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Information Technology Governance Implementation in a South African Public Sector Agency: Institutional Influences and Outcomes

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ABSTRACT

Information technology (IT) governance, which embodies how organisations arrange and manage their IT assets, continues to be of interest to those involved in the research and practice of information systems (IS). Most of the interest is because of the positive relationship between IT governance and organisational performance. Organisations are increasing their IT expenditure, which results in increased expectations by stakeholders. Public sector organisations have also gradually recognised the importance of IT governance to successful implementation of mandates, but the research conducted globally to understand how IT governance is actually implemented in the public sector has been limited.

A case study of ENTDEV (a public sector agency) was used to explore how IT governance implementation takes in a public sector organisation. The case study sought to understand how institutional influences (e.g. regulative, normative and cultural-cognitive) play a role in IT governance adoption and the selection of IT governance mechanisms, how IT governance implementation actually takes place and what IT outcomes are achieved as a result of the implementation - using institutional theory, IT governance mechanisms framework, and the IT outcomes framework, as lenses.

The case study identified regulatory influences as playing a role in IT governance adoption, and also uncovered the role of the Chief Information Officer (CIO) as important. Normative and culture cognitive influences were seen as not playing a role at the IT governance adoption stage. Regulatory and normative influences and the CIO have an influence in the implementation of IT governance mechanisms. The skills and capacity of people involved in implementing IT governance mechanisms, together with the positioning and organisation's perception of IT are some of the issues that impact on IT governance implementation.

The study recognised cost effective use of IT and improved compliance as the immediate IT outcomes as a result of IT governance implementation. Strategy enablement outcomes are recognised over time. Informed by the empirical evidence and literature, a framework for IT governance implementation in public sector organisations is conceptualised as a contribution to theory. It is envisaged that the framework may be used by public sector institutions to improve their understanding of IT governance and subsequently improve how they implement IT governance.

KEYWORDS: IT governance, institutional theory, IT outcomes, IT governance mechanisms, Chief Information Officer, strategy enablement, public sector.

DECLARATION

I, Yandisa Lusapho Njenge, declare this research report is my own work except as indicated in the references and akcnowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Commerce (Information Systems) by coursework in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.



……

Yandisa Lusapho Njenge

Signed at Pretoria on this 20th day of February 2015.

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CHAPTER 1: INTRODUCTION

The research report is on how information technology (IT) governance implementation takes place in a South African public sector agency. The first chapter is outlined as follows: it first gives an introduction to the field of study; followed by the background to the research problem, the problem statement, and the research purpose, goal and objectives. The chapter then presents the research questions, assumptions related to the study, the significance of the study and definition of key terms.

1.1 Introduction to the Field of Study

Governing IT in an appropriate manner is considered critical to fully benefitting from IT investments in organisations (Othman, Chan, Foo, Nelson & Timbrell, 2011). Organisations with formal and approved IT governance may, according to at least one study, realise a return on assets that is 20 percent more than in organisations with weaker or no governance (Weill, 2004). Technology presents organisations with opportunities to transform and enhance their products, services, markets, processes and business relationships (Sambamurthy and Zmud, 1999). The success of many organisations is determined by how effectively they manage and control their IT function to realise the expected returns (Bowen, Cheung & Rohde, 2007).

Public sector organisations have also realised the effective governance of IT as important to their performance (Vinten, 2002). The public sector has made considerable IT investments in an effort to increase efficiencies and improve service delivery (Devadoss, Pan & Huang, 2002). The public sector is dissimilar to the private sector as it has many objectives, numerous shareholders with differing interests, different levels of accountability and a complex legal and regulatory framework (Ali & Green, 2007).

Some studies contend that the public sector has not been able to fully realise the efficiency benefits, despite the considerable investments made on technology (Heeks 2006; Montazemi, Pittaway & Qahri-Saremi, 2010). Six factors have been identified as affecting government's operational transformation through technology. These are: regulatory influences, normative influences, cultural-cognitive influences, the governance of IT, technology enactment and outcomes (Liang, Saraf, Hu & Xue, 2007; Xue, Liang & Boulton, 2008).

1.2 Background to the Research Problem

Auditor-General (2012) suggest that there is a low level of IT governance implementation within the SA public sector, and where there is implementation, it does not yield satisfactory/intended value. As a result of this low level of IT governance, IT is not viewed as a strategic enabler; departments do not have adequate IT support; enterprise-wide IT risks assessments are not undertaken before policies and procedures are developed and there is ineffective management of IT (Auditor-General, 2012). This subsequently means that there is minimal value derived from IT investments made in the public sector and service delivery through IT is limited.

1.2.1 Study Location and Context

In the study, the unit of analysis was a government mandated and funded agency that supports small businesses in improving their capabilities and effectiveness. As the organisation expressed the wish to remain anonymous, the real name of the organisation was removed and replaced with ENTDEV.

IT governance is championed by the Department of Public Service and Administration (DPSA) in the South African public sphere, and is coordinated through a forum of public sector IT managers called the Government Information Technology Officers Council (GITOC). The DPSA released a circular in February 2013 which outlined a Corporate Governance of ICT (CGICT) Policy Framework. The CGIT policy framework uses COBIT as a core reference, with additional principles from King III Report on Corporate Governance and ISO/IEC38500 (ISACA, 2013). The circular, which makes adopting and implementing the Corporate Governance of ICT (CGICT) Policy Framework mandatory for public sector institutions, was in response to a report from the Auditor-General in 2010/2011 that only 21% of government departments had implemented governance controls that were deemed to be adequate and 79% of institutions did not have an IT governance policy. The report from the Auditor-General for the 2012/2013 financial year indicated that 98% the 313 national and provincial government departments and entities had designed IT governance related controls.

Despite efforts such as the King III Report on Corporate Governance and establishment of the Government Information Technology Officers Council (GITOC), IT governance implementation and effectiveness in the South African public sector remains low. Only 8% of the 313 entities that were audited during the 2012/2013 audits had IT controls that are fully embedded and functioning effectively (Auditor-General, 2014). One of the major contributors to the low levels of IT governance implementation in the South African public sector is the lack

of integration between and within the various institutions, where IT still operates seperate from and is not integrated into business processes.

The low level of IT governance implementation in the public sector leads to:

- IT not being viewed as a strategic enabler.
- Organisations and departments not adequately supported by IT.
- Enterprise-wide IT risks assessments not undertaken before policies and procedures are developed.
- Ineffective management of IT (Auditor-General, 2012).

As a result of the low level of IT governance implementation in the public sector, the strategic role and importance of IT is reduced in organisations. The public sector is therefore unable to fully exploit the following opportunities:

- Cost reduction and efficiency gains.
- Quality service delivery to businesses and customers.
- A culture of transparency, anti-corruption and accountability.
- Increased capacity of government.
- Network and community creation.
- Improved quality of decision-making.
- Promoting the use of IT in other sectors of the society (Ndou, 2004).

Availing government services online has potential to improve government efficiency and quality of services. Online services provide citizens with the opportunity to interact directly with government and participate in decision making. The ability of technology to network people from geographically diverse areas enhances communication and decision making.

1.3 Problem Statement

IT governance studies to date tend to largely focus on the prevalence of IT governance implementation, with little focus on how IT governance is actually implemented. It is inferred by literature that the lack of empirical understanding is what subsequently leads to governance issues and challenges often experienced in the public sector with regard to implementing IT governance, with indicators articulated in the preceding section., As a result, the study sought through a public sector agency, to understand how institutional influences play a role in IT governance adoption, how IT governance implementation takes place following IT governance mechanisms and what IT outcomes may be achieved as a result of the implementation.

1.4 Research Purpose, Goal and Objectives

The purpose of the study was to explore and describe how IT governance is implemented in South African public sector institutions, using one South African public sector institutions as a case unit. The study was done by looking at the role of institutional influences in IT governance adoption, the implementation of IT governance mechanisms and how IT outcomes are subsequently realised.

The research goal was to conceptualise a framework that may be used to understand how IT governance takes place in South African public sector organisations.

To achieve the goal, the following research objectives were identified:

- To identify the role institutional influences play in the adoption of IT governance in South African public sector organisations.
- To identify the issue and challenges manifesting with regards to implementing IT governance mechanisms in South African public sector organisations.
- To describe how IT governance implementation results in improved IT performance in South African public sector organisations.

1.5 Research Questions

The primary research question is:

- How is IT governance implemented in South African public sector organisations?

The following secondary research questions will be answered to arrive at an answer to the primary research question:

- What role do institutional influences play in IT governance adoption in South African public sector organisations?
- What are the issues and challenges regarding IT governance mechanisms, in South African public sector organisations?
- How are IT outcomes realised through the IT governance implementation?

1.6 Assumptions

Qualitative research entails the acknowledgement of certain philosophical assumptions. The assumptions consist of the researcher's position towards the nature of reality (ontology), how the researcher knows what he/she knows (epistemology), the role values play in the research (axiology), the research language (rhetoric) and methodology (Cresswell, 2012). The theoretical assumption for this study on ontology is that reality is considered to be a construction of the individuals. It is based on this assumption that the study used the qualitative approach as the focus was on the meanings that the respondents ascribe to the phenomenon.

With the epistemological supposition, the research took place where the respondents work. This allowed the researcher to know what they know from first-hand experience of the participants. The researcher further acknowledges the role of values (axiology) and the biases they present. The language of research used is personal and changes during the course of the study, instead of being defined by the researcher. The methodological assumption is that the research is context bound, and the research process is inductive and shaped by the data collection and analysis experience of the researcher.

1.7 Significance/Contribution of the Study

Research on how IT governance actually occurs has not been of primary interest, to researchers as the focus has mostly been on the extent of IT governance prevalence in different environments. This is articulated by Jacobson (2009) who highlights the need to move beyond research that defines IT governance and developing prescriptive models of IT governance, as well as lack of field based research on IT governance implementation and IT value (Jewer & McKay 2012). As a result, knowledge that looks at both the causes and effects of IT governance success remains scarce (Buchwald, Urbach & Ahleman, 2013).

This study sought to address these research gaps and also look at how theories other than rational theories can be used to understand the realm of IT governance. Assumptions are sometimes made that what works in the private sector also applies in the public sector. While there are many similarities, there are also differences and as a result one size fits all approach to IT governance may not be applicable (Sethibe, Campbell & McDonald, 2007).

This study contributes theoretically through the conceptualised framework. The framework shows how IT governance implementation may take place in public sector organisations. The public sector institutions could use the framework to practically address the challenges

regarding IT governance implementation and also to position IT governance as an asset, and not as a compliance requirement.

1.8 Definition of Terms

The term public sector agency refers to institutions that are established to implement mandates for and on behalf of government. They generally rely on government budgetary allocations for funding, although some are self-funding by generating revenue by selling goods, utilities and services (Sethibe *et al*, 2007). The terms public sector agency, public sector organisation and public sector institution are used interchangeably throughout the study.

IT governance adoption refers to the decision by an organisation that there is a need to have a governance framework for IT (Othman *et al*, 2011). It includes deciding which framework to adopt.

IT governance implementation talks to the establishment of structures, implementation processes and mechanisms from the IT governance framework it has adopted (De Haes and Van Grembergen, 2009).

1.9 Summary of Chapter

This chapter introduced the study by providing an background to the field of study, context to the problem statement, key goal and purpose, research questions, as well as vital assumptions, research and practice contributions and definitions of key terms. The rest of the report is organised as follows: Chapter 2 reviews literature on IT governance and IT governance practices related to the study; chapter 3 outlines the research methodology; chapter 4 analyses the data and discusses the findings; chapter 5 interprets the findings and presents a conceptual framework for IT governance implementation in South African public sector organisation and chapter 6 evaluates the research and provides concluding remarks from the researcher.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter assesses the literature that informs the study. It defines what IT governance is, the rationale for its implementation and how it is being implemented in the public sector. The theories used to explain IT governance adoption and implementation are then outlined, followed by IT governance mechanisms and IT outcomes that are realised as a result of effective IT governance implementation. The chapter concludes by identifying a theory, IT governance mechanisms and IT outcomes that are used to describe IT governance adoption and implementation in the public sector.

2.2 IT Governance Defined

IT governance is sometimes referred to as part of the bigger discipline of corporate governance (Korac-Kakabadse & Kakabadse, 2001; Weill & Ross, 2004). It is vital to view corporate governance's importance in the same way that IT is vital to the business (Viale Pereira, Luciano, Macadar & Marquez Daniel, 2013). Corporate governance refers to practices and responsibilities carried out by top management to ensure that strategic objectives are met, and the organisation's risks and resources are adequately managed (IT Governance Institute, 2003). It provides a framework for setting an organisation's objectives, coming up with ways of achieving these objectives, as well as how performance in relation to the objectives will be monitored.

De Haes and Van Grembergen (2009) define IT governance as 'an important part of enterprise (corporate) governance that articulates the processes, structures and relational mechanisms in the organisation that enable both business and IT people to execute their responsibilities in support of business/IT alignment and the creation of business value' (p. 123). IT governance is also defined as 'outlining the framework for decision rights and accountabilities to encourage positive behaviour and use of IT' (Weill, 2004, p. 2) and 'as the organisational capacity exercised by the Board, executive management and IT management to control the formulation and implementation of IT strategy and in this way ensure the fusion of business and IT (van Grembergen, 2004, p.4). Numerous other studies have defined IT governance, and the proposed definitions are tabled next.

Table 2.1: Several definitions of IT Governance

Definition	Researchers
IT governance decisions and the locus of responsibility for IT functions.	Brown and Magill, 1994, p. 373.
IT governance is the degree which the authority for making IT decisions is defined and shared among management, and the processes managers in both IT and business organisations apply in setting IT priorities and the allocation of the IT resources.	Luftman, 1996, p. 27.
IT governance refers to the patterns of authority for key IT activities.	Sambamurthy and Zmud, 1999, p. 261.
IT governance is about who is entitled to make major decisions, who has input and who is accountable for implementing those decisions. It is not synonymous with IT management. IT governance is about decision rights, whereas IT management is about making and implementing specific decisions.	Broadbent, 2003, p. 1.
IT governance is the responsibility of 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 organisation's IT sustains and extends the organisation's strategies and objectives.	IT Governance Institute, 2004, p. 10.
IT governance is the process by which decisions are made around IT investments. How decisions are made, who makes the decisions, who is held accountable and how the results of the decisions are measured and monitored are all parts of IT governance.	Symons, Cecere, Young and Lambert, 2005, p.2.
The strategic alignment of IT with business, such that maximum business value is achieved through the development and	Webb, Pollard and Ridley, 2006, p.7.

Definition	Researchers
maintenance of effective IT control and accountability, performance management and risk management.	
IT governance is the preparation for, making of and implementation of IT-related decisions regarding goals, processes, people and technology on a tactical or strategic level.	Simonsson and Ekstedt, 2006, p. 18.
IT governance is the collection of management, planning and performance reporting and review processes with associated decision rights, which establish control and performance metrics over key investments, operational and delivery services and new or change authorisations and compliance with regulations, laws, and organisational bodies. It formalises and clarifies oversight, accountability and decision rights.	Selig, 2006, p. 23.
The system by which the current and future use of IT is directed and controlled.	ISO 38500, 2008, p. 2.
IT governance is the process that ensures the effective and efficient use of IT in enabling an organisation to achieve its goals.	Gerrard, 2010, p.2.

(Source: Pereira and Mira da Silva, 2012)

IT governance includes the creation of decision rights, setting of goals and objectives and building the capacity to meet these, and a system that reviews and improves these rights, goals, objectives and capacity (Wilkin & Chenhall, 2010). IT governance can be broken down into two parts: decision-making structures and decision execution mechanisms (Dong 2012), which are detailed in the form of frameworks.

IT Governance frameworks can either be open best practice frameworks or proprietary frameworks (Goeken & Alter, 2008). Examples of open best practice frameworks are the Control Objectives for Information and Related Technology (COBIT), Information Technology Infrastructure Library (ITIL), ISO 12207 and ISO 15288, and examples of proprietary

frameworks are the Public Service Corporate Governance of Information and Communication Technology Policy Framework, the Microsoft Operations Framework (MOF), Hewlett-Packard's IT Service Management (ITSM) and the IBM IT Process Model (ITPM). Sarbanes-Oxley in the United States of America (USA) and other legislation enacted globally has made effective IT governance the law for many companies (Hardy, 2006). The COBIT Framework is annexed as an example of an IT Governance Framework (Annexure A).

Boards and executive management have come to realise that while they could traditionally avoid, delegate or ignore IT decisions, they can no longer produce, market or conduct research and development without depending on the IT function (Peterson, 2004). IT and business models have as a result become interlinked. The interlinking involves having the right people within the IT function to understand their role and responsibility in making sure the organisation achieves its strategic goals. Effective IT is not only about technology, but also includes shared IT governance (Peterson, 2004). IT governance is not concerned with what IT related decisions are made; that is IT management. IT governance instead focuses on who is responsible for each type of decision, who inputs into a decision and how decision makers are made accountable. Weill (2004) identifies five major IT decisions. These are strategic statements or principles about how IT is utilised in the business, the IT architecture or policies and rules that guide the organisation in achieving its business needs through IT, IT infrastructure strategies, specifying the business needs for IT applications and deciding about how to invest in IT.

