



**RHODES UNIVERSITY**  
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**A COMPLIANCE FRAMEWORK FOR  
IT GOVERNANCE ADOPTION AND USE  
BY STATE-OWNED ENTITIES  
IN SOUTH AFRICA**

by

**Monelo Nxози**

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IT GOVERNANCE ADOPTION AND USE  
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**THESIS**

submitted in fulfilment of the requirements for the degree

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Supervisor: Prof. Stephen Flowerday

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# Abstract

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IT governance adoption and use in the South African public sector is deemed critical to good public administration and is regulated by government through the Corporate Governance of ICT Policy Framework (CGICTPF). The CGICTPF was published in 2012 and is based on COBIT 5, ISO38500 and the King III Report. However, compliance with the CGICTPF has been poor; the Auditor-General of South Africa (AGSA) noted that a significant number of its auditees in the 2019–20 financial year had weak IT governance controls.

Therefore, the study sought to answer the research question: *How should IT governance adoption and use be enhanced by state-owned entities in South Africa?*

This study took the form of an exploratory inquiry with pragmatism preferred as the appropriate paradigm because of its predisposition towards abductive reasoning and the use of mixed methods – both of which are the attendant research approaches in this study. Owing to the “how” research question, this study followed a multi-case-study research method. The data collection process included semi-structured interviews, a questionnaire and expert reviews; triangulation of data is also based on these. A thematic analysis of the qualitative data was conducted using Atlas.ti – a CAQDAS tool.

The study shows that CGICTPF adoption and use is driven by strategic alignment and regulatory compliance. In addition, factors such as 1) IT governance competencies at the level of the board of directors, 2) top management support and longevity of tenure, 3) business process integration and data analytics, 4) the dynamic role of the chief information officer (CIO), 5) adequate government stakeholder support, and 6) organisational culture positively influence the adoption and use of the CGICTPF.

A compliance framework is proposed which is based on the technology–organisation–environment (TOE) framework and the DeLone and McLean IS success model. The proposed framework highlights management competencies as a crucial element and seeks to assist practitioners to improve accountability and oversight.

**Key words:** IT governance, CGICTPF, IT governance adoption, public administration, state-owned entities, compliance, management competencies, TOE framework, DeLone and McLean IS Success Model.

# Declaration

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I, Monelo Nxosi, hereby declare that

- the work presented in this thesis is my own work
- all sources used or referred to have been documented and acknowledged
- this thesis has not previously been submitted in full or partial fulfilment of the requirements for a qualification
- I am fully aware of the Rhodes University's policy on plagiarism and have taken every precaution to adhere to this regulation
- ethical approval for this study was obtained from the university's Ethics Committee with certificate reference numbers (i.e. original and extension approvals, respectively): 2020-0810-3207 and 2022-0810-6863.

Signed:



Date: 16 October 2022

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“To shape God, shape Self” – Octavia Butler.

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# Glossary

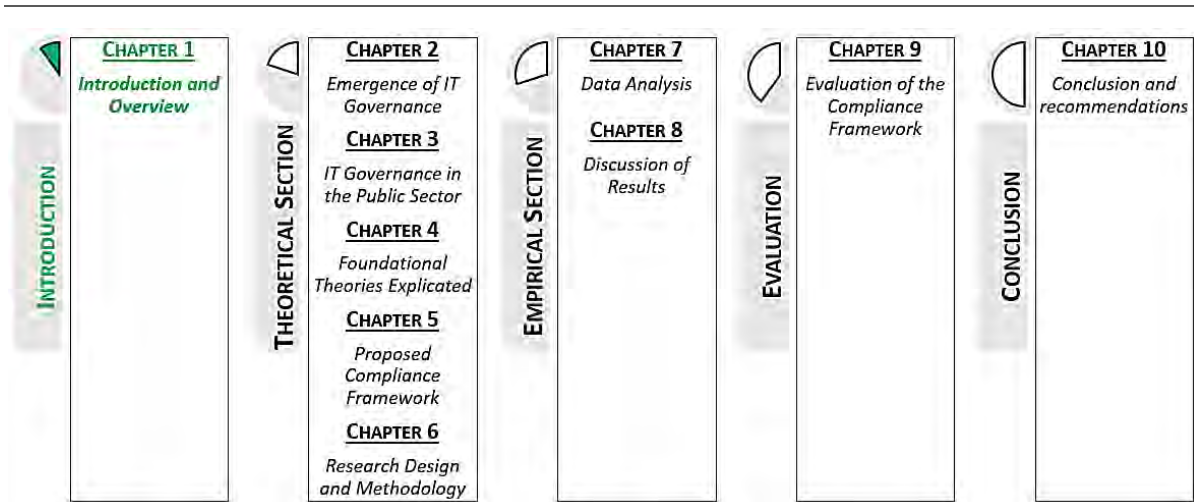
<b>AGSA</b>	Auditor-General of South Africa
<b>Business</b>	The unit executing business functions and services, typically supported by the IT department.
<b>CGICTPF</b>	Corporate Governance of ICT Policy Framework
<b>CIO</b>	Chief Information Officer
<b>CMMI</b>	Capability Maturity Model Integration is a process improvement approach the goal of which is to help organisations improve their performance
<b>COBIT</b>	Control Objectives for Information Technology
<b>COSO</b>	Committee of Sponsoring Organisations of the Treadway Commission
<b>DDD</b>	Data Driven Digital strategy
<b>DPME</b>	Department of Performance, Monitoring and Evaluation
<b>DPSA</b>	Department of Public Service and Administration
<b>e-Government</b>	The use of information and communication technologies in the public service to improve its internal functioning and to render services to the public
<b>e-Government Strategy</b>	The South African national e-Government Strategy and roadmap that was adopted in 2016 serves as the overarching strategy for creating public value using IT. The e-Government Strategy emanates from a recommendation of the Presidential Review Commission (PRC) of 1998 and is aligned to the National Development plan (NDP) objectives and Sustainable Development Goals (SDGs).
<b>ERM</b>	Enterprise Risk Management

