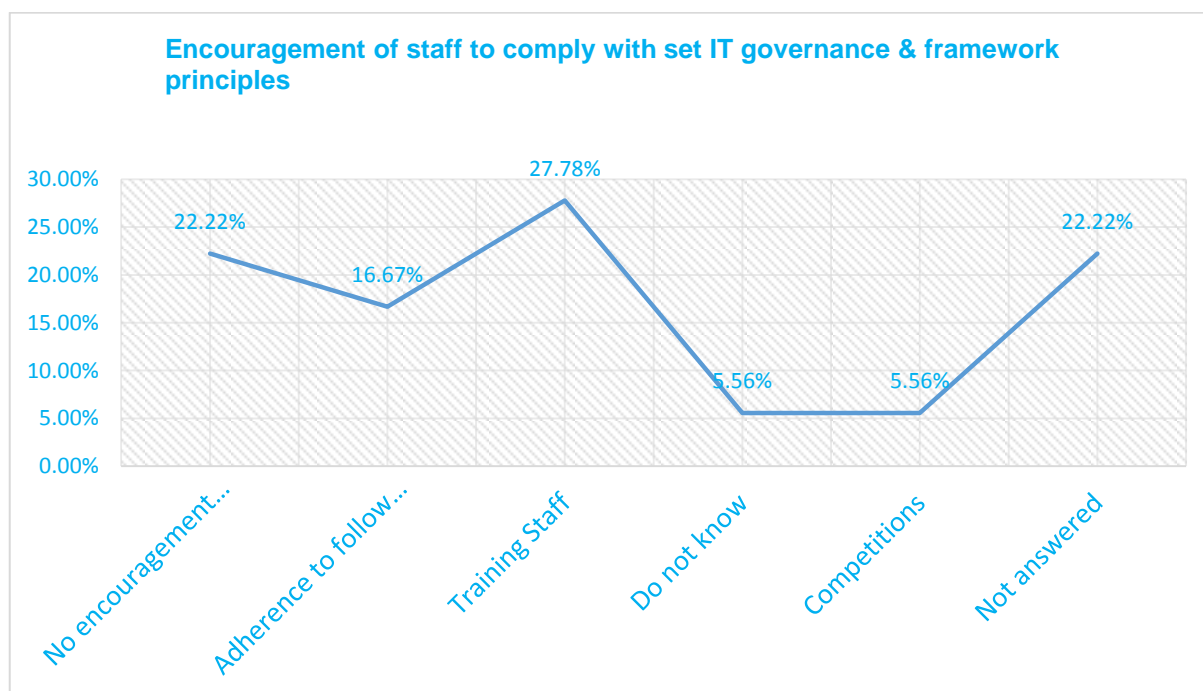


Figure 5.17: Encouragement of staff to comply with set IT governance and framework principles

Evidence quote 1: “Send staff on training to be explained why certain procedures and process are a ‘must’ as well as doing monthly competitions to incentivise them”. Those

who said there is no encouragement initiatives offered to staff constitute 22%. Evidence quote 2: *“No encouragement initiatives are in place. It has to be done because it is regulatory and mandatory for staff”*. A similar percentage of participants did not answer the question. Another set of participants, constituting 17% of all the participants, stated that it is punishable by the disciplinary process if the staff does not adhere and follow the principles put in place. Evidence quote 3: *“To avoiding risks that IT regulatory governance issues could cause if not adhered to the letter, staff have no choice and must follow and adhere to the process laid down or risk punishment by a disciplinary committee”*. Evidence quote 4: *“Compliance with set IT regulatory governance is seriously monitored by the Project Management Officer whose path should not be crossed at will”*. The remainder of the participants constituting 6% each gave different responses with one indicating that he/she does not know if the staff is encouraged.

### **5.3.18 Question 18**

Figure 5.18 indicates that the majority of the participants (28%) said they do not know whether stakeholder surveys take place, therefore, they could not comment. Evidence quote 1: *“Not aware of any taking place”*. Evidence quote 2: *“Never seen it happening here”*. Another 22% of the participants did not answer this question at all. It is a serious concern that half (50%) the participants were not able to comment on this question. Though it does not explicitly indicate that stakeholder survey does not happen, it may be argued that if it does happen at all, IT people would carry knowledge of the feedback. The more important question is what influences their customer services and offerings if the banks rarely capture what the market thinks. Those who said the surveys are conducted yearly constituted 11% and a similar percentage said the surveys are done half yearly. Another 11% of participants indicated that conducting stakeholder surveys is an on-going process at their bank.

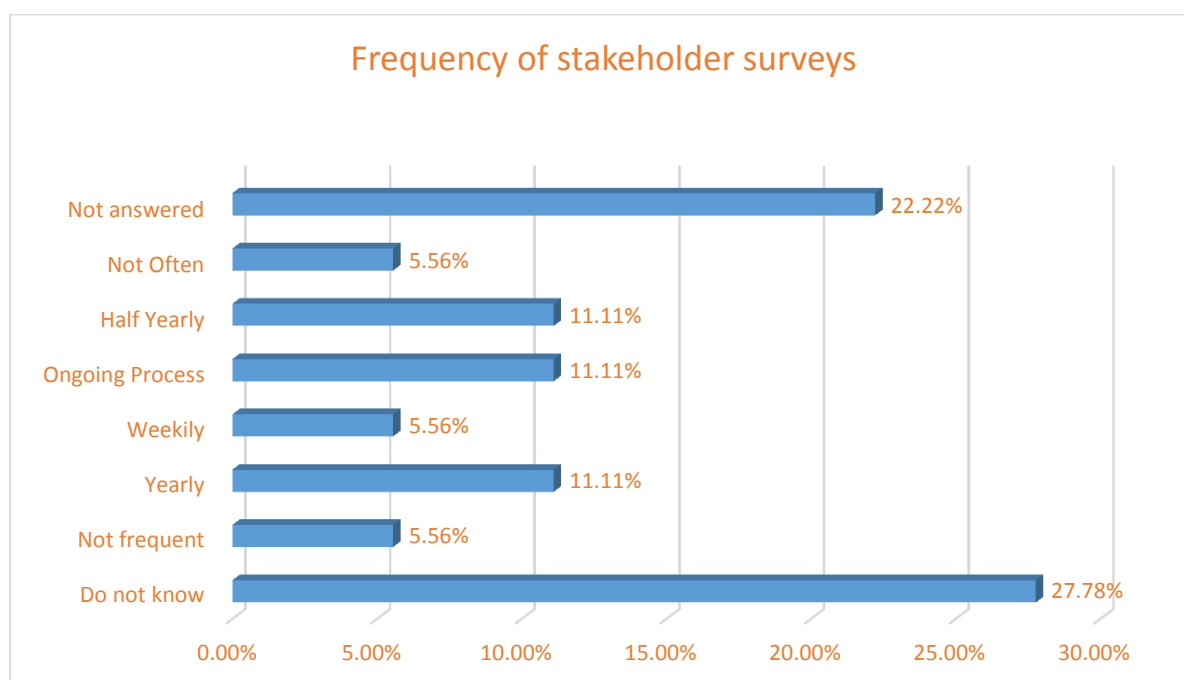


Figure 5.18: How often are stakeholder surveys carried out to shape policy

Evidence quote 3: *“Not conducted at fixed timeframes, but this is done on an on-going basis”*. The remainder of the participants constituting 6% each gave different frequencies as to when the stakeholder surveys are conducted, e.g. they are not often done.