2.3 IT Governance Research Focus

IT governance research has traditionally focused on the distribution of IT decision-making rights and responsibilities to relevant decision makers (Brown & Grant, 2005). The allocation of IT decision rights is referred to as IT governance structures and is broken down into two: the types of decision making that organisations adopt and IT governance contingency analysis. The types of decision making looks into the level of centralisation and decentralisation of decision making. At centralised governance, executive management or IT management make IT related decisions. The centralised governance provides efficiency and standardisation. At decentralised, governance, decisions are made by business units which improves flexibility and responsiveness (Brown, 1997).

Some scholars refer to a form of decision making which is a hybrid of centralisation and decentralisation, called federal IT governance (Hodgkinson, 1996; Sambamurthy & Zmud, 1999). Federal IT governance is when executive management and IT management have

authority over IT infrastructure decisions, and business units have decision rights on the development of IT applications.

IT governance contingency analysis is interested in what IT governance structures are best for which organisation. IT governance contingency is done by considering organisational structure, industry the business operates in, size of the firm, and competitive strategy.

Weill and Ross (2004) have added another form of IT decision making, called IT duopoly which is similar to federal IT governance. IT duopoly is a two-part arrangement where decisions are agreements between IT management and a group made up from business (Weill, 2004). The difference between IT duopoly and federal IT governance is that IT duopoly has only one group of business representatives whereas federal IT governance has more than one level of IT-business hierarchy.

IT governance research has been criticised for focusing on organisational structures (Sambamurthy & Zmud, 1999; Peterson, 2004) and less on the processes and relations. IT governance processes formalise the IT decisions made by the IT decision makers, and IT relations are the collaboration and communication between the IT decision makers (Peterson, 2004). De Haes and Van Grembergen (2009) have built on the research approach of Peterson (2004) and investigated how IT governance processes and relations manifest alongside IT governance structures; and also how IT governance processes, structures and mechanisms mature and their relationship with IT governance performance.

2.4 The Rationale for Implementing IT Governance

Governing IT in an appropriate manner is considered important to fully realising the benefits of IT investments in organisations (Othman *et al*, 2011). The pervasive utilisation of IT has led to a dependency on IT that warrants a specific focus on IT governance. Organisations with proper IT governance may, according to at least one study, realise a return on assets that us 20 percent higher when compared organisations with weaker or no governance (Weill, 2004). On the other hand, ineffective IT governance may result in inaccurate information quality, project costs going over budget, inefficient operating costs, reduced competitiveness and ultimately the demise of the IT function or the organisation (Woodhead, 2004).

The failures and disappointments associated with IT initiatives are well documented (Bowen *et al*, 2007; Willcocks Petherbridge & Olson, 2002). Blythe (2005), in Musson and Jordan (2006), estimates than on average about 20 % of the IT budget goes to projects that do not achieve the predetermined objectives, and enormous amounts of money and effort is wasted by companies on IT investments. Technology presents organisations with opportunities to transform and enhance their products, services, markets, processes and business

relationships (Sambamurthy & Zmud, 1999). The success of many organisations is determined by the extent of effectively managing and controlling the IT function to ensure that they realise the expected returns (Bowen *et al*, 2007). IT governance therefore has an influence on the benefits that organisations derive from their IT investments.

IT governance provides executive management with a platform to observe the improvements in the quality of IT services. It also reduces the failure rate of IT projects, which minimises risk and saves on costs. Over time, organisations experience enhanced IT services which are delivered at a reduced cost.

The ultimate goal of IT governance, according to Ridley, Young and Carroll (2004) and de Haes and Van Grembergen (2008) is realising alignment at a strategic level between IT and business and making sure that the money spent on IT is creating business value. Strategic alignment is important for the maximisation of organisational effectiveness (Henderson & Venkatraman, 1992) and performance (Chan, Huff, Copeland & Barclay, 1997). Strategic alignment should be built upon a formal, commonly accepted business strategy process. The board needs to take responsibility for the overall strategy and IT management with top management being responsible for developing an aligned IT strategy (Peppard, 2001).

Besides strategic alignment, IT governance assists organisations implement investments that deliver the benefits promised (value creation), ensure that both internal and external resources are managed efficiently, establish structures to measure performance of the IT function and ensure that IT measures, accepts and manages risks in a formal, rigorous manner.

2.5 Public and Private Sector: Definitions and Contextual Differences

The public and private sector are defined by the level of government involvement and influence in their ownership and control. Public sector institutions have a specific responsibility to deliver services to citizens with the funds generated by means such as taxes, bonds and loans. The public sector differs from the private sector in that it is has many objectives, numerous shareholders with differing interests, different levels of accountability and a complex legal and regulatory framework (Ali & Green, 2007). While the board and senior management are responsible for governance in private sector organisations, public sector institutions have a complex accountability systems that include numerous stakeholders, different spheres of government and parliament.

The objectives of private sector institutions are expressed and measured by profit maximisation and effectiveness, while public sector institutions are assessed on their efficiency and implementation of mandates. Public sector institutions, as a result, are less

affected by economic cycle changes, but more affected by political changes (Gregory & Borland, 1999). Private sector institutions are in a better position to justify investments in innovation for competitiveness, while public sector institutions might be expected to be behind as a result of the differences in operating goals and stakeholder impact (Rocheleau & Wu, 2002).

The key differences between public sector and private sector institutions are presented below.

Table 2.2: A summary of differences between the public and private sectors.

Factor	Public Sector	Private Sector
Goals	• Multiple and tangible.	• Specific and tangible.
Product	• Provides services and public goods.	• Profit.
Achievement measured by	• Political efficiency and achieving policy mission.	• Financial profitability and efficiency.
Operating environment	• Fewer incentives for productivity. • More legal and formal constraints. • Political influences.	• More incentives. • Less red tape. • Market influences.
Proprietary versus shared IT	• Shares IT resources, applications and technical help.	• Treats IT as proprietary to stay ahead and competitive.

Source: Campbell, McDonald & Sethibe, 2010

2.6 IT Governance in the Public Sector

Public sector institutions have also realised effective IT governance as important to how success they implement their mandates (Vinten, 2002). The public sector has made considerable IT investments in an effort to increase efficiencies and improve service delivery (Devadoss *et al*, 2002; Heeks & Bailur, 2007). IT has become vital in enabling government's goal to provide improved services to the public in an effective, efficient and sustainable manner. Efforts to modernise public management have also increased the attention placed on IT and IT governance (Ali & Green, 2007).

2.6.1 Challenges Relating to IT Governance in the Public Sector

Some studies contend that the public sector has not been able to fully realise the efficiency benefits despite the considerable benefits than can be realised from IT governance. (Heeks 2006; Montazemi *et al*, 2010). Implementation of IT governance frameworks, models and methods has been characterised by challenges, despite the importance of IT governance for public sector institutions (Bermejo, Tonelli & Zambalde, 2014). Challenges in implementing IT governance in the public sector, according to Bermejo *et al* (2014), are due to focusing on features that are relevant to the private sector such as market share, customer profitability and competitive edge; instead of ones relevant to the public sector such as social purpose achievement.

Weill and Ross (2004) identify the following challenges when it comes to implementing IT governance in the public sector: difficulty in measuring public value and performance, IT architecture co-production between public entities and difficulties in managing the interests of the different stakeholders. The presence of multiple goals, higher regulations and fewer performance incentives also influence public sector IT governance implementation (Campbell *et al*, 2010).

One of the reasons the public sector has not been able to realise the efficiency benefits from technology, according to Andersen and Henriksen (2006), is that the public sector has not transformed how it operates. Six factors have been identified as affecting government's operational transformation through technology. These are: regulatory influences, normative influences, cultural-cognitive influences, IT governance, technology enactment and outcomes (Liang *et al*, 2007; Xue *et al*, 2008).

2.6.2 IT Governance Structures in the Public Sector

The organisation of the IT function and the location of the authority where decisions are made has an impact on IT governance efficacy within an organisation. In the public sector, the need to reduce IT spend is partially fulfilled through a shared services approach between a number of organisations. The sharing of resources is ideal because of the interdependence in public sector organisations (Rocheleau & Wu, 2002). IT governance structures in the public sector aim to ensure that services are provided in an efficient and effective manner (Campbell *et al*, 2010).

Decision making processes in the public sector can be described as methodical and compliance oriented (Gershon (2008) in Campbell *et al* (2010), while private sector decision making is usually based on transitory reasons (Suomi & Tähkäpää, 2004). The numerous

layers of authority in public sector institutions may negatively impact on IT governance implementation as decisions are not quickly finalised and resourced (Campbell *et al*, 2010). The rigidity of funding allocations sometimes means that access to funding for IT requires a strong focus on reducing costs (Suomi & Tähkäpää, 2004).

IT governance also relies on mechanisms such as the ability of IT and business units to work together (Henderson & Venkatraman, 1992). Organisations utilise relational mechanisms such as training, job rotations and the use of non-technical language (De Haes & Van Grembergen, 2008) to drive towards collaboration and common understanding between IT and business. Regardless of whether IT is partially or wholly outsourced, the IT governance structures must allow for formal and informal relationships with the service provider (Luftman, Bullen, Liao, Nash & Neumann, 2004). Woods and Woods (2004) contend that it is difficult to instil the leadership practices from the private sector into the public sector, and that the public sector leadership practices are shaped and altered by the existing public sector philosophy.

2.7 IT Governance implementation in the South African public sector

IT governance implementation is driven by the Department of Public Service and Administration (DPSA) in the South African public sector, and is coordinated through a forum of public sector IT managers called the Government Information Technology Officers Council (GITOC).

2.7.1 Importance of IT Governance in the South African Public Sector

The South African government recognises IT a strategic and important in government's goal of improving service delivery. The recognition of IT as a strategic enabler can be seen in the ICT House of Value, which depicts the values and where ICT service delivery should be focused.

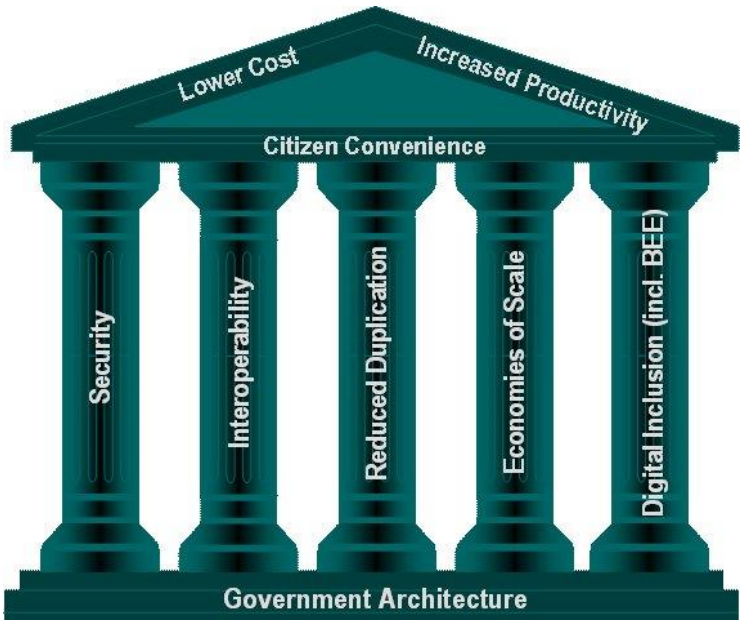

Figure 2.1: ICT House of Value, Source: Department of Public Service and Administration, 2012.

The ICT House of Value aligns with the 13 strategic outcomes of the South African government and thus allows for government service delivery to be enabled through IT. Various initiatives have been done to assess the adequacy of IT enabled serviced delivery. The Presidential Review Commission (1998) report, for example, stated that binding IT decisions should be made by senior and managerial leadership and not left to technology specialists and further proposed a uniform, enabling framework of governance.

The Auditor General's information systems review of governance of IT in 2009/2010 recommended the following:

- A government-wide Governance of ICT Framework should be put in place to implement a national ICT strategy to address ICT risks based on defined processes and standards; and
- The Governance of ICT roles and responsibilities should be defined and implemented to ensure adequate Public Service ICT enablement (Auditor General, 2010).

2.7.1 Overview of the Corporate Governance of ICT Policy Framework

A framework named the Public Service Corporate Governance of Information and Communication Technology Policy Framework or the Corporate Governance of ICT Policy Framework was approved in 2012. The Framework seeks to institutionalise IT governance in the South African public sector and prescribes a set of principles that all public sector

institutions must comply with. Two layers of decision-making, which are clearly articulated as authority and accountability are incorporated in the Framework, which are:

- Facilitating the achievement of the department's strategic goals (Corporate Governance of ICT layer); and
- The efficient and effective management of ICT service delivery (Governance of ICT layer).

The Corporate Governance of ICT Policy Framework (2012) is informed by COBIT policies and prescribes a minimum of twelve processes that must be part of the implementation. The twelve processes are:

- Governance Framework setting and maintenance.
- Manage the ICT management framework.
- Manage strategy.
- Manage enterprise architecture.
- Manage portfolio.
- Manage suppliers.
- Manage risk.
- Manage security.
- Manage programmes and projects.
- Manage operations.
- Manage continuity.
- Monitor, evaluate and assess performance and conformance.

2.8 Theoretical foundation of IT Governance implementation

IT research in investment decisions has used three approaches, namely the rational behaviour approach, the political behaviour approach and the institutional theory approach. Research has mostly used rational behaviour theories to understand the IT governance phenomenon (Jacobson, 2009). Rational theories assume that decision makers are aware of, prioritise and then choose the best alternative according criteria such as benefits and costs to achieve certain outcomes (e.g. improved efficiency). Human behaviour, in the rational approach, is assumed to be logical and consistent. The three rational theories that are used in IT governance research are contingency theory, transaction cost theory and agency theory. The table below details the key principles and assumptions of these theories and their weaknesses.

Table 2.3: Rational theories commonly used in IT Governance

Theory	Key Principles and Assumptions	Weaknesses
Contingency Theory	• Organisations must achieve 'fit' with their environment. • No one best way to organise. • Achieving 'fit' leads to improved performance. • Rational actors.	• Assumes 'fit' can be recognised and achieved. • Is a static view of organisations. • Fails to consider social embeddedness.
Transaction Cost Theory	• Bounded rationality. • Opportunism. • Transaction costs can be measured.	• Fails to consider social embeddedness. • Assumes transaction costs can be monitored and separated.
Agency Theory	• Bounded rationality. • Opportunism. • Goal incongruence. • Asymmetric information. • Risk aversion.	• Fails to consider social embeddedness. • Assumes motivations are financial. • Assumes monitoring is possible.

Source: Jacobson, 2009

Rational theories do not take into account the influences that occur in the environment within which organisations exist, assume that all motivations are financial and that action of individuals are based on static, ongoing systems of social relations (Granovetter, 1985).

Political behaviour theory assumes that organisational decision making takes place through a social, political process (Allen, Madison, Porter & Rewick, 1979). Political behaviour occurs when individuals make efforts to be in power or to secure their self-interests (Boonstra & De Vries, 2005). The dominant factors in political behaviour in information systems (IS) are relative power and dependence among individuals and are influenced by how the organisation is structured, mechanisms of cooperation and loyalty of employees (Robey & Markus, 1984). As a result, political behaviour promotes distrusts and prohibits IT from developing further within the organisation (Robey & Newman, 1996).

In situations where users do not have informed knowledge about information systems, information systems professionals can manipulate the political behaviour and IT to suit their interests by forming coalitions, changing requests, fighting against those opposed to their views and reinforcing subcultures that advance their interests (Chang, 2014).

Ang and Cummings (1997) and Pardo, Gil-Garcia and Burke (2008) offer a different view to the dominant, rational perspective by looking at the bigger environment within which IT governance structures manifest and identify executive involvement, enabling legislation and know-how of the participating organisation as key determinants from the operating environment. Jacobson (2009) suggest that the institutional perspective results in a more holistic view and understanding of IT governance.

According to the institutional perspective, organisations operate in an environment of norms, beliefs, values, and assumptions that guide and restrict their actions over time (Barley & Tolbert, 1997). These values, beliefs, norms and assumptions are formed as a result of the existence of institutions. Institutions are defined as social structures that provide orientations to organisations and individuals, yet at the same time restrict and control them (Scott, 2008).

A common argument of institutional theory is that social pressures from internal and external sources such as social norms, national culture and structure of the economy, political and legal structures, resources and restrictions influence the adoption and diffusion of innovations (Salmeron & Bueno, 2006). Organisational behaviours are responses to institutional pressures, in addition to market pressures (Greenwood & Hinings, 1996). DiMaggio and Powell (1983) posit that three types of institutional pressures exist, namely: coercive, normative and mimetic, and these determine the adoption of innovation by organisations. Institutional pressure happens when organisations face similar environmental conditions and are forced to become the same, a practice called isomorphism.

Butler and Murphy (2007) identify three exogenous dimensions that shape the institutionalisation of business process through strategy execution that is enabled by IT and change management. These exogenous dimensions are regulatory influences (for example, levels of government with higher authority), normative influences (for example, expectations from society to conduct specific activities), and cultural-cognitive factors (such as competences of role players and mimetic behaviours like implementing systems similar to others) (Butler & Murphy, 2007; Montazemi *et al*, 2010). The table below elaborates on the three pillars of institutional theory which formed the foundation for this study.