<b>EXCO</b>	Executive committee (i.e. executive management layer)
<b>FSCA</b>	Financial Services Conduct Authority
<b>GITO</b>	Government Information Technology Officer
<b>GITOC</b>	Government Information Technology Officers Council
<b>Governance champion</b>	The business EXCO member who is responsible for driving the corporate governance and governance of ICT
<b>GST</b>	General Systems Theory
<b>ICMS</b>	Integrated Claims Management Systems
<b>ICT</b>	Information and Communications Technology, used interchangeably with IT
<b>IFIP</b>	International Federation for Information Processing
<b>ISACA</b>	Information Systems Audit and Control Association
<b>ISO/IEC/SANS</b>	International Organisation for Standardisation (ISO); the International Electrotechnical Commission (IEC); and South African National Standards (SANS)
<b>ISO/IEC 38500</b>	International Standard on Corporate Governance of ICT
<b>IT</b>	Information technology, also the unit executing IT functions and services
<b>ITGI</b>	IT Governance Institute
<b>ITGO</b>	IT governance officer
<b>ITIL</b>	The Information Technology Infrastructure Library is a set of good practices for ICT service management that focuses on aligning ICT services with the needs of business
<b>King IV</b>	The King IV Report and Code on Governance for Southern Africa
<b>KPIs</b>	Key Performance Indicators

<b>MOU</b>	Memorandum of Understanding
<b>NDP</b>	National Development Plan
<b>NPM</b>	New Public Management
<b>OECD</b>	Organization for Economic Cooperation and Development
<b>PFMA</b>	Public Finance Management Act
<b>PMBOK</b>	Project Management Body of Knowledge
<b>PMO</b>	Project Management Office
<b>PoPIA</b>	Protection of Personal Information Act
<b>PSICTM</b>	Public Service ICT Management Branch of the DPSA
<b>PVF</b>	Public Value Framework
<b>PRC</b>	Presidential Review Commission
<b>RAF</b>	Road Accident Fund
<b>SDG</b>	Sustainable Development Goals
<b>SFIA</b>	Skills Framework for the Information Age
<b>SOE</b>	State-owned entity
<b>This researcher</b>	“This researcher” – refers to the primary researcher of this study
<b>TOGAF</b>	The Open Group Architecture Framework
<b>\$/R exchange rate</b>	\$1 = R17 as at 24 August 2022
<b>€/R exchange rate</b>	€1 = R16 as at 24 August 2022

# 1

## Introduction and Overview



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## **1.1 Introduction**

This chapter sets the contextual background for this study, including the problem statement, research questions and research objectives, as well as giving a general overview of the methodological approach adopted. In addition, the research contribution is outlined followed by the chapter layout of this thesis.

## **1.2 Background**

This thesis presents research in the area of information technology (IT) governance. The concept of IT governance is a critical component of corporate governance (Weill and Ross, 2004; Juiz, Guerrero and Lera, 2014; De Haes and Van Grembergen, 2015b; Lunardi et al., 2017; Turedi and Zhu, 2019). After the large-scale corporate governance scandals and failures of the early 2000s, including Enron, Tyco International, Adelphia, WorldCom and others, the concept of corporate governance gained greater significance (Willits and Nicholls, 2014; Chauke and Sebola, 2018; Cole, Johan and Schweizer, 2021), and IT governance is considered crucial to improving corporate governance practices. IT governance contributes to corporate governance by improving IT-related decision-making and controls. Although the concept of IT governance was first considered in academia in the 1960s (Brown and Grant, 2005), its location and relationship within the Information Systems (IS) discipline has not been adequately discussed or substantiated.

As a result of growing business reliance on IT as a strategic tool, IT governance has received increased attention from scholars, practitioners and regulators (Spremić, 2009; Caluwe et al., 2021). IT was not always considered a strategic tool by business, but merely a means of supporting the business in a master–servant kind of relationship. The evolution of IT as a strategic tool, as depicted in Figure 1–1 below, was driven by businesses in the private sector (Peppard and Ward, 2016; De Haes et al., 2020). The effect of this evolution has been an increased dependence by businesses on their IT investments, and the shift from using IT merely for “back office efficiency to creating completely new strategic opportunities and business models” (Peppard and Ward, 2016, p.43). In addition, as a consequence of aligning IT and business strategies to improve productivity and efficiency there have been instances of notable transformation in business processes, organisational structures and business performance (Marakas and O’Brien, 2013; Rainer, Prince and Cegielski, 2014).