### 5.3.19 Question 19

An overwhelming 78% of the participants indicated that there was IT governance and framework expertise at board level, as shown in Figure 5.19. Evidence quote 1: *“Yes, the company is run by directors who are experienced in IT”*. Evidence quote 2: *“Yes, they know the business too well and understand the IT vision of the business intimately”*. However, 11% of the participants stated that there was a lack of IT governance and framework expertise at board level. Evidence quote 3: *“No, the bank has already been fined and not enough emphasis is placed on regulatory governance and all the initiatives put in place have been largely reactive which is a bad reflection on the board and its expertise”*. A similar percentage of participants did not answer this question.

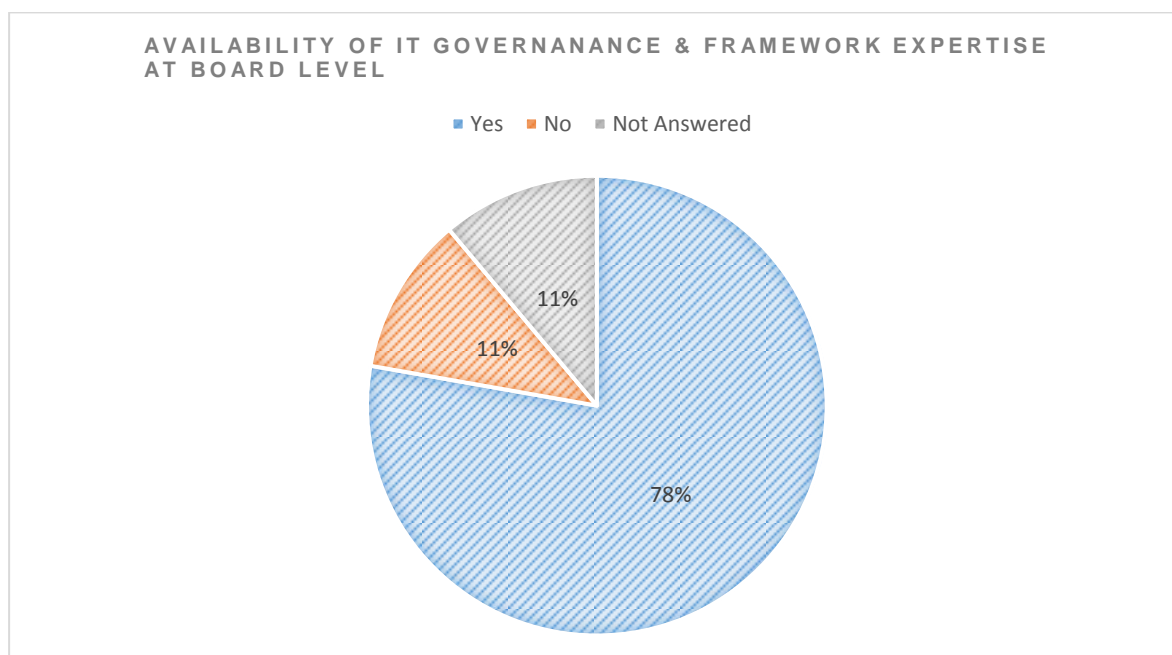


Figure 5.19: Availability of IT governance and framework expertise at board level

### 5.3.20 Question 20

Figure 5.20 indicates that 11% of the participants did answer the question and a similar percentage of participants indicated that, with good leadership and skilled project management teams, it is possible to reduce the failure rate of IT projects. Evidence quote 1: *“Good leadership by senior management and having the right people in the right positions, having the projects driven by business rather than by IT and, allowing flexibility within projects to facilitate the meeting of unique needs of each organisation”*.

Evidence quote 2: *“Have clear objectives, have a vision of the targeted state, understanding your current state so you know how to design going forward, understanding of the business needs and clearly articulated”*. A further 11% of participants stated that the adoption of Agile methodologies will greatly improve project management and regulatory governance execution success rates and, in turn, will positively address IT project failures in the South African banking industry. Evidence quote 2: *“Documentation should be limited, Agile approach be adopted as the industry’s main framework as well as clearly defining roles and responsibilities for everyone involved and then enforce stricter adherence to laid down procedures”*. Evidence quote 3: *“By being Agile (responsive to changing business environments) and being adaptive can make implementation of IT projects more successful”*. The remainder of all the participants constituting 5.56% each

gave various suggestions as to how project management and IT regulatory governance implementation can be improved. Some of the suggestion indicated include the following: Establishment of an Industry Project Assurance and Governance Council. Evidence Quote 4: *“Thorough implementation of an industry level project assurance and governance council, constituted of experienced practitioners to define and socialise requisite governance methodologies, through broad implementation of structured capability development programmes focused on developing skills through practical applications”*. Decisions on governance and project management managed centrally and at the executive level. Evidence Quote 5: *“These two critical aspects should ideally be managed centrally, aligned and streamlined to complement each other as far as possible. Avoid one size fit all mentality”*.