Table 2.4: Three Pillars of Institutional Theory

	Regulative Pillar	Normative Pillar	Cultural-cognitive Pillar
Basis of compliance	Expedience	Social Obligation	Shared understanding
Indicators	Rules, laws, sanctions	Certification, accreditation	Common beliefs
Basis of legitimacy	Legally sanctioned	Morally governed	Recognisable, culturally supported.

Source: Jacobson, 2009.

2.9 IT Governance Implementation

IT Governance is implemented through structures, processes and relational mechanisms. IT governance structures enable contact between IT and business management. IT governance processes relate to formalising the procedures that make and monitor strategic IT decisions, while the relational mechanisms relate to the collaborative relations between business and IT management together with executive level management (De Haes and Van Grembergen, 2009). De Haes and Van Grembergen (2008) identified 33 IT Governance practices which are broken down as follows: 12 IT Governance structure practices, 11 IT Governance process practices and 10 IT governance relational mechanism practices and tabulated below.

Table 2.5: List of IT Governance Structures, Processes and Relational Mechanisms.

IT Governance Structures	• IT strategy committee at level of board of directors. • IT expertise at level of board of directors. • IT audit committee at level of board of directors. • Chief Information Officer (CIO) on executive committee • CIO reporting to Chief Executive Officer (CEO) or Chief Operations Officer (COO)

	• IT steering committee at executive/senior management level. • IT governance function/officer • Security/compliance/risk officer • IT project steering committee • IT security steering committee • Architecture steering committee • Integration of governance/alignment tasks in tools and responsibilities.
IT Governance Processes	• Strategic information systems planning. • IT performance measurement. • Portfolio management. • Charge back arrangements – total cost of ownership. • Service level agreements. • IT governance framework. • IT governance assurance and self-assessment. • Project governance methodologies. • IT budget control and reporting. • Benefits management and reporting. • Committee of Sponsoring Organisations /Enterprise Risk Management (COSO/ERM)
IT governance relational mechanisms	• Job rotation. • Co-location. • Cross-training. • Knowledge management. • Business/IT account management. • Executive/senior management giving the good example. • Informal meetings between business and IT senior management. • IT leadership.

	• Corporate internal communications addressing IT on a regular basis. • IT governance awareness campaigns.

Source: De Haes and Van Grembergen, 2008.

An organisation does not have to implement all 33 practices, as it would be too cumbersome to manage. The number and selection of IT governance practices depends on factors such as the role of IT within the organisation, governance structures, the sector the organisation is in, and the regulatory and legal environment. Vaswani (2003) looked at IT governance from an auditor perspective and identified an IT steering committee, the involvement of senior management and corporate performance management systems as key IT governance mechanisms. Sohal and Fitzpatrick (2002) explored IT governance in Australian firms and came up with an IT steering committee, IT decision making that is centralised and senior management involvement as important IT governance mechanisms. De Haes and Van Grembergen (2009) identified the following IT governance practices as being the most important for both public and private institutions:

- IT Steering Committee.
- Chief Information Officer (CIO) on executive committee.
- Portfolio management.
- IT budget control and reporting.
- IT strategy committee at level of board of directors.
- IT leadership.
- Strategic information systems planning.
- IT project steering committee.
- CIO reporting to Chief Executive Officer (CEO).
- Project governance/management methodologies.

Ali and Green (2007) indicate five IT governance mechanisms, namely overall effectiveness of IT, presence of an IT steering committee, existence of an IT strategy committee, a corporate performance management system and a corporate communication system as crucial in a public sector context. These IT governance mechanisms have been used in other studies such as Nfuka and Rusu (2010) and Ferguson, Green, Vaswani and Wu (2013) and informed the conceptual research framework for this study.

2.10 IT Outcomes

Several studies have been undertaken to identify IT governance success determinants. Ribbers, Peterson and Parker (2002) draw the inference that IT governance effectiveness is influenced by the extent of integration between business and IT decisions, mutual relationships between IT and business, and a common understanding among key stakeholders. Chief Information Officers (CIOs) in multi-national organisations, according to Weill (2004) suggested eight critical success factors when evaluating the effectiveness of IT governance. These are transparency, an actively designed IT governance framework, a framework that is redesigned as and when there is a need to, education about IT governance throughout the organisation, simple governance mechanisms, a process to handle exceptions bring issues to the fore and allow for debate, designing IT governance at multiple organisational levels, and incentive and reward systems that are aligned to those of the organisation.

Organisations need to have appropriate measurement systems for IT performance in order for them to quantify the effectiveness of their IT function. IT outcomes, in relation to IT governance, can be measured by using a range of approaches. A structure to measure the business value of IT needs to be in place to eliminate the possibility of different approaches and metrics by business units. Peterson (2004) proposes a four-stage IT governance assessment process. These stages are: describing and assessing the IT governance value drivers, describing and assessing the differentiation of IT decision making authority over IT services, describing and assessing IT governance capabilities, and defining and assessing IT value realisation.

COBIT prioritises IT process maturity assessment as a way of gauging the effectiveness of IT governance (Debreceny & Gray, 2013). The COBIT process maturity assessment model measures the maturity levels of the selected COBIT processes at the time when the COBIT framework is implemented and then periodically assesses whether there are any process improvements as a result of agreed upon improvement actions. The levels of process maturity can either be non-existent, initial or ad hoc, repeatable but intuitive, defined process, managed and measurable, and optimised (Van Grembergen, De Haes & Guldentops, 2004).

The extent of strategic alignment between business and IT is also used to measure the effectiveness of an organisation's IT function (Luftman, 2000). Strategic alignment entails the activities that an organisation's management does to achieve goals that are cohesive across the IT and other business functions. The six measures for IT-business alignment are:

communications maturity, competency/value measurement maturity, governance maturity, partnership maturity, scope and architecture maturity and skills maturity. Strategic alignment maturity can be one of the following five levels: initial/ad hoc, committed, established, improved/managed and optimised (Luftman, 2000).

IT governance effectiveness is also measured through IT outcomes at a corporate as well as a project level. At a corporate level, corporate governance effectiveness is achieved by utilising IT cost effectively, effectively using of IT for business growth, using of IT for asset utilisation, using of IT for business flexibility and complying with regulatory and legal requirements (Bowen *et al*, 2007). At an IT project implementation level, success is measured through: ability to deliver full functionality on time and within the allocated budget, satisfying stakeholders with system quality and satisfying shareholders with information (Bowen *et al,* 2007).

The IT Governance Institute (2007) posits that effective IT governance results in increased stakeholder value through improved reputation, being an industry leader, trust, first-to-market, and diminished costs. It also further mitigates IT risks. The intention of IT governance is to obtain maximum returns from IT investments and to ensure that tangible and sustainable stakeholder value is achieved (Weill and Ross, 2004). The importance of extracting IT value is further highlighted by Parker (2005) and Tan, Eze and Teo (2008). The vision of IT governance adopted in this study also focused on obtaining maximum returns on IT investments at a corporate level and is consistent with that of Bowen et al (2007).

2.11 Conceptual Research Framework

The conceptual research framework is illustrated below. It was developed from studies by Butler and Murphy (2007) for institutional influences, Ali and Green (2007) for IT governance mechanisms and Bowen *et al* (2007) for IT outcomes.

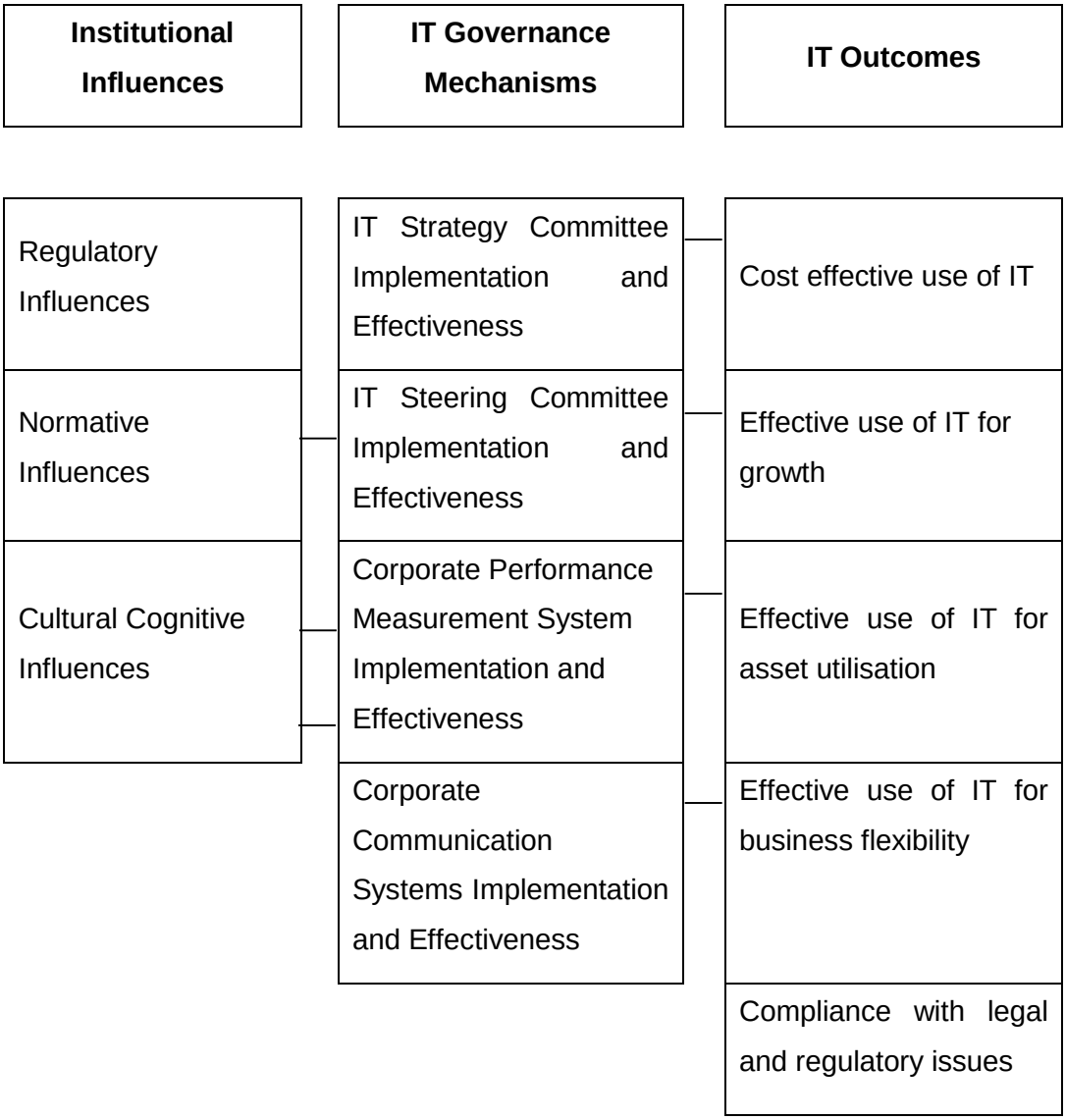

Figure 2.1: Conceptual Research Framework

2.12 Summary of the Chapter

The chapter defined in detail what IT governance is, the evolution of IT governance research and the basis for implementing IT governance. It then outlined the differences evident in public and private sectors before describing IT governance practices in the public sector.

An analysis of the theories used to explain IT governance implementation, how IT governance is implemented and the IT outcomes that are realised was presented next, and used to craft the conceptual research framework for the study.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology that was used in the study to understand how IT governance is implemented in public sector institutions, using a public sector agency as a case study. The chapter further contextualises the research approach and case study research. From this context, the research design and data collection methods are presented. It ends by detailing the limitations inherent in the approach and how the issues of ethics, reliability and validity were dealt with.

3.2 Information Systems Research

The question of what constitutes information systems (IS) research continues to be asked to the present day (Orlikowski & Iacono, 2001; Agarwal & Lucas, 2005; Gallupe, 2007; Hevner, Davis, Collins & Gill, 2014). Benbasat and Zmud (2003) centre IS research on the information technology (IT) artefact and its nomological effect and conceptualise the artefact as the use of IT to enable or support some task within a structure and within a context. It encompasses the values, structures, routines and norms that exist in the particular context within the artefact is set.

IS research however, does not only involve studying the IT artefact. It also includes the, methodological, managerial and technological capabilities and practices needed in planning, designing, developing and implementing IT artefacts; the human behaviours involved in the planning, designing, developing implementing and usage of the IT artefacts; the managerial, methodological and operational practices used to influence how the IT artefact is used; and the impacts of the IT artefacts on their users and the structures and contexts within which they are embedded (Benbasat & Zmud, 2003). Galliers (2003) presents an alternate core to the IT artefact put forward by Benbasat and Zmud (2003), by considering societal and cross-cultural considerations over and above the organisation.

Lamp and Milton (2004) come up with a number of findings relating to what complicates the IS research field. These findings are that there is often a debate what constitutes IS research, that IS has many foundations or disciplines it references from, that IS is located in different university faculties, that there is a perception of IS being weak in theory, that IS is practice dominated and that it uses many different research methodologies, frameworks and models.

3.3 Research Paradigm and Approach

A research paradigm is a belief about how data should be gathered, analysed and used when studying a particular phenomenon. Research paradigms are concerned with translating things that are believed into things that are known. The two main research paradigms are the positivist (also known as scientific) and the interpretivist (also known as anti-positivist).

3.3.1 Definition of interpretivist and positivist research paradigms

The positivist paradigm or approach to research can be traced back to Auguste Comte's dismissal of metaphysics and his contention that the truth about reality can only be revealed through scientific knowledge (Bhattacherjee, 2012). Comte further suggested that theory and observations have circular dependence on each other. Positivism states that real events can be observed by empirical means and explained through rational analysis and that researchers can take a scientific perspective when observing social behaviour (Travers, 2001).

Interpretivist research starts from the view that our wisdom of reality, including the area of human action, is constructed by human actors and that this also includes researchers (Walsham, 1993). The interpretivist paradigm further states that there exists no objective reality which can be revealed by researchers and replicated by others (Robson, 2002). The interpretivist paradigm differs from the positivist view and posits that the researcher uses his/her presumptions to guide the process of enquiry and through interactions with human subjects can change the perceptions of the researcher and subjects (Walsham, 1995).

3.3.2 Interpretivist and Positivist Research Paradigms: Differences

One way of differentiating between positivism and interpretivism is looking at their assumptions about the following: ontology, epistemology, research object, method, theory of truth, validity and reliability (Weber, 2004). The next table details the differences between positivism and interpretivism.

Table 3.1: Differences between positivism and interpretivism

Metatheoretical Assumptions About	Positivism	Interpretivism
Ontology	Researcher and reality are separate.	Researcher and reality are inseparable.
Epistemology	Objective reality exists beyond the human world.	Knowledge of the world is intentionally constituted through a person/s lived experience.
Research Object	Research object has inherent qualities that exist independently of the researcher.	Research object is interpreted in light of meaning structure of researcher's lived experience.
Method	Statistics, content analysis.	Hermeneutics, phenomenology.
Theory of Truth	One-to-one mapping between research statements and truth.	Interpretations of research object match lived experience of object.
Validity	Certainty: data truly measures reality.	Defensible knowledge claims.
Reliability	Replicability: research results can be reproduced.	Interpretive awareness: researchers recognise and address implications of their subjectivity.

Source: Weber (2004)

Lin (1998) points that differences between interpretivist and positivist research are seen in the questions one asks of the data and kind of conclusions one wishes to draw. In qualitative studies for example, positivist researchers seek to identify those details with suggestions that can be tested or observed in other cases, whilst interpretivist research seeks to integrate those details into systems of belief whose features are unique to a case (Lin, 1998).

An interpretivist qualitative research approach, using the case study design was utilised for this study. Research data was collected by using semi structured interviews.

3.4 Qualitative Case Study Research

The focus of this study was qualitative in that it looked for indicators of IT governance influences, implementation issues and challenges, and IT outcomes through the experiences of the participants.

3.4.1 Qualitative and Quantitative Research

Qualitative research looks at the participants in the setting they operate from and allows for researchers to bring their personal-self and researcher-self into the research (Creswell, 2012). Qualitative research is defined by Creswell (2012) as 'made up of a set of material, interpretive procedures that make the world visible' (p.15). It differs from quantitative research, which seeks to maximise objectivity, replicability and the level to which findings can be generalisable.

The qualitative practices transform the world by turning it into a series of accounts, comprising field notes, interviews, dialogues, photographs, footages and memos to the self (Denzin & Lincoln, 2002). Creswell (2012) divides qualitative research into the following five types: the biography, phenomenology, grounded research, ethnography and case study. Some contextual differences between qualitative and quantitative research are tabled next.

Table 3.1 Contextual differences between qualitative and quantitative research

Quantitative Research	Qualitative Research
• Number. • Point of view of the researcher. • Researcher distinct. • Theory testing. • Static. • Structured. • Generalizing. • Hard reliable data. • Macro.	• Words. • Point of view of the participants. • Researcher close. • Theory emergent. • Process. • Unstructured. • Context understanding. • Rich in depth. • Micro.