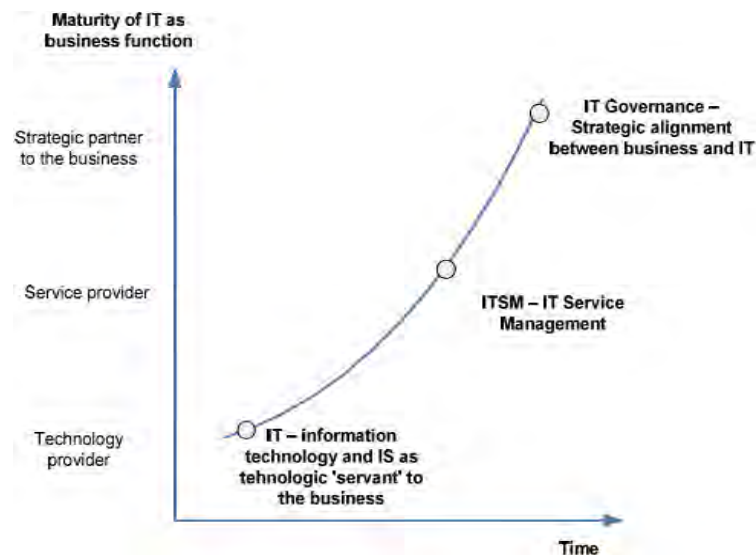


Figure 1–1: Strategic alignment between business and IT (Spremić, 2009; De Haes et al., 2020)

State-owned entities in South Africa are also becoming increasingly dependent on information technology (IT) resources to improve efficiencies when delivering services to the public (Pang, 2014; Maramura and Thakhathi, 2016). This increased dependency on IT is demonstrated by (1) the recognition of ICT as a strategic tool for public sector organisations to increase the productivity of public servants and lower the costs of providing services (DPSA, 2012), and (2) the related substantial and increasing IT-related financial investment (AGSA, 2019b).

State-owned entities are those organisations that depend on state budget allocation to provide public services (Campbell, McDonald and Sethibe, 2009; Juiz, Guerrero and Lera, 2014). There are more than 300 such state entities in South Africa. State-owned entities are distinct from state-owned enterprises in purpose and operation and, in some instances, the term “state-owned entity” is used erroneously when the reference is to a state-owned enterprise. Consequently, any valid and accurate analysis of state-owned entities must be underpinned by an appreciation of their distinctness from state-owned enterprises, as is done in this study. In the South African context, the Public Finance Management Act of 1996 (PFMA) establishes this distinction by categorising all public institutions according to Schedules 1, 2 and 3 (National Treasury, 2018), with the key distinctions being that state-owned entities fall under Schedule 3 Part A of the PFMA, they do not sell products and services, and they are non-profit making. State-owned enterprises, on the other hand, fall under Schedule 2 of the PFMA and are mandated to generate profit by selling products and services (National Treasury, 2018), as noted in Table 1–1 below:

Table 1–1: Public sector entities adapted from (National Treasury, 2018)

<b>State-owned entities vs state-owned enterprises characteristics</b>		
<b>#</b>	<b><i>State-owned entities</i></b>	<b><i>State-owned enterprises</i></b>
1	<ul style="list-style-type: none"> <li>• Non-profit making</li> </ul>	<ul style="list-style-type: none"> <li>• Profit-making</li> </ul>
2	<ul style="list-style-type: none"> <li>• Not mandated to sell products and services</li> </ul>	<ul style="list-style-type: none"> <li>• Mandated to sell products and services to the public</li> </ul>
3	<ul style="list-style-type: none"> <li>• Bound by relevant legislation</li> </ul>	<ul style="list-style-type: none"> <li>• Bound by ordinary business principles and legislation</li> </ul>
4	<ul style="list-style-type: none"> <li>• Board(s), commission(s), authority, fund or other entity</li> </ul>	<ul style="list-style-type: none"> <li>• National government business enterprise</li> </ul>
5	<p>Examples:</p> <ul style="list-style-type: none"> <li>- Road Accident Fund (RAF)</li> <li>- National Energy Regulator of South Africa (NERSA)</li> <li>- Financial Sector Conduct Authority (FSCA)</li> <li>- Independent Regulatory Board for Auditors (IRBA)</li> <li>- South African Revenue Service (SARS)</li> <li>- State Information Technology Agency (SITA) etc.</li> </ul>	<p>Examples:</p> <ul style="list-style-type: none"> <li>- DENEL</li> <li>- Development Bank of Southern Africa (DBSA)</li> <li>- ESKOM</li> <li>- Industrial Development Corporation of South Africa Limited (IDC)</li> <li>- Land and Agricultural Bank of South Africa</li> <li>- Telkom SA Limited</li> <li>- Transnet Limited etc.</li> </ul>

The South African government has introduced many reforms in the public sector since 1994, mainly to give effect to the objective of building a capable state that provides services to the broader South African population (Rosenberg Hansen and Ferlie, 2016). Some of these reforms relate to the use of IT in the public sector. A number of IT-related innovations have been introduced to help meet the strategic objectives of improving access to public services by the general public, increasing the productivity of public servants and lowering the costs of providing those services (DPSA, 2012; 2016). Some of the major projects undertaken include the SARS eFiling modernisation, UIF eFiling modernisation, online licence renewal and the business registration portal (DTPS, 2017; CPSI, 2020). The drive to digitise content and use cloud computing services to make these innovations a success requires substantial financial investments. The growth of IT spending in South Africa is largely driven by the public and financial services sectors (BMI Research, 2018). These two sectors have had a synergetic relationship as most of the IT investments within the public sector have been made in the state-owned entities that operate in the financial services sector. The South African government’s

IT budget for the national and provincial spheres of government for the 2018–19 financial year (FY) amounted to R20,6 billion (SITA, 2020), as shown below in Figure 1–2.