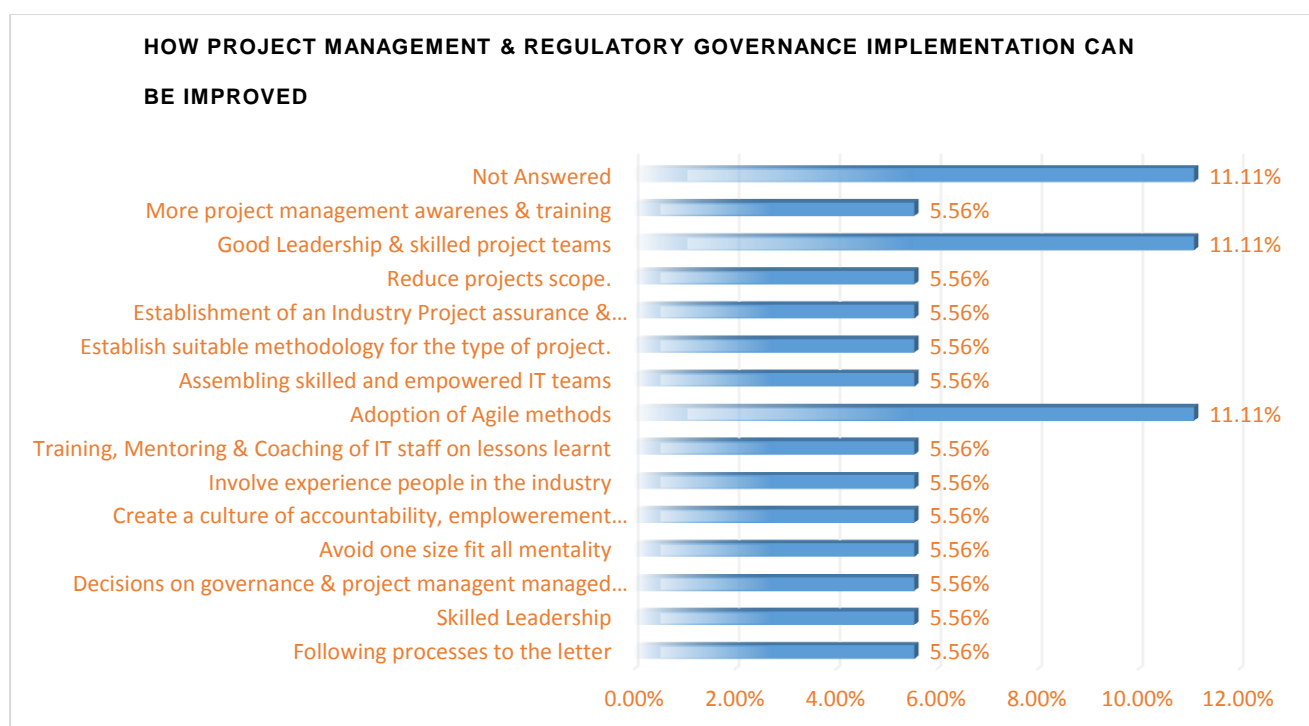


Figure 5.20: Improvement of project management and IT regulatory governance implementations

Evidence quote 6: *Recommend moving away from classifying all projects in one blanket to execute with the same framework”*. Adopt the best framework based on customer requirements. Create a culture of accountability, empowerment and continuous learning. Evidence quote 7: *“Create a culture of accountability, empowerment and continuous learning. Project governance should not be detached from the delivery process. Ensure*

*legal and compliance departments are involved from the start to the finish on any project”.*

## 5.4 Relationship between the Interview Questions and Research Questions

Table 5.1 describes the relationship between the interviewer questions and sub-questions.

**Table 5.1: Relationship between Interview and Research Questions**

<b>RESEARCH AND INTERVIEW QUESTIONS MATRIX</b>					
<b>Research Topic: Towards A Framework to Improve Governance requirements of IT Projects In the South African Banking Industry</b>					
<b>Sub Questions</b>		What frameworks (if any) are used when implementing IT projects within the South African banking industry? <b>Research Sub Question 1</b>	How is IT regulatory governance addressed and integrated into these frameworks? <b>Research Sub Question 2</b>	What are the problems experienced in terms of addressing and integrating IT regulatory governance into the IT Frameworks <b>Research Sub Question 3</b>	How can project management and IT regulatory governance implementation be improved to address IT project failures in the banking sector? <b>Research Sub Question 4</b>
<b>Int. Questions Nr.</b>	<b>Interview Questions</b>				
	<b>Demographics</b>				
	<b>Please indicate the details requested below</b>				
	Your age range [e-g 30 – 35 or 36-40]				
	Your job title				
	How long have you been working in IT related areas?				
1	For how long have you been employed in your current position?				
	What is your highest qualification?				
	What IT project management frameworks have worked with? Please name them.				
2	<b>Very roughly, of all the IT projects you have been involved with, how many of them</b>				
	did not deliver as was expected? Why?				
	did deliver as was expected? Why?				
3	<b>What common IT methodologies are utilised when implementing IT projects within the South African banking industry?</b>	x			
4	<b>Which of these IT methodologies have your organisation employed when implementing an IT project?</b>	x			
5	<b>In your experience, what was the success rate delivering the IT project(s) using the IT methodologies?</b>	x			
6	<b>What would you say was the single most important contributor to the success or failure of the delivery of the project.</b>	x			



7	What IT governance issues are addressed in the IT methodology referred to above?		X		
8	In your opinion what are the main factors affecting IT regulatory governance and the successful management and implementation of IT projects in the South African banking industry?		X		
9	Following up from question 8 above, how can the main factors (challenges) be addressed and integrated into governance protocols so as to improve IT project management and implementation success rates?		X		
10	Does your organisation have an IT steering committee?			X	
11	If yes, how often does the IT steering committee meet to review strategies and measure performance?			X	
12	To what extent does the IT steering committee formulate the IT strategies/methodologies/ policies of the organisation?			X	
13	Who is responsible for IT regulatory governance and methodology systems adopted within your			X	
14	What are the problems experienced in terms of addressing and integrating IT regulatory governance into the IT methodologies?			X	
15	In your opinion what IT methodologies can address and mitigate the rate of IT projects failure within your organisation? <i>Please briefly elaborate</i>			X	
16	How is IT regulatory governance addressed and integrated into the methodologies within your organisation?			X	
17	In your opinion, do the people tasked with implementing IT projects within your organisation have the requisite knowledge, experience and a thorough understanding of the governance and methodologies adopted and utilised in managing the projects?				X

18	How are staff encouraged to comply with set IT regulatory governance and methodologies principles?				x
19	How frequent are stakeholder surveys done to get both internal and external parties' views of the organisation's governance so as to cross-reference with the board's own views so as to test the board's awareness?				x
20	In your opinion, does the board have the skills, expertise and capability to lead IT regulatory governance and methodology strategies of organisation? <i>Please elaborate on your opinion.</i>				x
21	How can project management and regulatory governance implementation be improved to address IT project failures in the South African banking industry?				x
Summary of analysis [Relationship : Interview Questions and Research Questions]		The findings revealed that the most commonly used methodologies within the South African banking sector are a Hybrid of Waterfall and Agile methods. The Agile framework is still in its infancy and has not been fully adopted by many banks. However, the most prevalent framework utilised by practically every bank in the South African organisation is Waterfall. Various other Hybrid methodologies were indicated along with Agile and Prince2 methods.	The findings of the study, indicated that there are different practices of how IT regulatory governance issues are addressed and integrated into the frameworks within the banking industry. One practice is that the banks insist on their employees to follow a strict adherence to the laid down IT regulatory governance procedures and processes. In some banks, they enforce and monitor adherence to IT regulatory governance guides and in others they have created templates of how to go about addressing IT regulatory governance as well as how they should be interfaced with the methodologies.	The results of the analysis revealed that a lack of experienced manpower who understand governance issues and the setting of unrealistic timelines as some of the main challenges encountered in integrating IT regulatory governance. The findings also revealed that lack of awareness of governance procedures and knowledge regarding IT policies and procedures as well as the lack of integration between IT areas and various other projects (silo approach) has a negative impact on addressing and integrating IT regulatory governance into the IT frameworks.	The results of the analysis indicated good leadership and skilled project management teams as important to the possible reduction of the failure rate of IT projects. It was also highlighted that having worthy leadership style by senior management and having the adequate skilled people in the appropriate positions is key to successful execution of projects. It is critical that the projects be driven by business needs rather than by IT and as well as allowing flexibility in projects so as to facilitate the meeting of unique needs of each organisation. The setting of clear objectives, having a vision of the targeted date, and understanding the business's current state is critical for senior management to know, as this knowledge will enable the design of the projects going forward. It was also indicated the importance of understanding the business needs and clearly articulating them to the project teams.