Quantitative Research	Qualitative Research
• Behaviour. • Artificial settings.	• Meaning. • Natural setting.

Source: Bryman, 2008

Qualitative research seeks to gain a more nuanced insight into a particular phenomenon rather than an analysis of a few variables. The qualitative research approach is in line with the primary research question of the study which is *how* IT governance is implemented in South African public sector institutions.

Yin (1994) defines a case study by focusing on its scope and technical characteristics as follows: 'an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident' (p.13).

According to Yin (2003), case study research approach is suitable for answering the 'how', 'what' and 'why' questions regarding a particular occurrence. The case study approach is also suitable when one seeks to explore key variables and their relationships in an area where research is at its early stages (Gibbert, Ruigrok & Wicki, 2008). IT governance implementation and research in the South African public sector is still at its nascent stages.

Case studies can be categorised in numerous ways; either by functionality, attributes of the case or purpose of the case study. Stenhouse (1985) categorises case studies by functionality into four types; namely ethnographic, evaluative, educational and action research. Ethnographic and action research case studies are often conducted at single sites while the evaluative and educational case studies are conducted at both single and multiple sites (Sturman, 1994). Focusing on the subjects under study, Robson (1993) distinguishes between individual case study (one person), set of individual case studies (a small number of individuals with some common characteristics), community studies, social group studies, studies of organisations, and studies of events or relationships. A case study's purpose can either be intrinsic (to understand the event or phenomenon) or instrumental (to accomplish a particular purpose) (Stake, 1994). Case study research is flexible as researchers can select a topic and decide on boundaries based on the extent of their research topic or interest.

3.4.2 Appropriateness of the case study approach

The research questions on IT governance implementation in South African public sector institutions for this study were answered through a case study, with one public sector agency as a case unit. The case study approach was suitable for this study as the study was interested in understanding real case phenomena and not coming up with normative decision models (Perry, 1998). The study did not seek to test the strength of relationships among different dimensions of IT governance implementation, but focused on how these dimensions actually play out in the selected context.

The South African public sector operates in an environment that is largely influenced by exogenous factors. For IT governance, the need to have an IT Governance framework in place is necessitated by the Auditor-General's audits which also extends to IT governance and controls, the King III Report on corporate governance which equally applies to the private and public sector, as well as the discussions and decisions by the Department of Public Service and Administration (DPSA) and the Government Information Technology Officer Council (GITOC) on the implementation of corporate governance. One would therefore expect to see a strong correlation between the institutional influences and IT Governance implementation, which is similar to studies within the same context such as Boubaker and Nyrhinen (2008) and Jewer and McKay (2012).

The case study approach is also ideal when one seeks to explore key variables and their relationships in an area where research is at its early stages (Gibbert *et al*, 2008) such as IT governance implementation in the South African public sector. The main benefit of case studies design is that it shows how things occur practically and therefore can be useful for organisations (Boodhoo & Purmessur, 2009). The study does not seek to test the strength of relationships among different dimensions of IT governance implementation, but focuses on how these dimensions actually play out within the selected context.

3.5 Research Design

This section discusses how the research was designed. The unit of analysis and associated IT governance practices and participants are also identified.

3.5.1 Unit of Analysis

In this study, the unit of analysis is a government-funded agency that supports small businesses in improving their capabilities and effectiveness. As the organisation expressed the wish to remain anonymous, the real name of the organisation was removed and replaced by ENTDEV.

ENTDEV had prior to the release of the King III Report on Corporate Governance (King III) positioned and viewed IT as a transactional tool that reacted to organizational changes and requests. King III, which came into effect from 1 March 2009, highlighted the role of IT governance and the board's related responsibilities. The organisation, in response to the King III recommendations established a Chief Information Officer (CIO) position, which was filled in June 2012. A three year IT strategy was developed and approved by the board, with the terms of reference of one of the board committees amended to include oversight over the IT function.

3.5.2 Background to IT governance practices at ENTDEV

At an organisational level, the goals that were been identified as requiring critical input from the IT function are:

- Stakeholder value of business investments.
- Product and business innovation culture.
- Portfolio of competitive products and services.
- Customer-oriented culture.
- Information-based strategic decision making.
- Business service continuity and availability.
- Optimisation of business process functionality (ENTDEV, 2013).

The organisation implemented a COBIT based IT governance framework over three months, from August 2012. The objectives of the three-month project were to:

- Develop a COBIT based system that ENTDEV would utilise for governance and management of its IT function.
- Review current documentation in order to ascertain the as-is and desired state, and provide recommendations on closing the gap between these two states.
- Conduct an IT goal identification and alignment exercise.
- Develop a framework for creating and adopting IT policies, processes, procedures and standards, as well as defining roles.
- Provide foundation level COBIT training.
- Develop a road map for the implementation of the IT governance framework (ENTDEV, 2013).

The implementation was done with the guidance of an IT governance consulting company and involved the IT unit, risk and internal audit units, and IT systems owners from the business units within the organisation. The IT governance framework adopted by ENTDEV identified 13 enabling processes from the 34 COBIT processes. The identified processes are:

- Manage the IT Management Framework.
- Manage Innovation.
- Ensure Benefits Delivery.
- Manage Enterprise Architecture.
- Manage Strategy.
- Ensure Governance Framework Setting and Maintenance.
- Manage Requirements Definition.
- Manage Programmes and Projects.
- Manage Human Resources.
- Manage Portfolio.
- Manage Suppliers.
- Manage Service Agreements.
- Manage Security (ENTDEV, 2013).

Baseline assessment of maturity levels the 13 processes was done during the implementation of the IT governance framework, and the ideal maturity levels were agreed upon. Actions to move from the baseline levels towards the ideal maturity were agreed upon. Maturity assessments are conducted every six months, with subsequent

actions to further move towards the ideal maturity levels. The baseline findings of the process maturity are illustrated next.

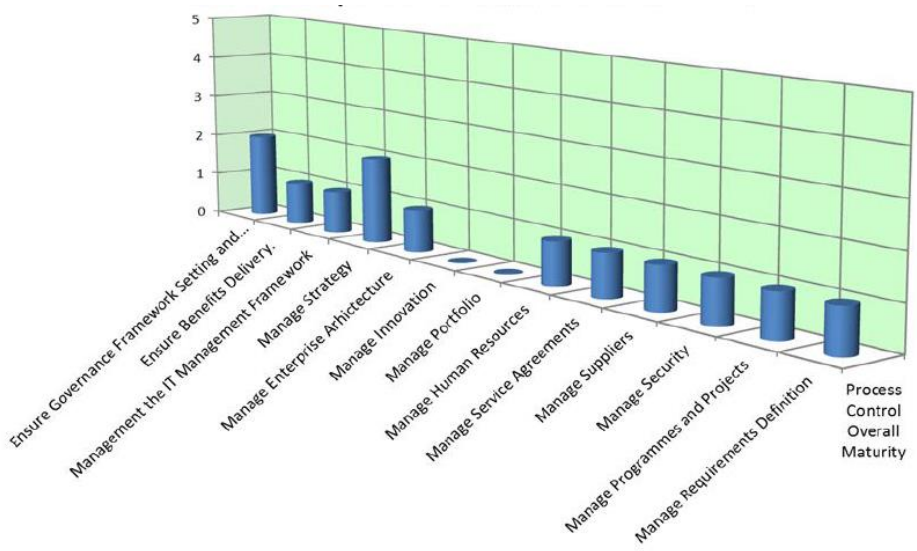

Figure 3.1: Baseline process maturity assessments at ENTDEV, Source: ENTDEV 2013

The governance processes adopted by ENTDEV largely align with those prescribed by the Corporate Governance of ICT Policy Framework, which was approved four months after ENTDEV had completed its IT governance implementation project. Four processes which form part of the Corporate Governance of ICT Policy Framework were not part of ENTDEV's thirteen processes, although they do form part of operations. These processes are:

- Governance framework setting and maintenance.
- Manage risk.
- Manage operations.
- Manage continuity.

ENTDEV has, after the introduction of the Corporate Governance of ICT Policy Framework realigned its process matrix and incorporated the four additional processes.

3.5.3 Sampling

Six people, who formed part of IT management and were involved in the IT governance framework implementation, were interviewed based on their varied positions and interaction with IT governance within the organisation. The participants' diverse positions and interactions with IT governance allowed for depth and full understanding from different viewpoints. For privacy reasons, each of the participants has been given labels which are made up of two randomly selected letters. The details of the participants are as follows:

Table 3.2: Details of the participants

Code (Letters)	Position
NX	Senior Manager: IT
LK	Lead External Consultant – IT Governance project
JL	Chairperson: Risk and Audit Committee
ON	Chief Information Officer
BJ	Manager: Performance Analysis
LM	Business Process Analyst

3.5.4 Data Collection Techniques

Case study data and evidence can come from many sources such as documentation, stored records, interviews, direct observations, observing participants and physical artefacts (Yin, 2009). Primary data for this case study was collected by using semi structured, face-to-face interviews with the lead external consultant and management level employees in the IT and business units in the organisation. Semi structured interviews involve conducting individual interviews with group of identified respondents to discover their perspectives on a specific phenomenon. The researcher pre-establishes questions that will lead to more information on a specific issue and identify new issues that are not part of the information at hand (Yin, 2009). It is flexible and the researcher can add or remove pre-established questions informed the results after each interview. The researcher is not expected to follow a specific order of questions, but can vary the order according to how the conversation is unfolding.

The participant's responses must develop according how the participant views the phenomenon (emic perspective) and not how the interviewer views it, which is the etic

perspective (Gioia, 2014). Advantages of one-on-one, semi structured interviews are that they are able to uncover valuable insights and what really happens from people in the know, respondents are more likely to open up on a one-one one basis as opposed to a focus group, the researcher is able to get data of an acceptable quality and add or change questions in real time, and data can be collected faster than other data collection methods.

The researcher followed the stages of conducting an interview that are detailed by Kvale (1996). Based on the research purpose, certain themes were developed to pinpoint the key information to be gathered from the interviews. An interview guide containing the key topics and questions was then developed and used for collecting information (See Annexure B). Secondary research data such as the business case for IT governance adoption, the Corporate Governance of ICT Policy Framework, project implementation reports, terms of reference and minutes of ICT Steering Committee meetings were also analysed and used in compiling the interview guide.

Thirdly, interviews were conducted and recorded after permissions had been sought from the respondents. The consequent steps of Kvale's seven step process which are transcribing, analysing, verifying and reporting are detailed in subsequent chapters.

The secondary research data was further used to augment and confirm the primary research data. Secondary research data allows the researcher to work with data that already exists and avoids the costs of collecting new data (Stewart and Kamins, 1993).

3.6 Validity and Reliability

The validity of a research study is assessed by the relevance of the research method and scale to which the research method adequately represents the real meaning of the phenomenon being studied. Qualitative studies, in general, have a broader range of validity considerations than quantitative studies (Svensson & Starrin, 1996 in Ottosson & Bjork, 2004). Validity standards are difficult to develop in qualitative research as the researcher has to include rigour, subjectivity and creativity in the research process (Whittemore, Chase & Mandle, 2001). Numerous terms such as truth, value, credibility (Lincoln & Guba, 1985), goodness (Emden & Sandelowski, 1998), authenticity (Guba & Lincoln, 1989) and trustworthiness (Eisner, 1991) have been used to explain validity criteria in qualitative research.

LeCompte and Goets (1982) use the terms internal and external reliability when referring to reliability in qualitative research. Internal validity is the extent to which two or more observers agrees to what is being observed and heard, while external validity

is the extent to which the study can be repeated. Bogumil and Immerfall (1985) in Rauner and Maclean (2008) propose that coherence, discourse and openness be considered to define reliability. Coherence is the degree to which the methodology meets the research goals, openness refers to the extent to which other appropriate methodologies can be used and discourse is the degree to which researchers are allowed to discuss and interpret the research data.

Simon (2011) uses the terms quality, rigour and trustworthiness to describe validity, and dependability instead of reliability. Triangulation and respondent validation were used as forms of validation for the study. Triangulation means comparing various forms of data and using different kinds of data collection to see whether they corroborate one another (Silverman, 1989). Observation of governance mechanisms such as IT steering committee meetings, interviews with management level people in IT and business, as well as reading of reports on IT governance mechanisms are the various forms of data collection that were used. Respondent validation was done by taking the findings back to the respondents for verification. Reliability in qualitative research is about the methods used to conduct the research; it is a methodological issue (Bapir, 2012). The dependability or reliability was addressed by using a standardised method to write notes and interview transcripts.

3.7 Ethical consideration

Ethical issues in qualitative research differ from that of quantitative research. Qualitative research is interested in exploring, observing and describing people and their environment within a particular context. Qualitative research has more to do with the concepts of power and relationship between the researcher and participants. (Orb, Eisenhauer & Wynaden, 2001). The ethics clearance was obtained from the faculty, prior to carrying out the study (Research Protocol Number: CINFO/1053, See Annexure C). Data was collected digitally, transcribed and kept electronically. From a power perspective, the interviews were conducted in settings that the participants were comfortable with.

Data was collected from invited participants with the realisation that participants are independent people who voluntarily share information and can withdraw from participation at any point. The researcher's interpretation of participant's information was from an emic perspective (Field & Morse, 1992). Additional ethical considerations that were taken into account during the study are:

- Protection of the dignity and wellbeing of the participants by conducting the interviews at sites that the respondents are comfortable, and requesting their permission to record the interviews.
- Confidentiality of the research data throughout the study by not providing the data to third parties.
- Privacy, confidentiality and anonymity of the participants by not divulging the details of the participants in the final report.

3.8 Limitations of the Study

The first limitation involved the purposive sampling (one organisation in the South African public sector) which limits the extent of generalisability of the research study. The single case unit might not be fully representative of the various cultures, beliefs of the South African public sector. The researcher approached organisations in the public sector, with the aim of using multiple case units, but the time needed to get confirmation proved to be a key constraint. The second limitation is that the study is not longitudinal, but cross sectional in nature. It represents a snapshot of IT governance implementation at the case unit at a precise point in time, and not the view of a period of time. It was therefore not possible to record the changes in perceptions and understanding that might occur over a period of time.

3.9 Summary of the Chapter

This chapter described the research methodology undertaken in exploring how IT governance implementation takes place in public sector institutions. The rationale for the research methodology was also provided. This was followed by the research design, ethical considerations and limitations of the study. The analysis of the collected and discussion of findings are presented and discussed in the next chapter.

CHAPTER 4: DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter analyses and discusses the data collected through semi-structured interviews. The analysis is presented under the three objectives, with a number of related questions under each objective. Each analysis is followed by a discussion of the findings from the analysis. To recap, the purpose of the study was to describe how IT governance is implemented in South African public sector institutions. The research objectives were to identify the role institutional influences play in IT governance adoption, to identify issues and challenges evident with regards to the implementation of IT governance mechanisms and to describe how the implementation of IT governance mechanisms result in improved IT performance in South African public sector institutions.

4.2 Data Analysis and Interpretation

Polit and Beck (2010) propose that data analysis in qualitative research starts with utilising a framework to establish recurring themes. The collected data was analysed by using the thematic analysis method. Thematic analysis is used for recognising, analysing and describing patterns or themes within data and as a result explains various elements of the research topic (Boyatzis, 1998). Thematic analysis differs from other data analysis techniques like interpretative phenomenological analysis (IPA) and grounded theory as these are interested in describing models from the data, but within the boundaries of theory (Braun & Clarke, 2006). Thematic analysis organises and describes research data according to themes. Themes are patterns that denote something important about the data based to the research question and present some level of response (Braun & Clarke, 2006). The research objectives formed the themes for this study. In other words, the study uses theoretical thematic analysis and not inductive thematic analysis. In inductive thematic analysis, the identified themes are strongly related to the data (Patton, 1990). Theoretical thematic analysis is informed by the researcher's theoretical or analytic interest in the area (Braun & Clarke, 2006).

4.3 Analysis of semi structured interview data

This section focuses on analysing of the semi structured interview data collected from the six participants within the organisation. The focus was on their experiences within the organisation, as well as the broader IT governance context in South Africa. The responses are discussed in narrative form, per research objective and related questions. The questions are written in italics, with the responses indented in Times New Roman font. The three objectives add up to the research purpose of describing how IT governance occurs in public sector institutions. The participants answered questions on research objectives related to their role in the organisation and interaction with IT governance.

Overall, IT governance adoption in the public sector is implemented primarily because of the need to comply. The compliance is driven by institutional influences like the Department of Public Service and Administration's Corporate Governance of ICT Policy Framework and annual audits by the Auditor-General. All public sector institutions are expected, as a minimum to adopt the Corporate Governance of ICT Policy Framework and subsequently implement 13 prescribed IT governance mechanisms.

Normative and culture-cognitive influences do not sway public sector institutions towards adopting IT governance frameworks. The low levels of benchmarking and knowledge sharing are a major contributor to the limited influence. The mandate and expectations from clients do influence IT mechanism selection and implementation. Organisations that seek to utilise IT as a strategy enabler need to implement additional mechanisms to the ones prescribed by the Corporate Governance of ICT Policy Framework.