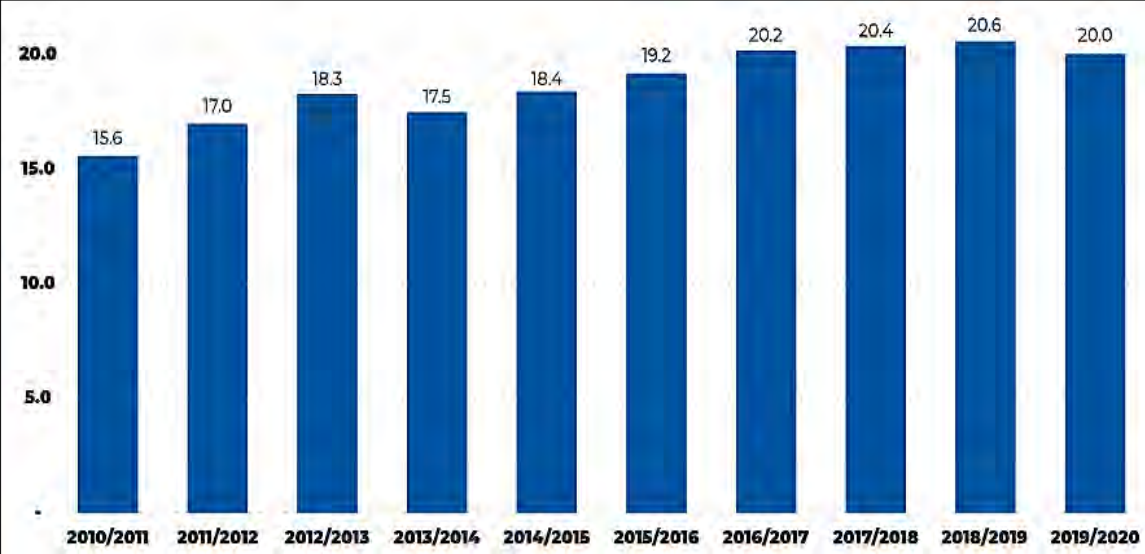


Figure 1–2: National and provincial government ICT budgets (R billions) (SITA, 2020)

For the 2018–19 FY IT-related expenditure by state-owned entities (excluding government departments) was estimated to be R4 billion, as shown in Figure 1–3 below:

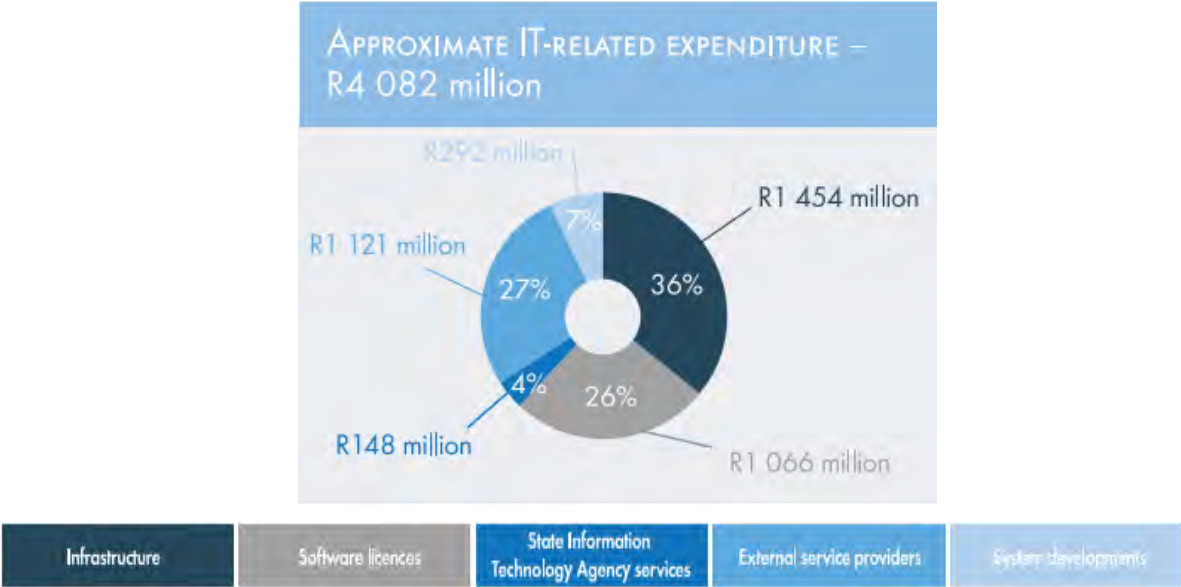


Figure 1–3: State-owned entities IT-related expenditure (AGSA, 2019b, p.107)

With this level of investment and the increase in IT dependence by state-owned entities, there was a recognition by government authorities to improve IT governance in the state-owned entities. In 2012, the Department of Public Service and Administration (DPSA) published the Corporate Governance of ICT Policy Framework (CGICTPF), which all public

organisations were mandated to implement from 2014 onwards (DPSA, 2012). The CGICTPF is tailored for public service and is comprised of elements of COBIT 5, the ISO38500 standard and the King III Report. The integration of these frameworks is intended to improve compliance. The key objective of the CGICTPF is to leverage the value of ICT as a strategic enabler of service delivery (DPSA, 2012).

### 1.3 Problem statement and research questions

The Auditor-General of South Africa (AGSA) noted that IT governance controls in the public sector have not been implemented effectively (AGSA, 2017; 2019b; 2020). This is consistent with trends noted in other developing countries (Nfuka and Rusu, 2010; Othman and Chan, 2013; Al-Qassimi and Rusu, 2015; Bayona and Ayala, 2017). As noted in Figure 1–4 below, the AGSA reported that 65% (up from 63% in the previous FY) of its auditees in the 2019–20 FY had weak IT governance practices, which was a demonstration of “a lack of accountability and oversight” (AGSA, 2020, p.100).