Source: own

This concludes the analysis of the interview and research questions. The next section will summarise the possible shortcomings of IT frameworks as identified through the primary research and conclusion of the findings. This will be followed by the proposal of a framework to address factors that affect IT governance and the successful management and implementation of IT projects in the South African banking sector.

## **5.5 Identified Shortcomings of IT governance in existing frameworks**

There are many constraints that face organisations that are trying to implement effective governance structures, particularly when there are significant IT investments involved. As indicated earlier, without effective governance to deal with the constraints, IT projects are subject to a higher risk of failure. Each organisation faces its own unique challenges as their individual environmental, political, geographical, economic and social issues differ.

Potential shortcomings of IT frameworks, as identified through the primary research and conclusion of the findings, can be summarised as follows.

### **i) Senior management not engaging with IT management**

The main contributing factor that hampers the realisation of IT projects is that management, especially senior management, are reluctant to deal and get involved with IT decision-making processes. It is very important that senior management engages and collaborates with their IT departments to give appropriate direction, especially where substantial IT investments are being considered in order to ensure the provision of the necessary knowledge and responses needed for suitable determinations.

### **ii) Poor strategic alignment**

It is imperative that IT investments are purposefully aligned with the company's goals, intentions and resources. Otherwise not much business, or worse still, no business value can be generated and derived from substantial investments in IT projects. Without superior strategic alignment, IT is unlikely to contribute sufficiently and considerably to the attainment of the company's ultimate and overall goal.

**iii) Lack of project ownership**

Historically, many IT projects were exclusively the responsibility of IT managers and departments while senior management, including the board, do not traditionally take responsibility and ownership of IT projects. If senior management do not take ownership of IT projects, these projects' goals are at risk of not being aligned with the ultimate organisational goals. This lack of responsibility and ownership on the part of senior management generates huge inadequacies for which IT managers are perceived as being responsible and thus blamed for such inefficiencies.

**iv) Weak risk management**

Weak administration and management of risks often pose huge challenges in accomplishing successful IT projects. It is imperative that an organisation is able to evaluate and identify possible and likely risks and to then take appropriate measures to lessen the negative impact of these risks. Failure to deal and attend to potential risks, especially at the beginning and during the course of a project, can potentially result in a high failure rate of projects. The inherent risks which are not owned by senior management usually have a high negative impact on the operations of the organisation.

**v) Unproductive resource management**

To be competitive and to attain the best performances and results at the lowest cost, it is crucial that an organisation administers and manages its IT assets effectively and proficiently at all times. It is significant that the essential people capital is available to provide the IT services and to accomplish the value generated investments in IT projects.

**vi) Hybrids**

The Waterfall methodology has been the most widely used framework for software development, especially in the banking community. In this framework, an idea becomes usable in a sequential process which cascades through the stages of Requirements, Analysis, Design, Coding, Testing and Acceptance. However, the Waterfall framework has some disadvantages, as discussed previously.

However, the Agile software development framework evolved to eliminate the challenges posed by the Waterfall framework. While the Waterfall framework has a sequential design, the Agile framework follows an incremental and iterative approach. When development teams, who previously used the Waterfall framework, switch to Agile the transition is fraught with many challenges. The reason for these challenges being inadaptability to a different approach to software development. However, the end product of the Hybrid framework turned out to be more acceptable to users and generally more successful.

## **5.6 Recommendations and Proposed Framework**

Often, senior management has to make IT project decisions without sufficient information and this can lead to sub-optimal outcomes. With the correct IT framework in place, management does not need to ask, 'What is missing?' but would rather say 'What is next?' With the correct IT frameworks in place, management and decision makers are able to understand the critical issues, resource optimisation and availability of.

My contribution, which reflects an ideal IT framework, as depicted in Figure 5.21, addresses the identified shortcomings of IT governance in existing frameworks. This framework centralises IT portfolio management by providing a holistic view of IT projects for analysis and reporting. IT portfolio management is the formal approach which an organisation uses to orchestrate and prioritise their projects. It automates the capture of information through processes enacted in the framework.