IT governance and IT strategy oversight should reside at Board level in line with corporate governance principles, with the function being delegated to the Audit and Risk Committee. The composition and skills at Board level need to take into account the growing importance of IT. The role of the CIO is important as it aligns interests between the Board, the Executive Committee (EXCO) and the IT division.

The IT Steering Committee is an important structure in looking at IT investments and IT/business alignment, risk management and evaluating whether the intended benefits have been realised once IT systems have been implemented.

IT needs to be cognisant of needs and views of its internal clients when it comes to planning and performance management. Performance, while managed within the

overall organisational framework, needs to report on measures that business is interested in. IT needs to translate the Board's vision into operational plans and also communicate the role of IT in strategy implementation.

Initial benefits of IT governance adoption and implementation are validation of IT investments and improved levels of compliance. These can be attributed to effective IT steering and IT strategy committees respectively. Utilising IT for business growth, improving business processes and influencing business flexibility will come about as a result of implementing mechanisms like managing innovation and managing business benefits.

Objective 1: To identify the role institutional influences play in the adoption of IT governance (through IT governance mechanisms) in South African public sector institutions.

The need to comply was identified as the main reason for adopting IT governance in public sector institutions. The Department of Public Service and Administration is the lead institution in driving IT governance adoption and implementation. Adopting and implementing IT governance is done through the Corporate Governance of ICT Policy Framework. The Corporate Governance of ICT Policy Framework has 13 mandatory, compliance focused mechanisms that must be implemented by public sector institutions. The Auditor-General assesses on an annual basis the extent to which IT governance has been adopted in the public sector, and reports the extent as part of its overall findings.

The use of compliance and audits to introduce governance mechanisms is a regular approach in the public sector and differs from the private sector, where governance mechanisms are introduced because it makes business sense. The mandate of the organisation did not influence the decision to adopt IT governance. It did, however, have a say on which mechanisms get implemented.

Despite the presence of forums for IT managers in the public sector, there was no benchmarking done on adopting and implementing governance mechanisms. The norm in the private sector is the opposite where benchmarking has been normalised. An additional influence was identified, which is the role of the Chief Information Officer (CIO). The CIO is expected to play an influential role in institutionalising IT governance, at Board Executive Management and business levels.

What would you say was the overall motivation for your organisation to adopt IT governance?

NX: Firstly it was the organisation finding a need and wanted IT to be restructured and not to focus on fighting fires. The second one I would say is more external, it would have been audit queries and findings that come up.

LK: Looking at the past five years, I can safely say it is for legislative reasons, for compliance reasons. Outside that, I don't really see any reasons why organisations implement IT governance. If it was not for that, organisations would not be implementing it.

LK: It is mostly based on 'the DPSA wants us to do this'.

LK: ….there was no awareness first created so that when you bring in the framework, officials understand fully what IT governance is and when the framework is developed, they then apply what they need to, and explain the parts they are not applying. Now they are doing everything, and even implementing parts that do not apply to them.

JL: … you can see the difference between the private and public sectors in terms of IT governance ownership. In the private sector IT governance has evolved to a business imperative. IT governance implementation is done initially for compliance reasons in the public sector. The business benefits might not be realised initially. IT governance is still in its infancy stages, will evolve to a business imperative. Unfortunately, sometimes it takes an IT failure for this to be realised.

JL: I think for now, you need the prescriptive approach. Over time it becomes a business must do.

BJ: I think in improving performance in government, things will not be done unless it is brought through compliance and audits. When organisations then mature, then people will start doing it, such as monitoring and evaluation.

Researcher's Comments

The responses identify the need to comply as the primary reason for deciding to adopt and implement IT governance. The need to comply is seen as different from the private sector where the influence is the King III Codes on Corporate Governance, which proposes acceptable practices to follow. Using compliance and as a way of introducing new measures seems to be the way things are done in the public sector, with the business imperative element coming in later.

What regulatory structures and requirements, in your view, influenced the decision to adopt IT governance?

> NX: Yes, the Auditor-General from a prompting point of view, in terms of what needs to be done. The AG can however be pushed by DPSA.
>
> NX: Yes, and SITA comes in via DPSA, but DPSA is that one that tells institutions what to do.
>
> LK: It's the DPSA, before that IT governance was just talked about. Now there is the DPSA framework. The Auditor-General with its audit findings also plays a role.
>
> JL: The National Treasury if it picks up areas of non-compliance, it informs the Auditor-General to address this. National Treasury also uses funds disbursement to punish and reward.

Researcher's Comments

The Department of Public Service and Administration (DPSA), through the Corporate Governance of ICT Policy Framework, has made it mandatory for the public sector to adopt IT governance. The State Information Technology Agency (SITA) works with the DPSA in ensuring the adoption. The Auditor-General annually assesses the extent to which public sector institutions have an IT governance framework in place. The National Treasury was also identified as an influence in IT governance adoption.

To what extent did these structures and requirements influence the organisation's decision?

> NX: Yes, and SITA comes in via DPSA, but DPSA is that one that tells institutions what to do.
>
> NX: Yes, the AG from a prompting point of view, in terms of what needs to be done. The AG can however be pushed by the DPSA……
>
> JL: National Treasury also uses funds disbursement to punish and reward. We don't have a choice but to approach things this way, as there is no time.

Researcher's Comments

The influence from the regulatory influences is seen as strong, as it is backed by legislative requirements such as audits. The discretion of National Treasury to use

levels of compliance to determine funds allocation and disbursement compels public sector institutions to adopt IT governance.

What IT governance mechanisms have been implemented as a result of regulatory influences? [The researcher read out the four IT governance mechanisms that form part of the conceptual research framework, namely: IT Strategy Committee Implementation and Effectiveness, IT Steering Committee Implementation and Effectiveness, Corporate Performance Measurement System Implementation and Effectiveness and Corporate Communications Systems Implementation and Effectiveness]

> NX: Straight out, would the IT Strategy Implementation and IT Steering Committee ones. They talk to aligning with the COBIT processes of ensuring governance framework setting and maintenance, managing strategy as well as managing requirements definition. There is also a requirement to monitor, evaluate and assess performance which talks to the third one.
>
> LK: The DPSA Framework prescribes the mechanisms that as a minimum must be implemented. The mechanisms in the framework seem pretty generic to all organisations. I think they looked at the core fundamentals for organisations regardless of mandate or focus. What entities fail to do is to look at what additional mechanisms would give them a competitive edge, and also incorporate these into their framework.

Researcher's Comments

The DPSA Framework prescribes mechanisms that all public sector institutions must implement as part of their IT governance framework. Three of the mechanisms from the conceptual research framework are addressed by the ones in the DPSA Framework. The DPSA Framework mechanisms are generic and applicable to all public sector institutions. Additional mechanisms would need to be implemented to create strategic enablement through IT.

How has the mandate and expectations from society, in your view, influenced your organisation's decision to implement an IT governance framework?

- NX: I see a lot of disconnect between how the organisation does things and how the mother organisation does things. There was no consideration of the mother organisation when a decision to implement IT governance was taken.

- NX: The influence you would get is if you did benchmarking with similar organisations. For us, one didn't go to sister organisations but similar service organisations.

Researcher's Comments

There is no clearly identified connection between the organisation's mandate and the need to adopt IT governance. The organisation did not consult with, not benchmark with the department it falls under and organisations with similar mandates when it considered adopting IT governance. The limited benchmarking was done with organisations that are also service oriented

What IT governance mechanisms have been implemented as a result of normative influences? [The researcher read out the four IT governance mechanisms that form part of the conceptual research framework, namely: IT Strategy Committee Implementation and Effectiveness, IT Steering Committee Implementation and Effectiveness, Corporate Performance Measurement System Implementation and Effectiveness and Corporate Communications Systems Implementation and Effectiveness]

> NX: From these, one would pick out Corporate Performance Measurement System Implementation. From core COBIT mechanisms, it would be ensuring benefits delivery, and manage innovation. Actually the needs of stakeholders such as clients, for example to access information online might indirectly influence the adoption of certain governance practices.

Researcher's Comments

Although normative influences did not play a role at adoption stage, the mandate and client expectations were considered in the selection of mechanisms to implement. The consideration supports the view the DPSA Framework mechanisms are compliance oriented and focus less on enhanced service delivery. Additional mechanisms such as ensuring benefits delivery and managing innovation were implemented by the organisation, as it wanted to position and benefit from IT as a strategic enabler.

Was there any benchmarking with other organisations prior to and during the IT governance framework adoption?

> NX: Yes, benchmarking was done at three organisations and departments, based on my prior experience and contacts there. I had to look at what policies they use to manage IT.
>
> LK: Departments don't talk to each other, and one wonders with platforms such as GITOC at a national, provincial and local level they don't share experiences and lessons If people get into the mind-set of let us do this for the good of it, because it is international good practices, like COBIT which has been established as a good practice, it has been so well advertised, as opposed to the DPSA framework. The DPSA framework needs to be made more attractive.
>
> JL: Very little, when compared to the private sector. If one company invests in something, its competitors immediately want to know why it is doing this and also look at implementing it.

Researcher's Comments

Limited benchmarking on IT governance adoption was done prior and during the implementation by the organisation. The benchmarking focused on policies, which is part of implementing mechanisms and not IT governance adoption. Benchmarking is not widely done in the public sector, as opposed to the private sector. The lack of benchmarking is despite various platforms established in the public sector such as GITOC to share experiences. Sharing experiences would enable organisations to see the benefits of IT governance, and normalise implementation.

What IT governance mechanisms have been implemented as a result of culture-cognitive influences? [The researcher read out the four IT governance mechanisms that form part of the conceptual research framework, namely: IT Strategy Committee Implementation and Effectiveness, IT Steering Committee Implementation and Effectiveness, Corporate Performance Measurement System Implementation and Effectiveness and Corporate Communications Systems Implementation and Effectiveness]

> NX: None of these. However, I would say the DRP was influenced by the benchmarking I did. This talks to managing continuity. It get confusing at first because you are exposed to so much. And differing views. But it empowers you over time to make informed decisions.

Researcher's Comments

None of the mechanisms in the conceptual research framework were implemented a result of benchmarking with other institutions. Benchmarking was defined as being initially confusing and an information overload. It can however, potentially give organisations material to make informed decisions, and also implement mechanisms in the best way possible.

Influence of Chief Information in IT Governance adoption

> NX: It goes back to what we are saying; you need a roving guy between Board, IT and business. This person, the CIO, plays a balancing act between these three, based on an IT Governance framework.
>
> JL: The reporting relations between the CIO and CEO are important; CIO position needs to be at Executive Committee (EXCO) level to demystify things at that level. CIO also needs to interact with the Board, and drive the adoption of an IT governance framework.
>
> ON: In our instance, the CIO, one of the first tasks they did was develop a business case that recommended the organisation adopt IT governance
>
> LK: The CIO needs to be an integral part of IT governance. Especially a business focused person, to drive strategy enablement.
>
> ON: The head of IT needs to translate the Board's objectives and receive EXCO support from a resource and change management view,
>
> LK: There are entities though, unfortunately these are the ones whose IT management comes from the private sector, where IT governance is a norm, with these IT governance is advanced.

Researcher's Comment

The influence of the Chief Information Officer (CIO), although not part of the three institutional influences in the conceptual research framework, was recognised as a key influence in IT governance framework adoption by the respondents. The decision taken by the Board to adopt a framework for governing IT was prompted by a business case developed by the CIO. The CIO has to balance the interests of the Board, IT and the rest of the organisation when adopting and implementing IT governance. Organisations with CIOs that have private sector exposure to IT governance tend to be more advanced in IT governance implementation.

Objective 2: To identify the issue and challenges manifesting with regards to IT governance mechanisms in South African public sector institutions.

The Board is responsible for IT governance and IT strategy oversight. The Board sees IT governance and IT strategy oversight as part of overall corporate governance. The trend is to delegate the function to the Audit and Risk Committee. As a result, the capabilities of the committee are changing to include IT governance and IT strategy. The skills of public sector Boards need to be enhanced around IT, if they are to play an effective oversight role. The CIO should translate that Board's strategic view to operational plans, and also report back to the Board on strategy implementation.

The role of the IT steering committee in the organisation focuses narrowly on IT investment decision making. The committee was introduced with EXCO support as a business imperative, and is chaired by the CIO. Its function is integrated with other business processes, and its membership is a combination of IT and business staff members. There is a view that the committee could enhance its activities by including business/IT alignment, risk management and value evaluation of IT investments.

IT planning and performance management is done within the overall planning and performance management framework and culture of the organisation. Although based on the balanced scorecard, there is little focus and interaction with internal clients. As a result, IT is still perceived as not having transformed into a strategic enabler by the rest of the organisation.

How do you see the role of the IT strategy committee currently being fulfilled within your organisation?

> NX: I want to take the IT strategy as mostly Board and Executives and a bit of IT management. IT governance there must have been some structure and meeting at that level. It might not be official but it is there. Or whichever committee has oversight over IT matters.
>
> LK: I believe the IT strategic committee, as an oversight committee, it's a Committee of the Board. I think the reason it has been recommended is to give IT the limelight at that level. It now has to be on the Board agenda; that was the reason for it. The strategy committee looks at where IT is going, operationalising and approves the strategy presented by the CIO.

LM: At a Board level, the interest should be how efficiently the organisation is managed using IT. The second one is effectiveness, is the data that is collected accurate, and what checks and balances are there to rely on this data. Efficiency talks to quickness.

ON: Currently the Board is providing oversight over IT matters. What needs to be done better is communicating the Board's view of what IT's role should be so that the IT unit can respond appropriately. At the moment, IT could run the risk of misalignment with Board objectives.

Researcher's Comments

The responses locate IT strategy committee function at Board level. The Board takes overall responsibility for the function of the IT strategy committee. The Board needs to provide oversight on IT matters and communicate what its view of IT is, to avoid misalignment between strategy and implementation. The Board should focus on how efficiently the organisation is being managed through IT.

LK: … if you read these adverts for Audit and Risk Committees and Board membership invites, you find that they require some IT or IT governance expertise. …they are now trying to diversify their oversight skills, where they normally had CAs and CFAs to now have legal people, risk managers, IT governance people. At a Board level, you might have a different set of skills than what you find at the ICT Strategy or Risk and Audit Committee. The Risk and Audit Committee Chair then brings IT governance issues to the Board from the Committee.

LM: It will not help to have Internal Audit invited from time to time to the Board, they help identify the challenges and then recommend possible solutions, and then when those challenges are addressed the focus on IT then goes away. If there is someone constantly there, then IT is always on the agenda.

ON: IT needs to be constantly on the Board agenda. What is important is getting a mix between IT/business alignment and IT governance implementation. If the right people are allocated to it, the Audit and Risk committee is the ideal committee to provide oversight. It should however provide assurance to the Board on IT matters.

BJ: The IT strategy should be where governance is, at Board level. It gets significance and importance there. The IT Steering committee looks at technical aspects and feeds

into the Board. People at Board level must be capacitated to see the importance of IT governance.

BJ: The CIO needs to be an integral part of this committee. Especially a business focused person, to drive strategy enablement.

JL: Private sector usually has a separate committee for IT strategy and governance, or as part of a committee, largely due to King III. Public sector usually uses the Audit and Risk committee to oversee IT governance.

Researcher's Comments

The emerging practice in the public sector is to delegate the IT strategy function to the Audit and Risk committee, which then gives assurance to the Board. The composition of Audit and Risk Committees in terms of capabilities is changing to accommodate IT governance and IT oversight. IT governance should be a permanent item on the Board agenda, and not treated like an audit finding which loses focus once it has been addressed. In the private sector, where IT governance seems to have been normalised, there is a separate IT strategy and governance committee. The CIO needs to be an integral part of the committee mandated to carry out the IT governance and IT strategy oversight functions, to translate the strategy into actions.

What factors do you think played a positive role in the implementation of this IT governance mechanism?

LK: Boards understand that according to King III, IT governance is their responsibility.

JL: Board members are well versed in corporate governance and attend regular training and updates. The introduction of King III was not an entirely new subject to them. King III codes are also pretty clear on Board roles and responsibilities.

Researcher's Comments

The King III Code on Corporate Governance, which clearly outlines Board roles and responsibilities, made it possible for the organisation to implement the IT governance and IT strategy oversight mechanism. Board members' prior exposure to corporate governance also played a positive role.

What factors would you say have played a negative role in the implementation of this IT governance mechanism?

LM: I think it's a generation gap, most board members are a bit mature and technology came later in their lives. Now they are in these strategic areas and their interest is how

business can be improved. Now if you present complex functions, which IT is trying to venture into, they might battle to understand.

BJ: While the governance capability might be limited at Board level, we need to build this at EXCO level to interact with the Board. Organisations should understand the benefits of IT governance and get Board to work with management. IT governance and strategy must be at Board level. If we deem IT governance as important, it should be at the top level.

BJ: …as the organisation matures, then there should be IT savvy people appointed to Board levels. Audit committee is fine, but it shouldn't focus on compliance.

JL: Board selection is important, it is driven by Ministers and sometimes Board composition is not balanced in terms of skills.