Figure 1–4: IT governance effectiveness in the public sector 2019–2020 (AGSA, 2020, p.100)

The lack of accountability and oversight can be attributed to poor IT governance competencies among members of the board of directors (Valentine and Stewart, 2015; AGSA, 2021). In organisations where there is limited “IT governance knowledge, skills and experience” among members of the board of directors, the board cannot challenge or “ask the right questions of management and advisors” (Valentine and Stewart, 2015, p.4514). Previous surveys of senior executives revealed that “less than 20 percent identify as having EBTG [Enterprise Business Technology Governance] competent directors” in their organisations

(Valentine and Stewart, 2015, p.4514). Further, when senior management understand the business-related benefits of IT governance and set the appropriate tone, IT governance implementation is a success (Valentine and Stewart, 2015). However, compliance with legislation, standards and the CGICTPF was not achieved as the state-owned entities “have not implemented all the elements of the [CGICTPF] framework” (AGSA, 2019b, p.108; 2020; 2021). The impact of the poor implementation of IT governance controls is that IT investments are not always maximised as a result of excessive levels of irregular, fruitless and wasteful expenditure (AGSA, 2019b; 2020; 2021). Where the level of IT investment is substantial, state-owned entities have been susceptible to a more debilitating phenomenon – the failure of financial management – which diminishes the value derived from IT investments. Based on the author’s analysis of Annexure 1 (AGSA, 2019a) of the *Consolidated General Report on the National and Provincial Audit Outcomes for 2018–19*, the overall (i.e. not just IT-related) extent of financial mismanagement in state-owned entities was noted to be approximately:

- R4,91 billion in irregular expenditure, and
- R197 million in fruitless and wasteful expenditure (see Appendix M).

While the above amounts do not specifically relate to IT spending, the alarming levels call for a deeper contemplation of corporate and IT governance in state-owned entities, as well as improved IT governance to raise compliance levels and ensure adequate management and oversight of IT investments (Lunardi et al., 2017; De Haes et al., 2020).

Therefore, the problem statement for this study is framed as follows:

*IT governance in South African state-owned entities is inadequate. Appropriate controls have not been implemented as expected following the publication of the CGICTPF, which all state-owned entities are mandated to implement. This has led to poor levels of compliance and IT investments not supporting organisational objectives.*

The main question that this research seeks to answer is:

*How should IT governance adoption and use be enhanced in state-owned entities in South Africa?*

The sub-questions to be considered are the following:

- (a) What are the factors that influence IT governance adoption and use in state-owned entities?

- (b) How do public sector characteristics affect IT governance adoption and use?
- (c) How does IT governance adoption and use influence corporate governance in state-owned entities?

## **1.4 Research objectives**

The objectives of this study were to develop a compliance framework for IT governance adoption and use in state-owned entities in South Africa. The aims of this study were to: (1) identify the factors that influence IT governance adoption and use in state-owned entities; (2) determine how public sector characteristics affect IT governance use; and (3) rationalise and optimise the influence of IT governance adoption and use on corporate governance in state-owned entities in South Africa.

## **1.5 Overview of the methodological approach**

This study took the form of an exploratory inquiry. Kanellis and Papadopoulos (2009) argue that the “three paradigms commonly adhered to in IS research are the positivistic (or conventional), constructivist (or interpretive), and critical paradigm” (p.3). However, pragmatism was deemed the appropriate paradigm for this study because of its philosophical predisposition which “orients itself toward solving practical problems in the ‘real world’” (Feilzer, 2010, p.8). Pragmatism is “the most commonly cited philosophical orientation associated with mixed methods and action research” (Christ, 2010, p.644). Feilzer (2010) further argues that pragmatism can be used as a guide for abductive research design and draws value from the use of qualitative and quantitative research methods. Therefore, a mixed method approach was deemed suitable for this study as it addresses “exploratory questions with both the qualitative and the quantitative approaches”, thereby creating a better platform for making inferences from “a greater assortment of divergent views” (Teddlie and Tashakkori, 2009, p.33).

This study followed a multi-case study research method. This case selection was also made to compare and contrast research findings so as to improve the generalisability of research conclusions. The distinguishing attribute of the two cases was the budget and organisation size (Wilkin et al., 2016). The case study research method is most relevant to the form of the research question (i.e. “How”) posed in this study (Creswell, 2014; Yin, 2018, p.9). The data

collection process included semi-structured interviews, a survey questionnaire and expert reviews.

A thematic analysis of the qualitative data was conducted using Atlas.ti – a computer assisted qualitative data analysis (CAQDAS) tool (Terry et al., 2017; Adelowotan, 2021). Data analysis and expert reviews resulted in the revision of the preliminary compliance framework. Owing to its relevance in the IS literature (Venkatesh, Thong and Xu, 2016), this study used the framework proposed by Weber (2012) to evaluate the revised framework. A finalised framework and related descriptive statistics in the form of bar graphs and pie charts was presented following an expert evaluation process.

## **1.6 Delimitations of the study**

The study focuses on public sector organisations that form part of Schedule 3 Part A of the PFMA in South Africa (i.e. non-profit-making agencies such as board(s), commission(s), authorities, fund(s) etc.) and only those that operate on the national level of government, rather than the provincial and local government layers. Government departments, the provincial and local government layers of governance, state-owned enterprises and institutions established under Chapter 9 of the Constitution of the Republic of South Africa were excluded.

Owing to the design of IT governance and its focus on the strategic aspect of management, participants in this study were drawn from executive and middle management layers of the case organisations. This was necessary to derive good insights relating to CGICTPF adoption and use decisions.