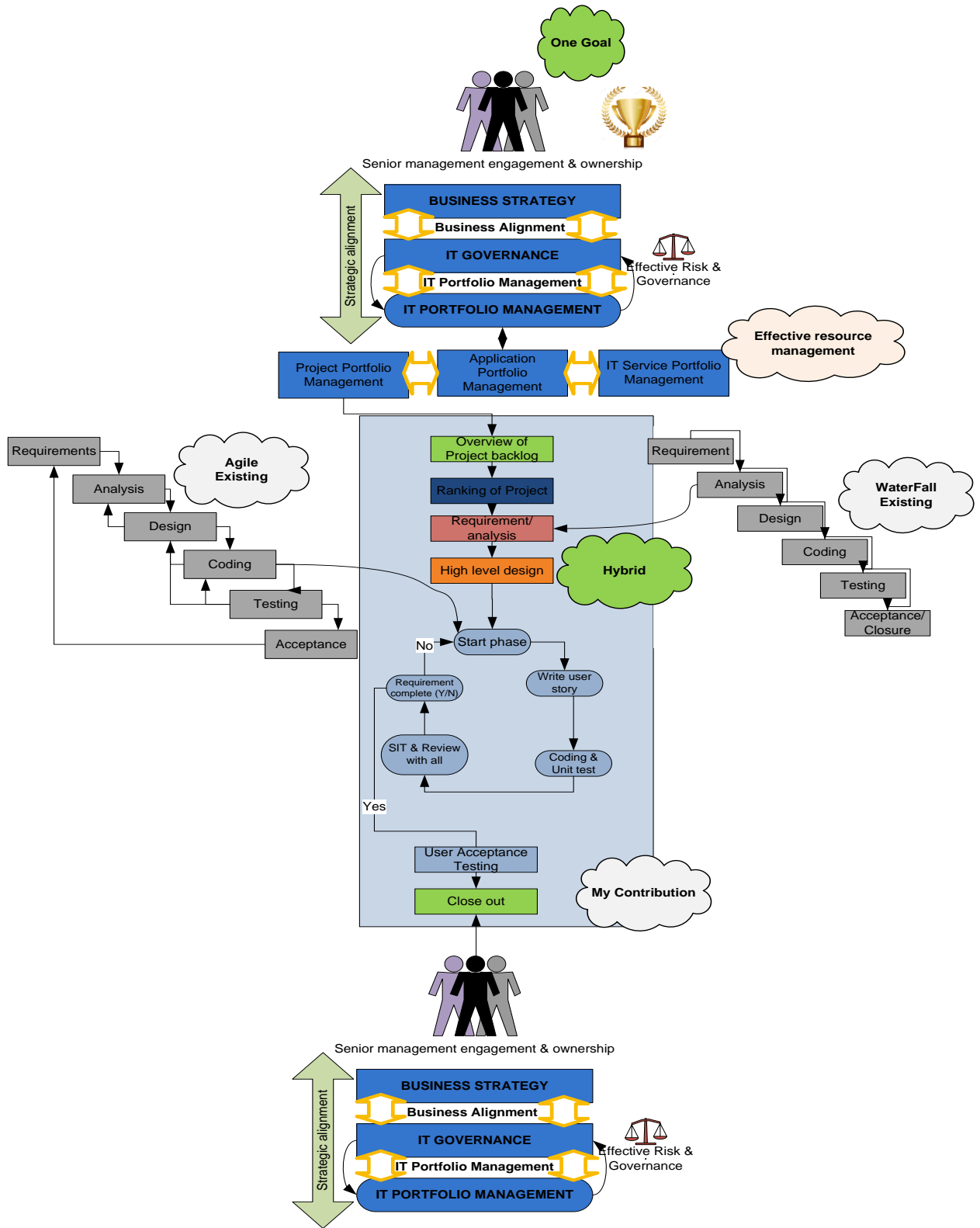


Figure 5.21: Proposed ideal best practice IT governance and framework

My contribution, depicted in the shaded blue, of ideal best practice, Figure 5.21, is now defined. Thereafter the process is documented holistically regarding its best use within an organisation.

- Overview of project backlog: a backlog is a build-up of project work that needs to be taken care of which is currently not being addressed. Resource will only start working on the projects when capacity becomes available.
- Ranking of the project: when there are two or more projects that an organisation want to execute in parallel, without extra capacity, it is necessary to prioritise. The process of project prioritisation is defining which projects will be run in what sequence, this is referred to as ranking.
- Requirements/Analysis: is the process of determining user expectations thus what they require from the project outcome.
- High level design: depicts the architecture that would be used for specific project outcome.
- Start iteration: is a set of repeating steps executed until the project is executed successfully.
- Write user story: describes, from a customer's view, what is required and why. User story is a simplified description.
- Coding and unit testing: within computer programming, the developer develops the code and thereafter does the unit testing which is a software testing of the code.
- SIT and Review with all: System Integration Testing (SIT) is a testing technique used to test the story board requirements which are real world scenarios from start to end. Whilst the testers are testing, this is being reviewed by the end users in parallel.
- Requirements complete (y/n): the requirements are considered completed once the user story is practically tested in SIT and reviewed by all and agreed upon.
- User Acceptance testing: is the second last phase of the testing process, whereby the end users test the software which they have reviewed and agreed upon in SIT. The project is thereafter promoted in the live environment by the project team.

- Closure: is the last phase of the project life cycle. The objective of the project was reached successfully and the project will be closed off formally.

The proposed framework clearly depicts that holistically having senior management, strategic alignment coupled with IT governance, which provides effective governance, is required in order to successfully run the IT portfolio of projects. Senior management needs to be engaged and strategically aligned to the organisation's goals with a mature sense of ownership.

This framework will address the shortcomings by ensuring business strategy provides business alignment to IT governance which filters through, and cascades, within the IT portfolio management. Having this structure in place requires compulsory involvement from senior management as IT is dependent on the business strategy. It is very important that senior management engages and gets involved and works with their IT departments, giving appropriate direction, especially where IT investments ensure the provision of the necessary knowledge and responses needed for suitable determinations. Compulsory involvement from senior management also creates ownership of projects. This will eliminate the shortcomings which arise when IT managers are alone responsible for making decision on projects without the perspective from business. This leads to projects being implemented without being aligned to business goals and often IT are blamed for such inefficiencies.

Strategic alignment is achieved through the involvement of senior management who own the business strategy and drive their projects through IT governance. With strategic alignment, IT will contribute sufficiently and considerably to the attainment of the company's goal.

As IT governance is structured at a group level, it allows the IT portfolio level to report risks that the project level cannot mitigate on. This transparency eliminates the shortcomings of weak risk management. As the organisation is able to evaluate and identify possible and likely risks and take the appropriate measures to lessen the negative impact of risk from a group level and assign it to the senior management who do not par-



ticularly understand it, usually are the most crippling and have a high negative impact to the operations of the organisation.

Within the IT portfolio management stream resides: the project portfolio management, application portfolio management and IT service portfolio management. This structure allows the different segments of IT to administer and manage IT assets effectively and proficiently at all times. The organisation thus has the ability to be competitive and attain best performances and results. This structure eliminates unproductive resource management shortcomings by creating an effective resource management namely the availability of people and capital to provide the IT services to accomplish the value generated investments.

Effective governance structures are created and managed at a group level. Having the IT governance structure at a group level will reduce the risk of failure on projects.

Using the Hybrid framework, which is a combination of Waterfall and Agile, the project portfolio management view is further unpacked to display the current overview of project backlogs. The next step is to understand the ranking of the projects which would have already been prioritised with senior management. The project requirement/analysis and high-level design would be followed, as per the Waterfall framework, the reason being that the requirement and coding will be a never-ending journey in agile, if not concluded. Whereas now it will be baselined in Waterfall, and coding will start in Agile, whereby the viewing of the functionality can be changed, based on the review of all the stakeholders which will be co-located with the project team. Running the analysis within the Agile framework, the risk is the analysis could never be completed as it can go back and forth.