Researcher's Comments

Board composition and IT related capabilities are the challenges related to effectively implementing the IT strategy oversight mechanism. Most Board members in the public sector tend to be experienced experts in a particular industry, who lack the ability to understand and manage nascent areas such as IT. Political heads need to realise the strategy enablement value of IT and consider IT expertise as a critical skill when it comes to Board selection. EXCO also needs to be capacitated on IT strategy and governance, and be part of discussions around these with the Board.

What still needs to be done on the implementation of this IT governance mechanism?

JL: Over time, the board should develop capacity to oversee this. Another committee looking at strategy can then look at strategy enablement related mechanisms, while IT risks become part of normal risk and compliance management processes. Business should overtime see IT was something needed to operate the way they see finance, human resources, etc. and not as support.

JL: The reporting relations between the CIO and CEO are important; CIO position needs to be at EXCO level to demystify things at that level. CIO also needs to interact with the Board. IT is complex and sophisticated. Boards need to be trained to understand, analyse and support the implementation of IT decisions. They should worry more about strategy and benefits, and less about costs.

LK: In some organisations, it is important to look at IT strategy from a committee other than Audit and Risk, especially if IT is a strategic enabler to the organisation. Then

audit committee looks at processes, governance and controls. Board need to be flexible in terms of where IT governance is located.

ON: The head of IT needs to translate the Board's objectives and receive EXCO support from a resource and change management view, and then get the IT unit to work towards operationalising these.

Researcher's Comments

Building Board capacity is important for effective IT strategy implementation and Board oversight over IT. Over time, IT governance should be normalised like other functions in the organisation where a separate committee looks at the strategy enablement part and the Audit and Risk committee looks at risk and compliance related issues, in line with how governance is done in the organisation. The CIO needs to translate the Board strategy into operational plans, obtain executive management support, and then ensure that the IT unit implements the operationalisation of the strategy.

What, if any, has been the impact of external influences on the implementation of this IT governance mechanism?

JL: None, but I expect the IoD as the custodians of corporate governance to start influencing IT governance practices.

LK: The problem is that there is limited communication in the public sector among each other; as a result it is not easy to learn from other institutions. GITOC as a platform should be encouraging the sharing of good practices.

Researcher's Comments

There is no external influence on implementing the managing IT strategy mechanism. At a directorship level, the Institute of Directors (IoD) can start influencing IT governance practices and position IT governance as part of the broader ambit of corporate governance. A similar role can be played in the private sector by Government Information Technology Officers Council (GITOC), by encouraging sharing of so-called "good practices" and learning from other institutions.

How do you see the role of the IT steering committee currently being fulfilled within your organisation?

NX: There is a body in the organisation for this, and for the IT steering committee to make investment decisions as some of them can be quite huge, they need a high profile chair within the organisation.

LK: …. create Steering Committee one level below EXCO; you then have an EXCO member chairing the Steering Committee. People who sit at the Steering Committee should know what is happening within business and not talk at an aggregated level.

BJ: I think, historically IT has been seen as support function in the organisation and not used for strategic enablement. The committee is located in the right place in the organisation. The skills to assess business cases are at that level.

ON: It is made up mostly of members from business, and as a result is not seen as an IT function. The CIO is more of a business than IT person and he therefore is neutral in chairing the meeting.

Researcher's Comments

There is a formally constituted IT Steering Committee in the organisation. It is located one level below EXCO and is chaired by the Chief Information Officer, who is an EXCO member. The committee is made up of mostly people from units other than IT, and is tasked with making IT investment decisions within the organisation. Committee members have an in-depth understanding of operations. Divisions that want to invest in an IT solution prepare and present business cases for the committee to assess and approve.

What factors would you say have had a positive role in the implementation of this IT governance mechanism?

ON: The organisation is fortunate in that it established this committee long before IT governance recommended it, and as a result this function is well entrenched.

LM: I think it was firstly elevating it to a strategic level, and having an Executive member being a member of the committee showed the level of importance that is required and decision making and also indicated that at EXCO level that this is a priority. Business people are consulted, their needs are assessed. There is a level of transparency.

ON: The language used is also business and less technical. Activities and decisions taken by the committee are reported to EXCO.

LM: …I am part of the steering committee and attended the COBIT training, which I think is a huge improvement. People now have to present a case, why I want to do this and they must give a motivation that they have done research on other options that are there in the market. So, it brings some level of confidence to say we have explored and are not just buying. We have evaluated the need thoroughly.

BJ: Committee focuses on one mechanism and it is doing very well there.

Researcher's Comments

The IT Steering Committee was established as a business need, and not as part of the IT governance framework implementation. As a result, it is well entrenched in the organisation, there is consultation with business and the process is transparent. The committee is chaired by an Executive Manager (the CIO) and its decisions are reported to EXCO. The committee members were trained on the organisation's IT governance framework. It brings a level of confidence to the organisation that there is some rationalisation of IT investments. The committee's focus in on one IT governance mechanism, and it has been very effective in this regard.

What factors have, in your view, had a negative role in the implementation of this IT governance mechanism?

NX: There is limited communication of some of the work and projects that have been implemented.

BJ: Committee doesn't go beyond business cases and investment decision making. Also doesn't do proper value assessment from approved IT investments. There is also limited capacity within the business analysis function, the function that works with the IT steering committee.

ON: ….certain divisions deliberately ignore it. Luckily, supply chain acts as a control and detects those who by pass the system.

Researcher's Comments

The narrow scope of the committee means that there are IT governance mechanisms that are left unimplemented. An example is ensuring benefits delivery from approved business cases. The capacity in the business analysis function has an effect on the functioning of the IT steering committee. There are some divisions that ignore the function of the IT steering committee when investing in IT. The supply chain function is able to detect this, as requisitions must be accompanied by an approved business case. The committee could also communicate its work and make itself more known in the organisation.

What still needs to be done on the implementation of this IT governance mechanism?

LM: One area of improvement is the issue of communication because in as much as we have communicated the process, some people are still not aware. Communicating once

or twice is not good enough. There should be consistent reminders, even if it is not of interest to your area of work.

LM: The level of critique and analysis from the members can be improved. You find that sometimes members battle to understand the language and function being discussed. They could be provided training.

LM: … you look for that adds value as opposed to just looking at price. We also tend to be bogged down by our area of specialization.

ON: I think the scope of the committee should be beyond the current business case analysis and approval. It should play a huge role in driving IT operations, especially IT/business enablement and risk management. Also, it needs to profile itself to an extent where it is known throughout the organisation.

Researcher's Comments

The committee scope needs to be broadened beyond business case analysis and approval to include IT/business enablement and risk management. The skills of committee members, particularly around critique and analysis need to be improved. Committee members should be able to look at things beyond their area of specialisation, such as costing or process management. Awareness about the work of the committee is needed, it should be known throughout the organisation.

What, if any, has been the impact of external influences on the implementation of this IT governance mechanism?

NX: None, as there is no benchmarking post. Implementation is therefore based on internal realities.

BJ: None, and as a result the scope of the committee might be too narrow. There is a need to look at how this is done in other organisations.

Researcher's Comments

There has been no benchmarking with other organisations after the IT steering committee was established. The committee functions are shaped by internal realities. The scope of the committee might be too narrow, and benchmarking with other organisations could enhance and improve the effectiveness of the committee.

How is the performance of the IT function currently being measured within your organisation?

NX: It is measured against its KPAs and there are timelines within which certain projects have to be completed. As well the risk register which has some projects as treatment options. Your final audit on processes also gives you a sense of controls and processes.

LM: There are few measures, a core one is turnaround times when issues are being logged and the level of errors into the network, how does IT assist in reducing issues of uncertainty and the retrieval of data and the ease of use of the system we are currently using. Those are the core measures that are critical.

BJ: Globally within the organisation, performance is measured against the organisational scorecard. So it is similar to other divisions. In terms of measuring according to strategy, that is being done.

Researcher's Comments

There is an IT performance scorecard with key performance areas. It is part of the organisation's overall scorecard and measures IT performance against the organisation's strategy. There are set timelines for IT projects. IT also measures performance through risk mitigation and outcomes of IT audits. Examples of performance measures are turnaround times, network errors and ease of use of systems in the organisation.

What factors have played a positive role in the implementation of this IT governance mechanism?

NX: You have to have a strategic goal, to align to your business and objectives. IT has such a strategy that aligns to business.

BJ: Globally within the organisation, performance is measured against the organisational scorecard. So it is similar to other divisions. In terms of measuring according to strategy, that is being done.

ON: IT has transformed over the past two years with a CIO.

Researcher's Comments

The presence of an organisational strategic goal has compelled IT to align to business. There is a performance management system in the organisation and all divisions have to manage performance according to the performance management system. The

introduction of the CIO role has transformed IT performance management over the past two year.

What factors have played a negative role in the implementation of this IT governance mechanism?

> ON: I think it's a cultural thing within the organisation, where divisions only communicate to those they think need to know about their work and not the rest of the organisation. …some people in business still see it way it was years ago.
>
> BJ: For all divisions. Divisional strategies should be mapped according to the balanced scorecard with indicators that talk to client requirements. The client perspective needs to be heightened. Internal clients need to also be part of the assessment stage.
>
> NX: On a personal or individual level, I would still think that business perceives as IT being there to provide hardware and basic operating software.

Researcher's Comments

The culture of communicating in the organisation is one where divisions communicate with a few people and not the entire organisation. As a result some people still see IT as not having changed in the past few years, and only providing hardware and basic operating software. The client perspective of the IT balanced scorecard needs to be emphasised, with internal clients being part of assessing IT performance.

What still needs to be done on the implementation of this IT governance mechanism?

> NX: IT would have to provide reports on interactions with business, on what business has been looking for and how IT has provided these services. It is for business then at the end of the day to survey and then say they were satisfied with the quality of services.
>
> LK: If your business relations are working well, you should be able to get out of and define requirements from business. Once this has been done, you then ask them how they will measure you, then you are in fact doing governance and not self-assessment. IT needs to get business to define the performance measures, in a language that business understands and not technical. Then each IT unit needs to look at how it contributes to this performance measure, from security, access, etc. This happens in the private sector too, by the way.
>
> NX: I think IT would need to publish an IT Service catalogue, it has been developed. It provides a list of services availed by IT.

ON: Absolutely, IT probably measures things that business has zero interest in. Maybe there is interest, but not in the way IT defines things. This gap needs to be closed.

ON: Communication, needs analysis from IT and clarifying things in a language that business understands.

Researcher's Comments

IT performance management should be informed by the requirements of business and how business intends to measure IT on the fulfilment of these requirements. Business needs to be part of the assessing IT performance in the organisation, in line with private sector trends. The language used in IT performance management should be one that business understands. IT needs to have in place an IT services catalogue which details all the services offered by IT.

What, if any, has been the impact of external influences on the implementation of this IT governance mechanism?

NX: The IT scorecard is benchmarked against other organisations, especially in the public sector.

ON: When the organisational balanced scorecard was conceptualised, there was widespread consultation and comparison with other institutions. This was a while ago, so there might be a need to revise the scorecard as IT is repositioning itself.

Researcher's Comments

The initial IT scorecard, which is part of the organisation's balanced scorecard, was developed through a process of internal consultation and benchmarking with other institutions. IT has repositioned itself subsequent to the development of the initial IT scorecard, and there is merit in reviewing the scorecard.

How does the IT function communicate its plans and performance with the rest of the organisation?

NX: The Manage IT Service catalogue is one such mechanism, IT would also need to communicate its annual plan to business and be part of business planning sessions.

ON: IT has to always justify its expenditure, especially to the finance people. They see projects like enterprise architecture and business continuity as things that the organisation can do without. The reality is that these are must haves for the organisation.

BJ: I think it is being done to an extent, but lack of communication is systemic in the organisation. You assume senior management communicates. But this doesn't get done. But IT can do much more.

Researcher's Comments

There is a lack of communication throughout the organisation, and as a result there is limited IT communications of its plans and performance. IT plans and initiatives are still seen as costs that the organisation can do without. IT needs to communicate its IT services catalogue, and also be part of and influence business planning sessions throughout the organisation.

What factors have played a positive role in the implementation of this IT governance mechanism?

BJ: IT can do much more.

NX: This is one area where IT has to improve a lot.

Researcher's Comment

The view from the interviewees is that this is one IT governance mechanism that IT is not implemented effectively in the organisation. A lot needs to be done around communicating IT plans and performance.

What factors have played a negative role in the implementation of this IT governance mechanism?

ON: Divisions such as finance still see IT expenditure as a cost.

BJ: …but lack of communication is systemic in the organisation. You assume senior management communicates.

ON: … divisions still plan without IT.

LM: They are only focused on their issues.

Researcher's Comment

IT is still perceived as a cost and not as strategically enabling to the organisation, and as a function that divisions can afford to plan without. IT is also perceived as focusing on its issues, and not business issues. The lack of communication, which is systemic in the organisation results in IT management not communicating its plans and performance.

What still needs to be done on the implementation of this IT governance mechanism?

LM: IT needs to check whether we are moving together, still in the same direction.

LM: So, ICT in my view, should be more focused on business issues. Then in that way business will support IT.

LM: I think what is important is constant engage, asking business how you rate us. Do surveys on what do you think our function is, and try and get business to understand what you operate from. This understanding of where IT can help and cannot is very important.

LM: I think in terms of the strategy, if the organisation is going in a particular direction. Also at a strategic level highlight your plans, achievements, challenges and plans to resolve these, but I mean above those it's the issue of highlighted to the level, in a realistic manner. Also, highlight your strategy map, this is where ICT is taking the organisation. Also highlight achievements, and not always uncover challenges because people will see IT as an area that solves problems.

BJ: I think there are lots of platforms, like internal communications, our intranet and roadshows. IT should sell its services to business, people need to know what services they can get from IT. Leaflets, there is internal printing.

BJ: IT should be at the forefront of innovation and should not wait for the rest of the organisation to transform its communication culture. The IT Services Catalogue needs to be on the intranet, for example.

Researcher's Comments

There needs to be alignment of IT plans and performance measures to the strategic direction of the organisation. There needs to be a strategy map that outlines how IT will transform as the organisation's strategy is implemented. IT needs to be better understood by business, and also better understanding of business needs by IT. IT should focus more on business issues, which will result in business support for IT. The communication needs to be improved, IT can utilise the various platforms in the organisation, and be at the forefront of introducing innovative ways of communicating. The communication should move beyond IT related challenges and also highlight achievements made by IT.

What, if any, has been the impact of external influences on the implementation of this IT governance mechanism?

> ON: There has not been any. IT plans and communicates according to the way it is done in the organisation.
>
> BJ: None, and there are lots of public sector institutions such as SARS where IT is at the core of their operations. The organisation should approach such institutions and learn from them.

Researcher's Comments

The communication of planning and performance is driven by the organisation's culture on these two practices. There is little comparison with outside institutions. There is an opportunity to approach public sector institutions where IT plays a leading role, to learn lessons from them.

Objective 3: To describe how IT governance implementation results in improved IT performance in South African public sector institutions.

The introduction of the IT steering committee has resulted in rationalisation on IT investments. As a result of the rationalisation, some business units recognise IT investments as process automation driven, and not done because they have been budgeted for. The scope of the committee can be expanded to include other IT investments such as hardware, where IT currently makes decisions on its own.

There is an expectation that the IT governance mechanisms of managing innovation and managing business benefits will result in IT being effectively used for business growth and IT influencing business flexibility. The views on the business process improvement capabilities of IT governance are mixed. The mixed view can be attributed to the practice by some divisions of not including the IT division and the IT steering committee processes when they decide to procure an IT solution. The levels of compliance related to IT have improved significantly as a result of IT governance implementation.

How has IT governance enabled your organisation to utilise IT in a cost effective manner?

> NX: there is a committee that deals with IT investments. It is going to cut a lot on unnecessary expenditure. It's going to lead to meaningful procurement.

ON: Yes, the IT steering committee has led to a rationalisation of IT investments. Business units are obliged to interact with the business analyst and IT when they intend on automating certain processes. The language has actually changed from wanting to procure a system to automating a process. This is very encouraging.

BJ: I don't think entirely, I think because things are centralized, IT determines what we need and don't need. So, IT can make decisions on upgrades. Some decisions in the past have not been influenced by cost benefit, especially on hard ware.

BJ: If we take information systems to include everything, include hardware then all should be subjected to a business case. Even a hardware refresh. But some decisions must be taken by the unit.

Researcher's Comments

The IT Steering Committee has led to rationalisation of IT investments, particularly on software related systems. As a result, business wants to invest in systems, because the system will optimise a particular process and not because it has been budgeted for. There is merit in extending the scope of the IT steering committee to include major hardware projects where decision making still resides with IT.

How has IT governance enabled the effective use of IT for growth?

NX: I would say give it another year, once you start talking about the Manage Innovation and Manage Benefits mechanisms then you are talking to that. You need to get the basics first. These will ensure that whatever IT offers will be of value to business. Maybe a resource is needed to get a look at whether the organisation is implementing IT governance the right way.

LK: It needs to sell the benefits of IT governance, and not sell it as a compliance exercise to EXCO, and also get their support when issues of IT controls are raised. Explain the benefits of the mechanisms in a language they understand.