## **1.7 Research contribution**

Taking the above into consideration, the main contribution of this study is to improve corporate governance in the public sector by developing a compliance framework for rationalising and optimising the influence of IT governance adoption and use on corporate governance in South African state-owned entities.

**Practitioners:** IS research needs to be relevant to managers, consultants and other practitioners (Hirschheim and Klein, 2012). In particular, this study sought to assist state-owned entities to meet their compliance obligations in relation to IT governance. This was done by addressing the following aims of this study:

- (a) To identify the factors that influence IT governance use in state-owned entities
- (b) To determine how public sector characteristics affect IT governance use
- (c) To develop a compliance framework for rationalising and optimising the influence of IT governance adoption and use on corporate governance in South African state-owned entities.

This will be useful in assisting policymakers to determine the key areas of focus for immediate action, with the purpose of improving IT governance controls in state-owned entities.

**Theoretical:** This contribution seeks to address the gap in IS literature in relation to research targeting the adoption and use of the CGICTPF in state-owned entities. The researcher is not aware of a compliance framework that has been developed to theorise the adoption and use of the CGICTPF, nor is the researcher aware of any studies that have explored the implications of the mandated adoption and use of IT governance in public administration. Finally, one of the constructs of the compliance framework in this study is information quality, which is a novel addition to IT governance research in the public sector context.

In addition to the above theoretical contribution, the research relevance of this study also lies in its generalisability. The standard and frameworks that underpin the CGICTPF – which is the phenomenon explored in this study – are internationally recognised and used. Therefore, the factors that constitute the proposed compliance framework are applicable to more than just the South African context. This notion of general applicability is enhanced owing to those factors of the compliance framework being anchored on literature sourced from reputable databases.

The recommendations of this study are categorised according to their applicability to practice, the case organisations themselves and future research. The key recommendations include an appropriately established government chief information officer (GCIO) office as an agency of government to provide adequate support and oversight for a mature implementation of the CGICTPF, updating the CGICTPF, strengthening the IT governance officer (ITGO) role, establishing a universal public sector-wide IT risk universe, adopting and implementing the skills framework for the information age (SFIA), improving board composition and board-level IT governance competencies, and establishing interoperability requirements, principles, standards and architecture.

## 1.8 Thesis chapters layout

This thesis consists of five parts and ten chapters. For ease of reference and navigation a diagrammatic representation of the narrative below appears at the beginning of each chapter:

- ***Introduction***

There is only one chapter in this part, chapter 1. ***Chapter 1*** gives the contextual background of this study, including the problem statement, research questions, research objectives and research contribution, as well as a general overview of the methodological approach that was adopted.

- ***Theoretical section***

This part consists of five chapters. ***Chapter 2*** presents a logical and historical outline of the emergence of IT governance as a concept, and the relationship between IT governance and the IS discipline is explored within the context of the development and evolution of the IS discipline. The interrelatedness of IT governance practices and corporate governance is explored from the perspective of corporate governance codes of practice which led to the institutionalisation of corporate governance in business throughout the world. ***Chapter 3*** presents an in-depth review of the literature with a specific focus on the role of IT governance in the public sector in South Africa, drawing from the international frameworks that underpin the CGICTPF. This chapter further explores the drivers of public sector IT governance adoption and use, and the manner in which IT accrues public value for public sector organisations. ***Chapter 4*** presents a discussion on how theory guides the process of formulating research questions and influences the research concepts, design and results. The chapter further entails a delineation of the two IS adoption and use theories – the TOE framework and DeLone and McLean IS success model – which are applied to develop a compliance framework that is the major contribution of this study. ***Chapter 5*** identifies the constructs and propositions of the preliminary compliance framework and articulates its utility. ***Chapter 6*** presents the research design and methodology that was relied on for a structured way of conducting this study. The research design aspects in this chapter cover the research paradigm, research reasoning approach, methodological approach and strategy. A further discussion ensues in relation to the research sites – the case organisations from which data was collected using the specified preferred methods.

- ***Empirical section***

This part consists of two chapters. **Chapter 7** presents the data analysis for this study arranged according to the three research sub-questions. In order to meet the objective of triangulating the data from interviews, the survey and later the expert reviews, this chapter presents qualitative interview data and descriptive statistical data from the survey under corresponding themes. The survey data is presented in the form of bar graphs that depict respondents' responses in percentages using a Likert scale. This data is further triangulated with expert reviews explicated in chapter 9. **Chapter 8** presents a synthesis of the empirical and theoretical analyses. The theory from the literature is triangulated with the empirical analysis in chapter 7 since the empirical analysis is structured according to the research sub-questions and the framework constructs. This chapter presents a discussion of the results based on the propositions associated with each of the framework constructs that were introduced in Chapter 5.

- ***Evaluation***

This part consists of one chapter. **Chapter 9** presents the evaluation of the preliminary compliance framework through expert reviews. The framework was evaluated by a total of ten experts drawn from academia and industry – six from academia and four from industry. The expert reviews were based on a questionnaire with seven questions and a long-form, open-ended text field for answers. The questionnaire is based on Weber's (2012) framework and criteria for theory evaluation. The questionnaire was designed using GoogleForms and was administered online using a URL sent to the experts via email.