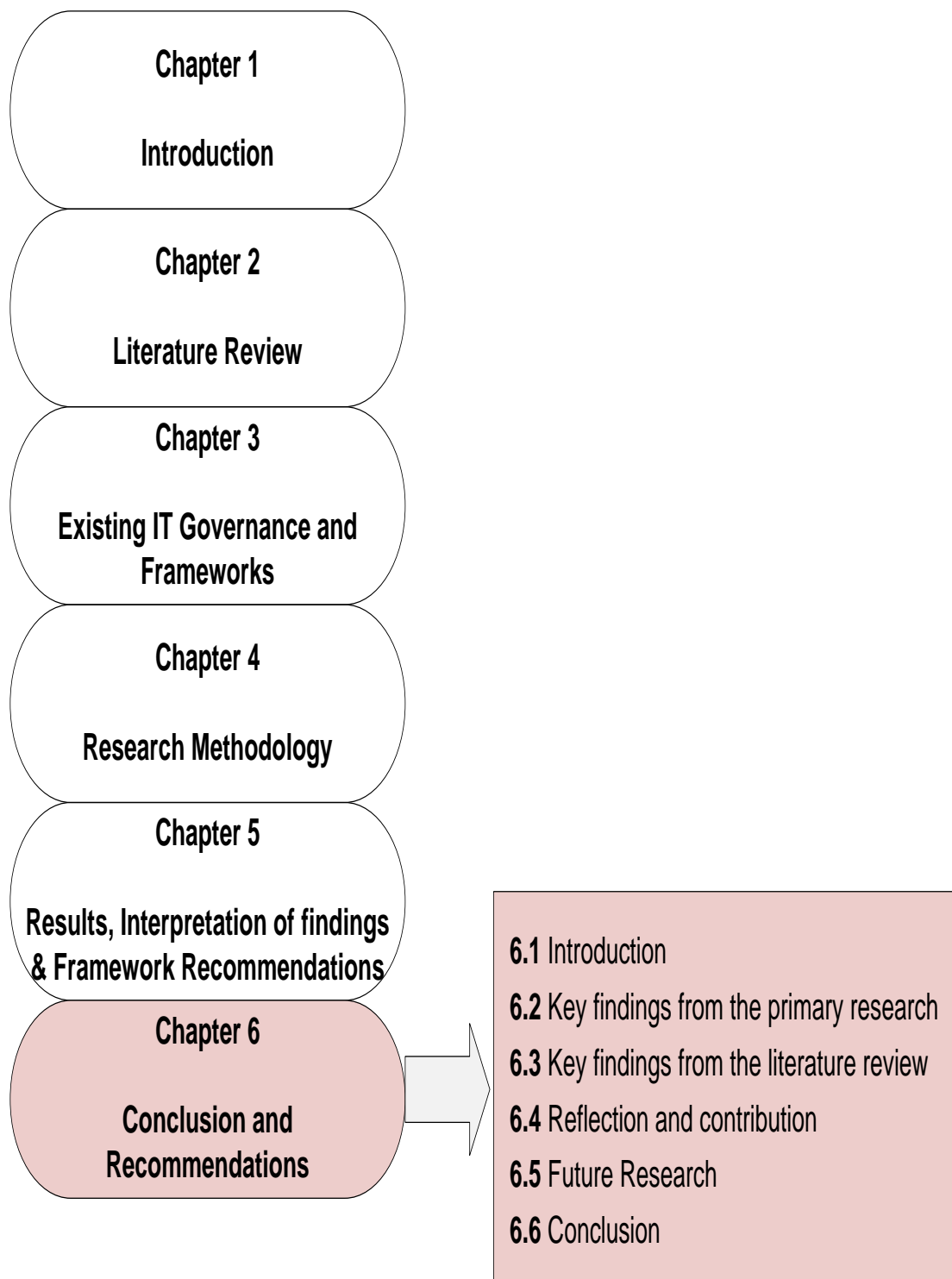
Within the Hybrid framework, the first iteration starts with writing user stories, thereafter the developer will code based on the story board. The developer thereafter reviews the code and the System integration testing (SIT) commences. Within SIT, the requirement is tested by the tester and in parallel reviewed by the business owner to confirm if it is complete or not. If it is complete, the functionality will proceed to move into user acceptance testing (UAT), if not, the requirement will branch back to the user story board,

whereby the iterative process starts again. The product owner will test the functionality in UAT again, and give the go ahead to release into production, which eliminates lack of ownership from a business perspective. Thereafter the acceptance of the project will default to the Waterfall approach. This is done to ensure that the project is closed out with the relevant documentation and handover to the business sponsor and product owner to take ownership from a project team.

The key focus is placed on the requirements and analysis which is the foundation of the project whilst the development life cycle is incremental which allows for creativity, flexibility and innovation. This generates buy-in at a senior business management level with IT governance being in place as everyone is committed to ensure that the project is successfully delivered. In this instance, we clearly see that having the best of the Hybrid framework coupled with the Waterfall framework does indeed provide faster traction on projects.

## **5.7 Conclusion**

This chapter presented the results, interpretation of findings and framework recommendations. Based on the finding, a new framework recommendation was presented. The next chapter will provide the conclusion to this thesis.



## **6. CHAPTER 6: CONCLUSION AND RECOMMENDATIONS**

### **6.1 Introduction**

This chapter presents the conclusion and recommendations of the study, based on the previous chapters. An effort was made to illuminate the extent to which the study was able to address the research objectives and questions as they relate to Regulatory Governance Frameworks of IT projects. Essential to this chapter is the evaluation of the link between the literature review and the primary research findings in order to support recommendations. These recommendations may be shared with leaders within the South African banking sector for possible assimilation into their strategic decision making. Areas of future research study were also identified and were proposed at the end of the chapter.

This section discusses findings from the study by examining the results of both the literature review and primary research. An extensive review of relevant literature was done to establish reasons why IT projects and IT regulatory governance fail. The results of the study have also indicated and highlighted some areas and practices that need to be enhanced and changed and aimed to find ways of improving the way in which project management and regulatory governance are implemented so as to address IT project failures in the South African banking sector. However, only a summarised report is presented under this heading.

### **6.2 Key findings from the primary research**

The key findings from the eighteen respondents involved in this research study are as follows:

#### **6.2.1 IT staff work experience and period held in current position**

The demographic data collected for this study indicated that 33% of the participants had between 6 to 10 years IT working experience, as depicted in Figure 5.1. This is fairly good IT work experience, however, with the fast changing field of technology even such seemingly extensive experience may not be a solid enough foundation as the staff may

still be novices to new frameworks. Those participants who had IT work experiences of between 11 to 20 years constituted 28% while 22% of the participants indicated that they had between zero to five years IT work experience. Three participants, constituting 17%, had IT work experience of between 21 to 30 years. However, the above statistics changed when compared to the duration each participant had held his current position at his/her current employer. For example, 5.56% of participants had the longest IT work experience of between 21 to 30 years in their current position. Ten participants had been in their current positions for periods between zero to five years.

### **6.2.2 IT projects success and failure rates**

Poor, or unsuccessful, projects were deemed to be those with a below 50% delivery success rate. Those participants who indicated that there were poor project delivery success rates at their various banks constituted 16.67%. It was further indicated that the poor project delivery rates were mainly due to poor leadership by management and lack of focus.

Participants, constituting 44.44% of the participants, stated that they had good success rates ranging between 65% to 100% delivery of projects. The good success rates were attributed to the fact that the project delivery was business driven, communication was efficient and delivery timelines were thoroughly monitored. There was proper planning and project scoping and skilled people worked on the projects. More importantly, all stakeholders were continuously engaged at every stage of the project's progress

### **6.2.3 Most common IT frameworks utilised by the South African banking industry**

Participants interviewed, constituting 44%, stated that the most commonly used frameworks within the South African banking sector are a Hybrid of Waterfall and Agile methods. However, the most common framework utilised by practically every bank in the South African banking industry is the Waterfall framework.

## **6.2.4 IT governance issues addressed by the IT frameworks**

According to 27.78% of the interviewed participants, the most IT governance issues addressed by the IT frameworks relate to risk and issue management. It was indicated that most banks make use of governance to monitor risks and to control scope creep as well as release, production issues and change requests. There were those participants (11%) who indicated that IT governance issues commonly dealt with at their banks related to documentation management.