BJ: Yes, if the organisation wants enablement and value from IT, and there is agreement at EXCO level, then the question will always be on what role is IT playing in our new initiative. The CIO needs to provide direction in this regard.

Researcher's Comments

The effective use of IT for business growth has not yet been realised in the organisation. The selection of IT governance mechanisms such as managing innovation and managing business benefits signals IT's intention to influence business

growth. IT needs to sell the business benefits of IT governance to EXCO in a language management understands, and get their support. The CIO needs to ensure that EXCO supports the positioning of IT for enablement and value, and provide direction in making the use of IT for business growth a reality.

How has your organisation increasingly utilised IT to improve business processes?

> ON: Business units are obliged to interact with the business analyst and IT when they intend on automating certain processes. The language has actually changed from wanting to procure a system to automating a process. This is very encouraging.
>
> BJ: I don't think so, I think business on its own simply wants to purchase a system without looking at process optimisation. They don't bring IT on board. As a result they develop business cases when existing systems can address their challenges.

Researcher's Comments

There are mixed views on whether the organisation is increasingly utilising IT to improve business processes. There is acknowledgement that business cases are being developed with process automation in mind, but that this thinking is not always the case. In some instances, business simply wants to procure a system without looking at whether it will result in process optimisation.

How has IT governance enabled your IT function to influence business flexibility by allowing for innovative use of IT?

> NX: The Managing Innovation mechanism talks to this. .
>
> ON: By adopting the mechanisms of managing innovation and business benefits, IT made a decision that its role will be impacting on the core business. To date there is a move toward using IT to make certain processes more efficient in the organisation.
>
> BJ: It goes back to what we said earlier. If you don't market your services, then business won't see IT as a process optimising solution. On doing the basics, IT is doing things right. It needs to move beyond this.

Researcher's Comment

IT is still to effectively play the role of influencing business flexibility, although the intention is there based on the selected IT governance mechanisms. IT needs to communicate the intention of influencing business flexibility, and get business to

realise the business optimisation potential of IT. There have been certain processes in the organisation that have been made more efficient through IT.

What has been the effect of IT governance on your compliance with legal and regulatory requirements? [The researcher read out the requirements: compliance with the Department of Public Service and Administration requirements, compliance with the Auditor-General audit requirements.]

> NX: Yes, and it continues to do. We keep answering questions on whether we are doing things according to legislation. We see ourselves going in that direction. The AG and internal audit play a large role in this regard.
>
> ON: There is a marked improvement. The number of findings has reduced remarkably, and it's a matter of time before there is full compliance from the IT function. The willingness is always there, it is just that funding for some major projects such as business continuity took some time to be availed. The compliance is becoming normalised, which means that over time IT can focus on other areas such as innovation and business benefits.

Researcher's Comments

There is improvement in compliance levels as a result of IT governance framework implementation. The number of findings by the Auditor-General and Internal Audit are reducing and full compliance is possible. There is a willingness to improve and normalise compliance. Once compliance has been normalised, the IT function can then focus on areas like managing innovation and business benefits.

4.4 Summary of the Chapter

The Chapter presented the data analysis and researcher's comments on the data collected through semi-structured interviews with six respondents from ENTDEV. The data is analysed under the three objectives that add up to the overall research purpose detailed in Chapter 2. The next Chapter interprets these findings and presents a conceptual framework.

CHAPTER 5: INTERPRETATION OF FINDINGS AND THE CONCEPTUAL FRAMEWORK

5.1 Introduction

This chapter interprets the findings addressing each secondary research question and subsequently the primary research question of how the implementation of IT governance takes place in South African public sector institutions. The secondary research questions relate to the role institutional influences play in IT governance adoption, what issues and challenges manifest with regards to the IT governance mechanism implementation and how IT governance mechanism implementation results in improved IT performance.

5.2 Interpretation of Findings

5.2.1 Institutional Influences and IT Governance Adoption

It is commonly understood that adoption and diffusion of innovations is influenced by social pressures from internal and external sources like social norms, national culture, structure of the economy, political and legal structures, resources and restrictions (Salmeron & Bueno, 2006). Butler and Murphy (2007) identify three exogenous dimensions that influence the adoption of business process through strategy execution that is enabled by IT and change management. These exogenous dimensions are regulatory influences, normative influences and cultural-cognitive influences.

In this study, regulatory influences had an impact on the organisation's choice to adopt an IT governance framework. There is a government department that is mandated to ensure that a culture of IT governance in the public sector exists, and it is supported by the Auditor-General. The practice of using regulatory influences is similar to efforts by the South African government to institutionalise monitoring and evaluation. A Department of Performance Monitoring and Evaluation was established in 2009, and audits of performance information were included in the scope of the Auditor-General.

Expectations from society (normative influences) played no role in the organisation's decision to adopt an IT governance framework. Expectations from society could influence mandate implementation, and thus the core services of the organisations. They do not have a role in influencing the support and governance functions in public sector institutions. They do however have a role in the selection of IT governance

mechanisms to be implemented. The company used in the study is a service organisation that assists clients to improve their competence and capabilities. Technology plays a large role in implementing the mandate of the organisation. The responses below indicate the role technology is envisaged to play in the organisation.

> JL: Over time, the board should develop capacity to oversee this (IT Strategy implementation and effectiveness). Another committee looking at strategy can then look at strategy enablement related mechanisms, while IT risks become part of normal risk and compliance management processes.
>
> BJ: Yes, if the organisation wants enablement and value from IT, and there is agreement at EXCO level, then the question will always be on what role is IT playing in our new initiative. The CIO needs to provide direction in this regard.

To signal intent, the organisation approached selection of IT governance mechanisms from a strategy enablement point of view (see 3.5 Research Design).

Despite their presence, the platforms (culture cognitive influences) to discuss common issues and challenges in the public sector do not seem to be influencing decisions to adopt governance mechanisms. There is no sharing of good practices and lessons learnt. In some instances, public sector institutions will grapple with an issue for a number of years and receive adverse audit findings, instead of consulting with institutions that have been able to solve the issue.

Left only to regulatory influences, IT governance runs the risk of being a compliance, or box ticking exercise. The role of the IT head or CIO becomes an additional influence in the direction and shape IT governance takes in public sector institutions. The CIO becomes the driver of IT governance framework adoption, by ensuring there is Board and Executive Committee buy-in, and also that the IT governance mechanisms the organisation implements talk to the needs of the Board, EXCO, the IT division and the rest of the organisation. Prior experience and exposure to IT governance adoption and implementation by the CIO facilitates easier institutionalisation.

5.2.2 Issues and Challenges in IT Governance Implementation

Once an organisation has decided on which IT governance framework to adopt, it needs to identify and establish appropriate structures, implement processes and relational mechanisms. IT governance structures enable contact between IT and business management, IT governance process relate to formalisation of strategic IT decision making and monitoring procedures, while the relational mechanisms relate to

the collaborative relations between business and IT management together with executive level management (De Haes & Van Grembergen, 2009).

The four structures, processes and relational mechanisms that form the conceptual framework for the study are broad and accommodate the Corporate Governance of ICT Policy Framework structures, processes and relational mechanisms, as tabulated below.

Table 5.1: Alignment of the Conceptual Research Framework Mechanisms with the Corporate Governance of ICT Policy Framework Mechanisms

Conceptual Research Framework Mechanisms	**Corporate Governance of ICT Policy Framework Mechanisms**
IT Strategy Committee Implementation and Effectiveness	Ensure Governance Framework Setting and Maintenance Manage IT Management Framework Manage Strategy
IT Steering Committee Implementation and Effectiveness	Manage Enterprise Architecture Manage Portfolio Manage Risk
Corporate Performance Measurement System Implementation and Effectives	Monitor, Evaluate and Assess Performance and Conformance Manage Suppliers Manage Security Manage Continuity Manage Programmes and Projects Manage Operations

Conceptual Research Framework Mechanisms	Corporate Governance of ICT Policy Framework Mechanisms
Corporate Communications System Implementation and Effectives	Monitor, Evaluate and Assess Performance and Conformance Manage Programmes and Projects

The roles and responsibilities of the Board need to be clearly articulated and should form part of the Board charter. The prevailing theme is that of locating IT strategy and IT governance oversight at Board level without clearly articulating what locating it there means. There is acknowledgement that the composition and skills at Board level currently do not match the IT strategy and IT governance oversight responsibilities. Institutions such as the Institute of Directors and the Department of Public Service and administration need to provide Board training on the IT governance, especially on the IT strategy committee related mechanisms. Institutions that have not prioritised strategy enablement through IT can focus on the mechanisms prescribed by the Corporate Governance of ICT Policy Framework, and delegate the function to the Audit and Risk Committee. The ones that seek to facilitate strategy implementation through IT would need to implement additional mechanisms and infuse these as part of the overall strategy formulation and implementation.

The location of the IT steering committee in the public sector should be determined by the level of IT expertise at Executive Committee level. Where there is adequate skills, the Executive Committee can fulfil the role of the IT Steering Committee. In instances where the IT expertise is limited to the Chief Information Officer (CIO), then the IT steering committee should be located one level below the Executive Committee, and chaired by the CIO. The scope of the committee should be aligned to the mechanisms in the Corporate Governance of ICT Policy Framework, with the requisite powers. Committee members should be capacitated to effectively carry out IT steering committee role.

Transitioning from a reactive support function to a proactive business enabler carries additional responsibilities for the CIO and IT divisions. Firstly, the division needs to be customer oriented and strive to understand and meet customer expectations. The IT division needs to communicate its offerings to business, and use feedback from business for improvement. The planning and reporting frameworks should reflect the

proactive business enablement. IT needs to be at the top of the minds of business divisions when they develop their operational plans.

5.2.3 IT Outcomes as a Result of IT Governance Implementation

Organisations achieve IT governance effectively by realising cost effective use of IT, effective use of IT for business growth, effect use of IT for asset utilisation, effective use of IT for business flexibility and compliance with regulatory and legal requirements (Bowen et al 2007).

In the public sector, where organisations adopt IT governance primarily for adoption, the immediate outcome that is realised is improved levels of compliance. The commitment of the institutions to provide resources and support the implementation of mechanisms determines is important. Instances where IT investments are seen as unnecessary costs impede the drive towards IT governance mechanism implementation.

An effective IT steering committee, through analysing business cases, is able to recommend cost effective yet value adding options to the organisation. The role of the committee needs to be communicated to the organisation, and its decision support supported by EXCO. In some instances, the IT steering committee recommendations might go against the views of certain EXCO members. The Committee should also conduct post implementation assessments on the overall cost versus benefit of IT investments and communicate these lessons to the rest of the organisation.

The remaining three outcomes i.e. effective use of IT for business growth, effective use of IT for asset utilisation and effective use of IT for business flexibility depend on the ability of the IT division to position itself and exert influence over the rest of the organisation. Before the IT division, can venture into the IT outcomes mentioned above, it first needs to get the basics of compliance in order. As a result, these outcomes can only be realised in later years, as affirmed by some of the respondents.

> NX: I would say give it another year, once you start talking about the Manage Innovation and Manage Benefits mechanisms then you are talking to that. You need to get the basics first. These will ensure that whatever IT offers will be of value to business
>
> LK: It needs to sell the benefits of IT governance, and not sell it as a compliance exercise to EXCO, and also get their support when issues of IT controls are raised. Explain the benefits of the mechanisms in a language they understand.

5.3 Conceptual Framework

From the analysis and interpretation of the findings, the following framework is conceptualised.

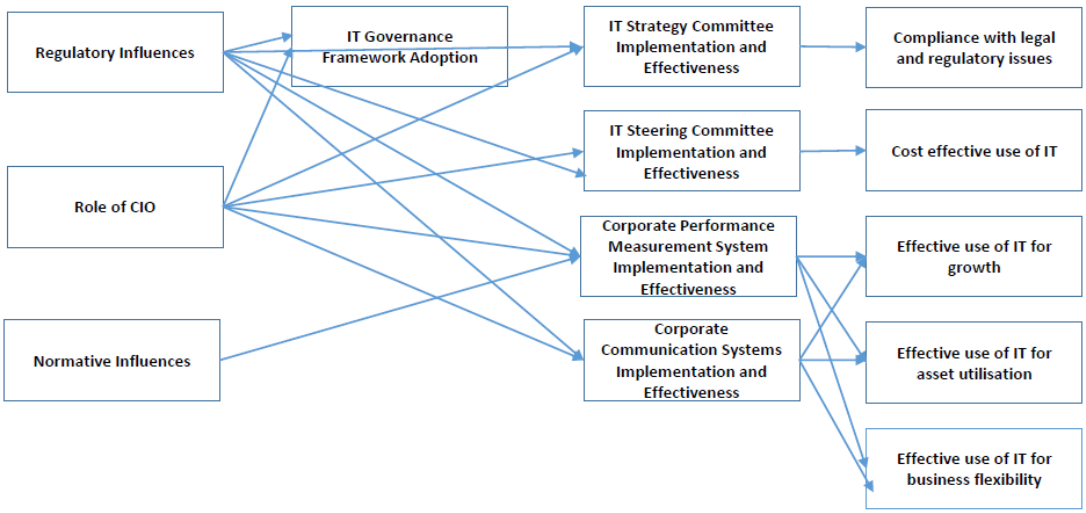

Figure 5.1: Conceptual Framework for IT governance implementation in South African public sector institutions

Figure 5.1 above depicts how IT governance occurs in the public sector institution that formed part of the study. The reason to adopt an IT Framework is as a result of influences from regulatory institutions as well as the CIO influencing the Board and management on the need to have a framework that governs IT. IT governance adoption is a separate process from IT governance implementation. South African public sector institutions are compelled by the Corporate Governance of ICT Policy Framework to adopt IT governance. The regulatory influences prescribe a set of IT governance mechanisms that must be implemented. As a result, they influence the implementation of all the governance mechanisms in the conceptual framework. The CIO as the driver of IT governance implementation, influences the extent to which the organisation implements the four IT governance mechanisms.

Normative and culture cognitive influences play no role a role in the IT governance adoption stage in the public sector. Normative influences, particularly in public sector institutions that provide direct services to citizens, have a say in the implementation and effectiveness of IT planning, performance management and communications. These mechanisms shift the focus of IT from a reactive, compliance oriented division to a strategy enabler. They interact with the rest of the organisation, and have the ability to influence and be influenced by the organisation's culture. The culture-

cognitive influences play no role at all, both at the adoption and selection of IT governance mechanism stages.

The IT strategy committee function should ideally reside within the Audit and Risk Committee, which will result in normalisation and improved compliance to IT related legislation. There is a risk of focusing on compliance at the expense an IT strategy that effectively contributes to the organisation. The risk can be mitigated by balancing the skills in the committee or mandating a separate committee to deal with the strategy enablement part of IT governance. Compliance should normalise over time, and the focus should shift to strategy enablement.

The IT steering committee, by managing requirements definition and ensuring benefits delivery, can instil a culture of using IT in a cost effective manner. The committee needs to profile itself as a business friendly, transparent function in the organisation and use the profile to drive towards the enablement outcomes like using IT for business growth, using IT to improve business processes and using IT to influence business flexibility.

The three enablement outcomes mentioned above will be realised once there is effective planning, performance management and communication in the IT function. They also rely on how willing the organisation is in supporting the endeavours of the IT function to enable strategy. They are more difficult to realise and measure, and should not be expected as immediate outcomes of IT governance implementation.

The IT Strategy and IT Steering Committees have potential to also influence the achievement of the three enablement outcomes. To accomplish the influence, the IT Strategy Committee has to broaden its scope to look at mechanisms other than compliance related ones. The IT Steering Committee would also need to broaden its focus to look at risk management and IT/business alignment.

The CIO needs to manage things at two levels. Firstly, the CIO needs to manage and balance the interests of the Board, EXCO, the IT division and business. Secondly, the CIO needs to create and maintain a distinction between IT governance and IT management. Failure to manage the second one can result in a protective IT division that sees committees taking over their function, or business units that feel they run IT and therefore derail the IT division focus.

5.4 Summary of the Chapter

The institutional theory and literature on IT governance mechanisms and IT outcomes were used to interpret the evidence collected during the study. A conceptual framework

was developed from the interpretation of the evidence. The framework identifies regulatory influences and the role of the CIO as key drivers of IT governance adoption. Two of the institutional influences (regulatory and normative) and the CIO influence the implementation of IT governance mechanisms. The IT governance mechanisms result in the realisation of IT outcomes, with the cost effectiveness and compliance ones being realised faster than the three enablement outcomes. The next chapter evaluates the research conducted.

CHAPTER 6: EVALUATION OF THE RESEARCH AND CONCLUSION

6.1 Introduction

This chapter summarises the chapters of the study and reflects on the research approach and evaluates it on relevance and whether the research objectives have been met. It determines whether institutional theory, the identified IT governance mechanisms and IT outcomes explain IT governance implementation in public sector institutions. It ends by evaluating the relevance of the research methodologies used.

6.2 Overview of the Research

The study is divided into six chapters. The following gives a brief overview of each Chapter and its contribution towards the research objectives.