- ***Conclusion***

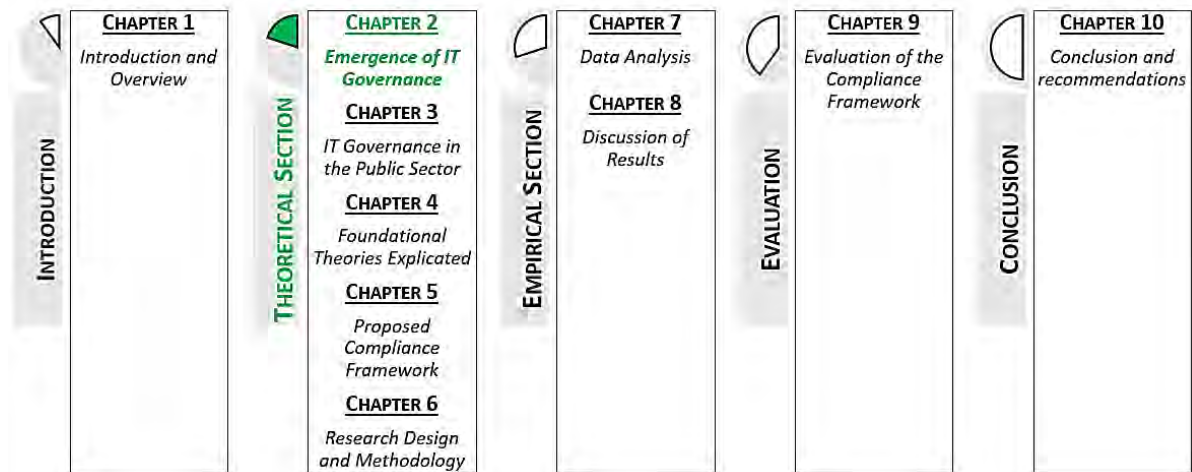
The final part consists of one chapter. **Chapter 10** reiterates the design of this study and emphasises the contribution it makes – which is primarily the compliance framework for IT governance adoption and use by state-owned entities in South Africa. The compliance framework is derived from theory, literature and empirical evaluation. Further, key findings, conclusions and recommendations of this study were discussed in this chapter. The recommendations were categorised according to their applicability to practice, case organisations and future research.

# **THEORETICAL SECTION**

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# 2

## Emergence of IT Governance



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## **2.1 Introduction**

This chapter presents a sequential historical outline of the emergence of IT governance as a concept in order to enhance the contemporary understanding of the adoption and use patterns of IT governance. This is an important undertaking as it provides context for the growth of, and the present gaps in, IT governance adoption and use. The key drivers of IT governance adoption are explored which include improving organisational controls and business process innovation. These key drivers remain relevant for contemporary organisations.

In addition, the relationship between IT governance and the Information System (IS) discipline is explored within the context of the development and evolution of the IS discipline. The interrelatedness of IT governance practices and corporate governance is explored from the perspective of corporate governance codes of practice, which led to the institutionalisation of corporate governance in business throughout the world.

## **2.2 Historical context**

Some researchers have stated that the concept of IT governance has been in existence since the early 1990s (De Haes, Van Grembergen and Debreceny, 2013). This view adds limited hermeneutic value to the evolution of the concept of IT governance because it has been noted in research since the 1960s (Brown and Grant, 2005; Coertze and Von Solms, 2014). The term “IT governance” was however first noted in the literature in 1991, as used by Venkatraman, who also provided the earliest description of IT governance as the means used by business and IT to navigate the use of IT-based systems for the optimal benefit of business (Da Silva et al., 2020). In 1992, the term was further used by Loh and Venkatraman (1992), and in 1993 by Henderson, Venkatraman and Oldach (1993). In both instances the authors used the term to “describe the set of mechanisms for ensuring the attainment of necessary IT capabilities” (Brown and Grant, 2005, p.698; De Haes, Van Grembergen and Debreceny, 2013). Later, in 1999, a different variation of the term was introduced with the use of “IS governance frameworks”, and the term “IT governance frameworks” gained prominence from thereon (Brown and Grant, 2005).

There are two key historical considerations that necessitated the emergence of IT governance:

### **2.2.1 Improved organisational controls around IT investments**

The emergence and evolution of IT governance is a direct response to and was necessitated by the need to improve controls in relation to IT-related organisational investments. The earliest research that addressed the concept of IT governance was conducted in 1963 in a study of 27 companies which had been using computers in their business operations (Garrity, 1963). Brown and Grant (2005, p.698) posit that Garrity “tackled the issue of IT governance, when he attempted to isolate the various organizational factors that lead to an increased return on technology investments”. This was an important development: it is the earliest indication of the locus of control in relation to IT governance, namely, the organisational management function beyond just the IT/IS department. However, it only addressed one component of IT governance in its contemporary form: monitoring (i.e. specifically monitoring of returns on IT-related investments) (International Standards Office, 2015a).

### **2.2.2 Business process innovation**

Brockhoff (2017) suggests that major elements of technology and innovation have contributed significantly to increased productivity in companies. Innovation has not only contributed to this productivity but also plays a role in influencing the survival of companies over time (Ortiz-Villajos and Sotoca, 2018). The various forms of innovation, which have been influenced by the application of IT/IS in companies from the 1990s, include “new products (or services), administrative innovations (improving internal control, coordination, and structure), and technical innovations (changes to technology or work processes) ... product innovations (‘the introduction of new products or services that shift or expand an organization's domain’) and process innovations (‘the introduction of new methods, procedures or responsibilities within existing domains’)” (Swanson, 1994, p.1071; Thong, 1999; Walker, 2006; Anand, Fosso Wamba and Gnanzou, 2013). Interestingly, by 1990 forward-thinking researchers were already noting the increasing influence of IT in organisations’ processes which resulted in more improved tactical, operational and strategic processes (Cooper and Zmud, 1990). To be clear, the value of technology in organisations was initially noted in the field of production technology (as opposed to information technology) where productivity improvements were realised as a result of incremental developments in automation (Loveman, 1994). This led to increased investments in research and development to create “technologies that process, store, transport and manipulate information” (Jonscher,