## **6.3 Key findings from the literature review**

The main findings from the Literature review were the following:

### **6.3.1 Constraints and Complementarity of IT Frameworks**

Essentially best practice applies in two areas, namely the areas of Infrastructure Support and Development. Development may be mission-critical in certain industries, such as finance, but infrastructure support will apply to any IT organisation, regardless of the emphasis on development.

Many constraints face organisations that are trying to implement effective governance structures, particularly when there are significant IT investments involved. Without effective governance to deal with the limitations, IT projects will have a higher risk of failure. Each organisation faces its own unique challenges, as their individual environmental, political, geographical, economic and social issues differ. Any one of these matters can present obstacles to providing effective governance. One would never be able to list all the inhibitors relating to IT governance, but the following are common to most organisations.

Symons *et al.*, (2005:4) observe that most IT governance frameworks are complementary to each other. In essence, providing organisations with the “best of both worlds”. It is important for organisations to ‘map’ the framework to the process, not the process to the framework (Siviy *et al.*, 2005). There are numerous governance /best practice

frameworks available to the different IT operational intents (Cater-Steel, Tan & Toleman, 2006). The King III report (2009) defines IT governance as the effective and efficient management of IT resources to facilitate the achievement of corporate objectives (Li-ell-Cock, Graham & Hill, 2009). Symons *et al.*, (2005) add to the definition of IT governance by defining it simply as the process by which decisions are made by IT investments.

### **6.3.2 Information Technology Governance Frameworks**

The literature review indicated that some of the popular frameworks investigated in this study, namely ITIL, CobiT, PMBOK, CMMI, Waterfall and Agile are complementary.

According to Cater-Steel, Tan & Toleman (2006), it can be concluded in regards to efficiency and waste reduction, that integrating IT frameworks can be beneficial to organisations. Pardo *et al.*, (2011:1) concluded that organisations have trouble with the complexity and interpretation of these frameworks within the frameworks' integration.

According to Cater-Steel, Tan & Toleman (2006) successful deployments require that the processes be aligned by ensuring that the business needs are addressed through the process objectives and through the adoption of best practice to enable streamlining. Further detailed mapping of tasks for workflows and role assignments, verified by various organisational functions that meet their business requirements, owned by assigning formal roles for accountability and documented for consistency of implementation throughout the organisation and ultimately measured to ensure that the process is effective and efficient while meeting Compliance.

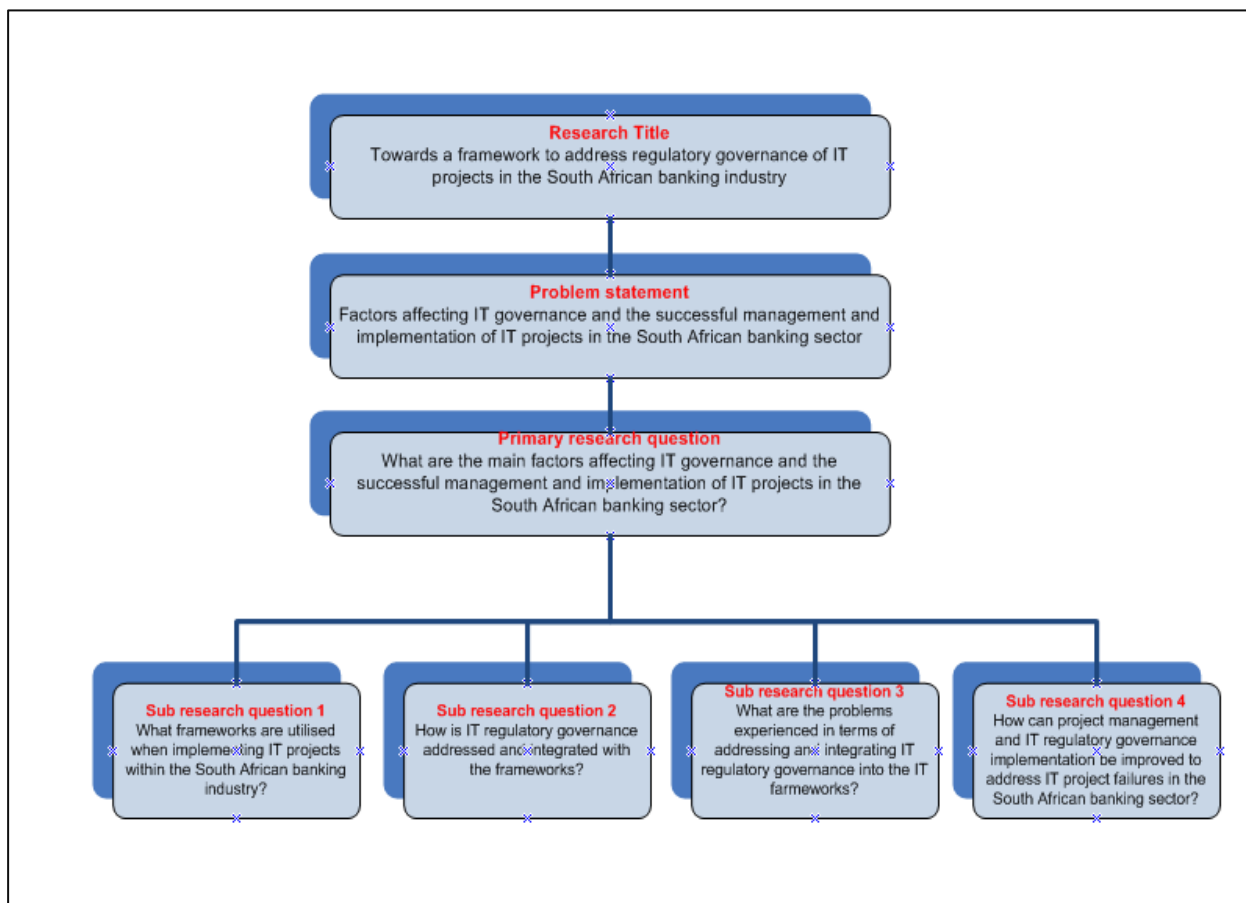


Figure 6.1: Diagrammatic depiction of the research study

## 6.4 Reflection and Contribution

In an attempt to answer the sub-questions, both the literature review and primary research were used.

### 6.4.1 Sub-Question 1

The first sub-question, *What frameworks are utilised when implementing IT projects within the South African banking industry?* was addressed by identifying frameworks that are used in implementing IT projects in general (Chapters 2 and 3) and are summarised above in key findings from the literature review. Furthermore, the findings of the primary research revealed that the most commonly used methodologies within the South African banking sector are a Hybrid of Waterfall and Agile methods. The Agile framework, which many banks have not adopted, is still in its infancy. Thus, the most prevalent framework utilised in the South African banking industry for implementing IT projects is the Waterfall framework.