Chapter 1 introduced the purpose of the study. It provided context to the study, the importance of the study and the problem being addressed. It also included the research purpose, goal and objectives as well as the primary and secondary research questions.

Chapter 2 reviewed literature related to IT governance, IT governance research, IT governance implementation in the public sector, theoretical foundations of IT governance adoption, IT governance implementation and IT outcomes. Drawing on institutional theory, IT governance mechanisms and IT outcomes as lenses, a conceptual research framework was developed.

Chapter 3 discussed the research paradigm, approach and design selected as suitable for this study. The qualitative research method was adopted. The case study approach was utilised, and documentation and semi-structured interviews were used to collect data. The data was collected through a recorder and transcribed.

Chapter 4 analysed the data through themes informed by the research objectives and discussed the data under each question. The analysis was carried out with the aim of responding to the secondary research questions and identifying any other emerging themes. The role of the CIO in IT governance adoption and implementation emerged as an additional theme.

Chapter 5 interpreted the findings of the data came up with a conceptual framework based on the interpretation of the findings. The elements of the framework were also briefly discussed.

The purpose of this Chapter was to reflect on the study and evaluate to what extent the researched addressed the primary and secondary research questions.

6.3 Research Questions Revisited

The primary research question, which is 'How is IT governance implemented in South African public sector institutions?' was answered through responses to the three secondary research questions using one public sector institution as a case unit. The following gives a brief summary of how each secondary research question was addressed.

Secondary Research Question 1: What role do institutional influences play in IT governance adoption in South African public sector institutions?

This research question was addressed through interviewing the different people within the organisation, and reviewing the IT governance implementation project report and Corporate Governance of ICT Policy Framework. The study found that regulatory influences play a huge role in the adoption of IT governance mechanisms, to the extent that they have even developed a framework which is mandatory for all public sector institutions. Normative and culture-cognitive influences do not play a role at the adoption stage, but normative influences might influence what mechanisms get implemented. The study went further than describe the role played by the institutional influences, but also identified them. The following excerpts from the respondents, attest to this:

> NX: Yes, and SITA comes in via DPSA, but DPSA is that one that tells institutions what to do.
>
> LK: It's the DPSA, before that IT governance was just talked about. Now there is the DPSA framework. The Auditor-General with its audit findings also plays a role.
>
> LK: Departments don't talk to each other (talks to limited role of culture-cognitive influences), and one wonders with platforms such as GITOC at a national, provincial and local level they don't share experiences and lessons
>
> JL: Very little benchmarking (talks to limited role of culture-cognitive influences), when compared to the private sector. If one company invests in something, its competitors immediately want to know why it is doing this and also look at implementing it.

The study introduced an additional influence (the role of the CIO), which although not part of institutional influences plays a material role in IT governance framework adoption.

Secondary Research Question 2: What are the issues and challenges regarding IT governance mechanisms, in South African public sector institutions?

The secondary research question 2 was answered through semi-structured interviews and reviewing the organisation's literature on the IT governance implementation project report, sitting in on IT steering committee meetings, reviewing the IT steering committee terms of reference and reports and the IT strategy and performance reports. It was uncovered that the appropriate positioning of strategy and steering committees is important, and these need to have the right skills and balance of capabilities. The challenge of Board selection in the public sector, the composition of Risk and Audit committees and how these could impact on IT strategy and IT governance implementation were raised by the respondents.

Repositioning IT from a reactive support function to a strategic business enabler was also identified by the respondents as integral to IT governance implementation. The study found there needs to be a balance between IT objectives at the different levels in the organisation. The IT function needs to transform, and be at the forefront of business planning.

The respondents also recognised the scope of the IT governance mechanisms as being narrowly focused on a few areas and not looking at broader IT governance. As a result, not all IT governance mechanisms are implemented optimally.

Secondary Research Question 3: How are IT outcomes realised through the IT governance implementation?

The secondary research question 3 was answered through semi-structured interviews. Cost effective use of IT and improved levels of compliance were the two outcomes that the organisation realised as a result of implementing IT governance. There was acknowledgement from respondents that the enablement related IT outcomes, i.e. the effective use of IT for business growth, the effective use of IT for asset utilisation and effective use of IT for business flexibility would be realised at a later stage, but the selection of IT governance mechanisms showed the organisation wanted to achieve these IT outcomes. The following excerpts from the respondents, attest to this:

NX: I would say give it another year, once you start talking about the Manage Innovation and Manage Benefits mechanisms then you are talking to that. You need to get the basics first.

LK: It needs to sell the benefits of IT governance, and not sell it as a compliance exercise to EXCO, and also get their support when issues of IT controls are raised. Explain the benefits of the mechanisms in a language they understand.

ON: By adopting the mechanisms of managing innovation and business benefits, IT made a decision that its role will be impacting on the core business. To date there is a move toward using IT to make certain processes more efficient in the organisation.

6.4 Relevance of the Research Methodology

This section addresses the research methodology used and its relevance and appropriateness in reaching the research objectives. The study sought to understand the 'how', 'what' and 'why' questions on IT governance implementation in South African public sector institutions and not to test the strength of relationships among different dimensions of IT governance implementation. A case study was utilised and provided insight into the phenomenon.

The case study approach was suitable for this study as the study was interested in understanding real case phenomena and not coming up with normative decision models (Perry, 1998). The field of IT governance implementation in the South African public sector is still in its early stages. The early stage level of IT governance implementation in the South African public sector makes the case study approach ideal because the research focus at nascent stages is on affirming and exploring key variables and their relationships.

6.5 Relevance of Institutional Theory to the Study

The study focused on the appropriateness of institutional theory in explaining the role of influences in public sector IT governance adoption. The theory has been used before to explore IT governance adoption, in different contexts. It is important to look at IT governance adoption in the public sector from the rational theory, the political behaviour approach and the institutional theory approach to get a sense of which theoretical approach best describes how public sector institutions go about adopting IT governance frameworks.

The study identified only one institutional influence, namely regulatory influence as playing a role in IT governance adoption. This supports the view that there are contextual differences between the private sector (where all three influences play a role) and the public sector.

6.6 Recommendations for Further Studies

This section gives recommendations on further research that can be done around IT governance adoption and implementation in public sector institutions. It must be noted that the conceptual framework is informed by the responses from one public sector institution. There is therefore merit in testing the framework further in the public sector, through both qualitative and quantitative approaches. The qualitative approach would affirm or revise the conceptual framework, while the quantitative approach would test the relationships between the variables as proposed by the conceptual framework.

6.7 Reflection on the Research Study

The research study has been a personal journey for the researcher, as the researcher's background is scientific/technical in nature. The researcher's background, had, prior to the study, been in quantitative, rational theory focused studies. While this was an unfamiliar area of research for the researcher, it proved to be an enjoyable and informative journey.

There were some cases where the researcher experienced difficulties in keeping the interviews focused to the purpose of the study and research objectives. This experience where participants provide long responses that initially appear to have nothing to do with the research objectives is common in qualitative research (Riessman, 2001). The experience did however allow for richer data collection and uncovered the role of the Chief Information Officer as an additional influence for IT governance adoption.

The researcher enjoyed the research experiences and processes and writing up the research report, and hopes that the reader had the same experience going through the research report.

6.8 Conclusion

The main contribution of the study was to present a conceptual framework that can be used to explain how IT governance adoption and implementation occurs in public sector institutions in South Africa.

The research revealed that regulatory influences and the CIO play a major role in getting institutions to adopt an IT governance framework. Normative and culture cognitive influences do not feature at the adoption stage, but normative influences play an equally important role as the regulatory influences and the CIO in the selection and implementation of IT governance mechanisms. It also revealed the mechanisms through which IT governance is implemented and some of the challenges and issues public sector institutions are faced with. It further proposed ways of overcoming these IT governance implantation challenges.

The skills and capabilities of the committees entrusted with implementing IT governance mechanisms are critical for effective implementation. The organisation's culture and perception of the IT function will determine to what extent to IT function is able to transform and reposition itself as a strategic enabler. IT governance and the growing stature of IT in strategy implementation present a good platform for IT to reposition itself.

The research further revealed that IT governance implementation does result in certain IT outcomes. Cost effective use of IT and improved compliance are the ones that were realised soon, and the the effective use of IT for business growth, the effective use of IT for asset utilisation and effective use of IT for business flexibility would be realised at a later stage.

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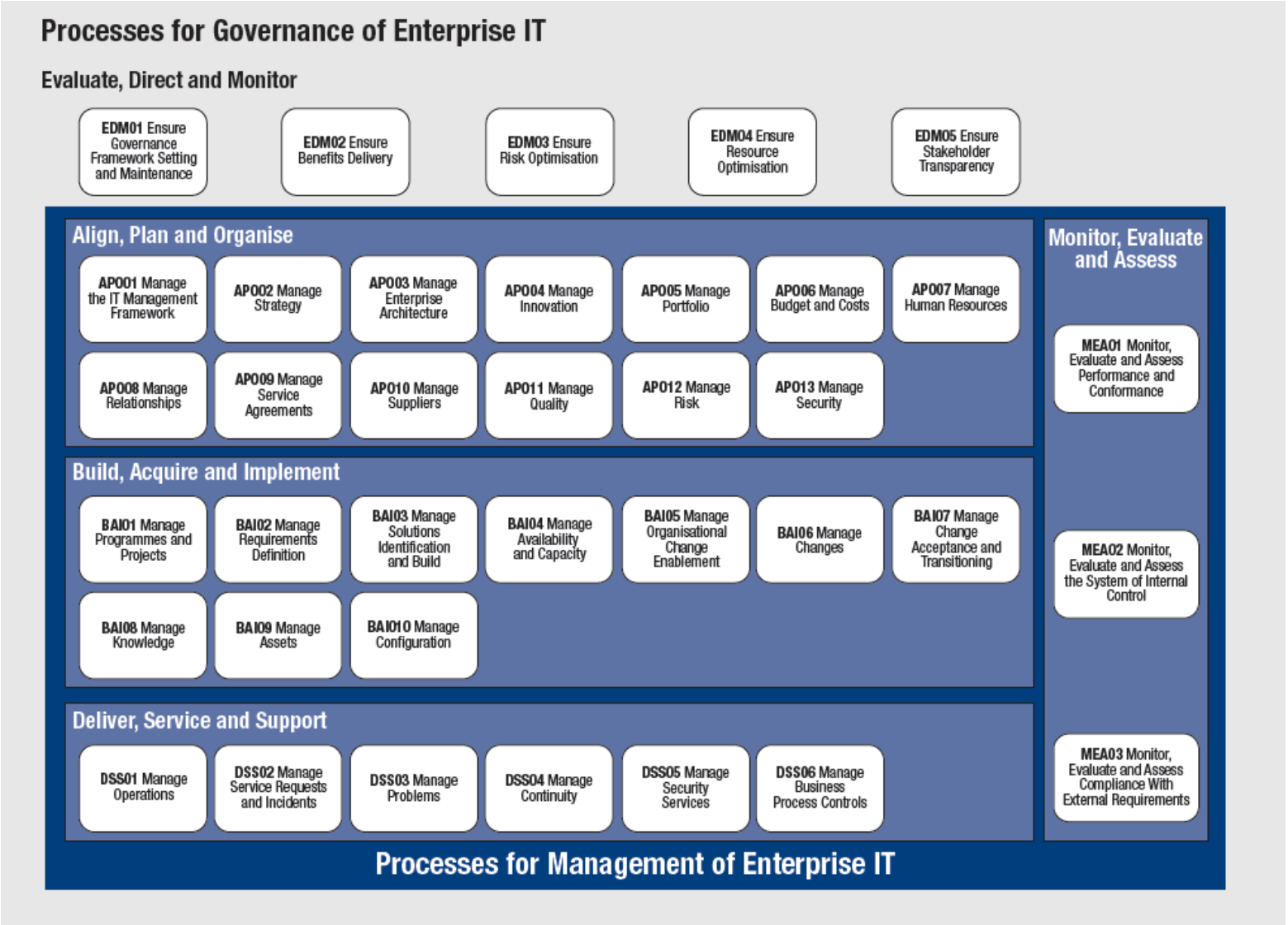
Annexure A: COBIT Framework



Annexure B: Research Instrument Guide

Objective 1: To identify the role institutional influences play in the adoption of IT governance (through IT governance mechanisms) in South African public sector institutions.

Biographical Questions:

- What is your current role in the organisation?
- How many years have your been employed at the organisation?
- What was your role during the IT governance implementation project?
- How does your current role interact with IT governance within the organisation?

Sub Objective 1.1 Related Questions:

- What would you say was the overall motivation for your organisation to adopt IT governance?
- What regulatory structures and requirements, in your view, influenced the decision to adopt IT governance?
- To what extent did these structures and requirements influence the organisation's decision?
- What IT governance mechanisms have been implemented as a result of regulatory influences? [Read out the four IT governance mechanisms that form part of the conceptual research framework, namely: IT Strategy Committee Implementation and Effectiveness, IT Steering Committee Implementation and Effectiveness, Corporate Performance Measurement System Implementation and Effectiveness and Corporate Communications Systems Implementation and Effectiveness]

Sub Objective 1.2 Related Questions:

- How has the mandate and expectations from society, in your view, influenced your organisation's decision to implement an IT governance framework?

- What IT governance mechanisms have been implemented as a result of normative influences? [Read out the four IT governance mechanisms that form part of the conceptual research framework, namely: IT Strategy Committee Implementation and Effectiveness, IT Steering Committee Implementation and Effectiveness, Corporate Performance Measurement System Implementation and Effectiveness and Corporate Communications Systems Implementation and Effectiveness]

Sub Objective 1.3 Related Questions:

- Was there any benchmarking with other organisations prior to and during the IT governance framework adoption?
- What IT governance mechanisms have been implemented as a result of culture-cognitive influences? [Read out the four IT governance mechanisms that form part of the conceptual research framework, namely: IT Strategy Committee Implementation and Effectiveness, IT Steering Committee Implementation and Effectiveness, Corporate Performance Measurement System Implementation and Effectiveness and Corporate Communications Systems Implementation and Effectiveness]

Objective 2: To identify the issue and challenges manifesting with regards to IT governance mechanisms in South African public sector institutions.

Biographical Questions:

- What is your current role in the organisation?
- How many years have your been employed at the organisation?
- How does your current role interact with IT governance within the organisation?

Sub Objective 2.1 Related Questions:

- How do you see the role of the IT strategy committee currently being fulfilled within your organisation?
- What factors do you think played a positive role in the implementation of this IT governance mechanism?
- What factors would you say have played a negative role in the implementation of this IT governance mechanism?

- What still needs to be done on the implementation of this IT governance mechanism?
- What, if any, has been the impact of external influences on the implementation of this IT governance mechanism?

Sub Objective 2.2 Related Questions:

- How do you see the role of the IT steering committee currently being fulfilled within your organisation?
- What factors would you say have played a positive role in the implementation of this IT governance mechanism?
- What factors have, in your view, played a negative role in the implementation of this IT governance mechanism?
- What still needs to be done on the implementation of this IT governance mechanism?
- What, if any, has been the impact of external influences on the implementation of this IT governance mechanism?

Sub Objective 2.3 Related Questions:

- How is the performance of the IT function currently being measured within your organisation?
- What factors have played a positive role in the implementation of this IT governance mechanism?
- What factors have played a negative role in the implementation of this IT governance mechanism?
- What still needs to be done on the implementation of this IT governance mechanism?
- What, if any, has been the impact of external influences on the implementation of this IT governance mechanism?

Sub Objective 2.4 Related Questions:

- How does the IT function communicate its plans and performance with the rest of the organisation?

- What factors have played a positive role in the implementation of this IT governance mechanism?
- What factors have played a negative role in the implementation of this IT governance mechanism?
- What still needs to be done on the implementation of this IT governance mechanism?
- What, if any, has been the impact of external influences on the implementation of this IT governance mechanism?

Objective 3: To describe how IT governance implementation results in improved IT performance in South African public sector institutions.

Biographical Questions:

- What is your current role in the organisation?
- How many years have your been employed at the organisation?
- How does your current role interact with IT governance within the organisation?

Sub Objective Related Questions:

- How has IT governance enabled your organisation to utilise IT in a cost effective manner?
- How has IT governance enabled the effective use of IT for growth?
- How has your organisation increasingly utilised IT to improve certain business processes?
- How has IT governance enabled your IT function to influence business flexibility?
- What has been the effect of IT governance on your compliance with legal and regulatory requirements?

Annexure C: Ethical Clearance Certificate

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CLEARANCE CERTIFICATE **PROTOCOL NUMBER: CINFO/1053**

PROJECT: **Information Technology governance implementation in South African public sector institutions: influences and outcomes.**

INVESTIGATOR: Yandisa Njenge

STUDENT NUMBER: **707235**

SCHOOL: SEBS

DATE CONSIDERED: 15 April 2014

DECISION OF THE ETHICS COMMITTEE: Approved

NOTE

Unless otherwise specified this ethics clearance is valid for 1 year and may be renewed upon application.

DATE: 15/04/2014 **CHAIRPERSON: Mr.J Bancilhon**

cc: Supervisors:

Prof Ray Kekwaletswe

SCHOOL OF ECONOMIC & BUSINESS SCIENCES