#### **6.4.2 Sub-Question 2**

The second sub-question *How is IT regulatory governance addressed and integrated with the frameworks?* was addressed in Chapter 2. The findings of the study indicated that there are different practices relating to how IT regulatory governance issues are addressed and integrated into the frameworks within the banking industry. One practice is that the banks insist on their employees following a strict adherence to the laid down IT regulatory governance procedures and process. In some banks they enforce and monitor adherence to IT regulatory governance guides and, in others, they have created templates of how to go about addressing IT regulatory governance as well as how they should be interfaced with the methodologies.

#### **6.4.3 Sub-Question 3**

The answer to the third sub-question, *What are the problems experienced in terms of addressing and integrating IT regulatory governance into the IT frameworks?* The primary research revealed that a lack of experienced work force who understand governance issues and the setting of unrealistic timelines are some of the main challenges encountered in integrating IT regulatory governance. The findings also revealed that lack of awareness of governance procedures and knowledge regarding IT policies and procedures as well as the lack of integration between IT areas and various other projects (silo approach) has a negative impact on addressing and integrating IT regulatory governance into the IT frameworks.

#### **6.4.4 Sub-Question 4**

The final sub-question, *How can project management and IT regulatory governance implementation be improved to address IT project failures in the South African banking sector?* was addressed in Chapter 5.

#### **6.4.5 Main Research Question**

The main research question is *What are the main factors affecting IT governance and the successful management and implementation of IT projects in the South African banking sector?* To answer this question, a framework was proposed based on the guidelines identified by the first three sub-questions. However, contrary to the findings of the literature review in the primary study, none of the participants mentioned other

very useful frameworks, such as Information Technology Infrastructure Library (ITIL) and Capability Maturity Model Integration (CMMI), yet these crucial frameworks exist.

The framework indicated good leadership and skilled project management teams as important to the possible reduction of the failure rate of IT projects. It was also highlighted that a good leadership style by senior management and correctly skilled people in the appropriate positions is key to the successful execution of projects. It is critical that the projects be driven by business needs, rather than by IT, and that flexibility is allowed in projects to thus facilitate the meeting of the unique needs inherent to each organisation. The setting of clear objectives on the part of executives, thus a vision of the targeted state, and understanding the business's current state enables it to know how to design its projects going forward. It was also indicated that it is important to understand the business needs and clearly articulate them to all involved.

## **6.5 Future Research**

A recommendation for future research is an in depth investigation on how to involve senior management in IT projects quicker and how to make them understand how important the successful execution of IT projects is towards the realisation of strategic organisational goals.

Furthermore, the closeout phase needs to be investigated in depth to retrieve best practices. Closeout is underestimated, since without closeout, senior management would never take ownership of their business solution.

## **6.6 Conclusion**

This research study was undertaken to evaluate and establish the reasons why IT project management and IT regulatory governance often fail within the South African banking industry. The objectives of the study were to find ways of improving the manner in which project management and regulatory governance are implemented to thus address IT project and management failures. The next aim was to recommend frameworks that would usher in a positive impact on the implementation of IT projects and develop effective IT regulatory standards for the South African banking sector.

The research study also found that although IT governance budgets are dedicated to satisfying regulatory compliance requirements, there are indications that there is a lack of responsibility and commitment by boards and senior management of the banking industry.

The findings of this study will assist the South African banking sector in understanding the primary and essential goals of IT governance and successful project implementations. It also revealed the importance of executives taking control of the IT function to ensure that the investments they make in IT generate business value, and mitigate the risks that are associated with IT. This can be done by implementing organisational structures with well-defined roles regarding the responsibility of information, business processes, applications and infrastructure.

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## 8. APPENDICES

### 8.1 Appendix A: In Depth Questionnaire

#### **IN-DEPTH QUESTIONNAIRE**

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1. Please indicate the details requested below

Your age range [e-g 30 – 35 or 36-40]	
Your job title	
How long have you been working in IT related areas?	
For how long have you been employed in your current position?	
What is your highest qualification?	
What IT project management methodologies you have worked with? Please name them below.	

2. Very roughly, of all the IT projects you have been involved with,
- a) how many of them did not deliver as was expected? Why?
  - b) how many of them did deliver as was expected? Why?
3. What common IT frameworks are utilised when implementing IT projects within the South African banking industry?
4. What IT governance issues are addressed in the IT frameworks referred to above?

5. Which of these IT frameworks have your organisation employed when implementing an IT project?
6. In your experience, what was the success rate delivering the IT project(s) using the IT frameworks?
7. What would you say was the single most important contributor to the success or failure of the delivery of the project?
8. In your opinion what are the main factors affecting IT regulatory governance and the successful management and implementation of IT projects in the South African banking industry?
9. Following up from question 8 above, how can the main factors (challenges) be addressed and integrated into governance protocols so as to improve IT project management and implementation success rates?
10. Does your organisation have an IT steering committee?
11. If yes, how often does the IT steering committee meet to review strategies and measure performance?
12. To what extent does the IT steering committee formulate the IT strategies/frameworks/ policies of the organisation?
13. Who is responsible for IT regulatory governance and framework systems adopted within your organisation?
14. What are the problems experienced in terms of addressing and integrating IT regulatory governance into the IT frameworks?



## 8.2 Appendix B: Covering Letter to Participants

Dear Participant

You are invited to participate in a Masters of Business Administration student research study titled, “**A FRAMEWORK OF GOVERNANCE OF INFORMATION TECHNOLOGY PROJECTS IN THE BANKING SECTOR**”. This Research study is being conducted by me, Charlene Anup in partial fulfilment of the requirements for the degree of Master of Technology which I am studying with the University of South Africa under the supervision of Prof. Ian Strydom and Petra le Roux.

In this study, you will be asked to complete a questionnaire and return to me. Your participation in this research study is voluntary and you are free to withdraw your participation from it at any time you wish. The completion of the questionnaire should take only 20 minutes of your time. This research study has been approved by the University of South Africa. There are no risks associated with your participating in this study. The research study collects no identifying information of any respondent. All of the responses collected by the questionnaire shall be recorded anonymously.

If you have any questions regarding this research project in general, please contact, **Charlene Anup on e-mail address, [charlene.anup@standardbank.co.za](mailto:charlene.anup@standardbank.co.za)**.

Please indicate your willingness to participate or not to participate in this research study, by putting an “**X**” in the appropriate provision below and return this completed to me using the e-mail address [charlene.anup@standardbank.co.za](mailto:charlene.anup@standardbank.co.za). I would appreciate it if you return the completed letters by close of business on 1 December 2015.

Willing to participate	
Not Willing to participate	

Thank you for your consideration. Your help is greatly appreciated.

**Researcher Name:** Charlene Anup

**Researcher Signature:**

**Date:**

## **8.3 Appendix C: Research and Interview questions Matrix**

See attachment.

## **8.4 Appendix D: Data Analysis Excel Spreadsheet**

See attachment.