1994, p.14). Consequently, from a technological development perspective, the four stages of IT application emerged as explicated below and depicted in Table 2–1 (Jonscher, 1994):

- Stage 1 – **Processing**: numerical calculations, logical operations, sorting and related functions, almost all carried out in modern IT systems by means of integrated circuits.
- Stage 2 – **Memory**: storage of text, data, image or other information, usually in either integrated circuit memory or on rotating magnetic devices (disk or tape).
- Stage 3 – **Transmission**: communication of information between remote locations, using either a private telecommunications network or the services of telecommunications network operators.
- Stage 4 – **Input/output**: the interface between the IT system and the persons (or possibly machines) using it. The most common input device is a keyboard, and the most common output is a printer or the VDU screen.

Table 2–1: Four stages of information technology applications development (adapted from Jonscher, 1994)

STAGES OF INFORMATION TECHNOLOGY APPLICATIONS DEVELOPMENT				
Stage	1	2	3	4
Timing	1950s	1960s	1970s	1980s
Principal new application area	Scientific/mathematical	File handling	Remote working, networking	Personal computing
Principal new cost component	Processing	Storage	Communication	Input/output

In the 1990s, a correlation is noted between the rise in the use of IT by businesses and its influence on business process re-engineering and innovation (Anand, Fosso Wamba and Gnanzou, 2013), on the one hand, and the increasing prominence of IT governance processes during the same period on the other. During this time, IT emerged as a key enabler of process innovation, as companies took a process view of their operations and worked to attain efficiencies on key processes, using IT to improve their competitive advantage (Davenport, 1993). The main reason for IT to assume the crucial role of enabling business is that the use of IT had reached a phase of strategic importance in companies. Peppard and Ward (2016) developed a three-era model to provide a historical context for the evolution of IT use from

merely improving back-office efficiencies to influencing organisations’ competitiveness. In their model, Peppard and Ward (2016) define the three eras as shown in Table 2–2 below:

Table 2–2: Three-era model (adapted from Peppard and Ward, 2016)

PERIOD	ERA	CHARACTERISTICS
1960s	Data processing (DP)	<ul style="list-style-type: none"> <li>• Improved operational <b><u>efficiency</u></b></li> <li>• Automating information flows and processes</li> </ul>
1970s & 80s	Management information systems (MIS)	<ul style="list-style-type: none"> <li>• Increased management <b><u>effectiveness</u></b></li> <li>• Satisfying management information requirements for decision making</li> </ul>
1980s & 90s onwards	Strategic information systems (SIS)	<ul style="list-style-type: none"> <li>• Improved <b><u>competitiveness</u></b></li> <li>• Changing the nature and conduct of business</li> </ul>

Peppard and Ward (2016) and Galliers, Leidner and Simeonova (2020) accurately evaluated the era of IT strategic importance as encompassing the contribution of IT to the competitiveness of an organisation. This phenomenon, where IT use spread at a very high rate among people and organisations, was called *social sweep* (Swanson, 1994). Swanson (1994) further noted that “the widespread impacts of IS on the businesses it serves are increasingly acknowledged to be fundamentally strategic, as new information technology continues to progressively penetrate core business technologies” (p.1069). One of the key drivers of this social sweep was the increased use of interorganisational networks where “computer-to-computer exchange of formatted business documents such as purchase orders, invoices, and bills of lading” occurred (Jonscher, 1994, p.32). Interestingly, it was the public sector that fuelled the social sweep by

- mandating the adoption and use of interorganisational networks as standard practice by government agencies in the United States (US) (Jonscher, 1994), and
- promoting end-user computing within the Internal Revenue Service (IRS) when 14 000 revenue agents were issued with laptops in 1986 to conduct their field audits of corporate and individual tax returns (Pentland, 1994).

However, during this same period researchers did not foresee to the same degree how deeply dependent on IT many businesses would become in order to gain and maintain competitive advantage. As an example, Martinsons (1995) argued that IT was a critical enabler of business processes, but bizarrely undercut his argument by stating that IT was not a necessity to advance changes in business processes. This latter view was based on the experiences of some organisations who were unable to realise any tangible gains from their investments in IT (Allen and Morton, 1990; Venkatraman, 1994). In essence, some businesses were not able to show how the IT expenditure they accrued improved productivity. There are various reasons for this, key among them include mismeasurement of the real value of IT for quality improvements and customer service; the distributional versus productive use of IT as a marketing tool; and organisational efficiency in relation to exploiting information value (Loveman, 1994; Avgerou, 2000). Certainly, the world has changed considerably since the 1990s, and the proliferation of the internet, social media and digital penetration rates now mean that businesses would not gain competitive advantage if not reliant on IT for their core operations (Peppard and Ward, 2016).

During the 1990s, IT governance was conceptualised primarily as a management process which entailed “the policies, procedures and systems for the allocation of design-rights to the key decision makers both within the organization as well as external vendors and/or partners responsible for IT management” (Venkatraman, Henderson and Oldach, 1993, p.144). Based on this conceptualisation, IT governance can be considered to encompass both administrative and technical aspects of business process innovation in organisations. This, as a response to the increasing IT-related investments that organisations were making. Thus, the correlation is established: the use of IT as a strategic enabler of business grew in tandem with IT governance considerations, as business management involvement in IT-related decision-making increased owing to rising IT-related investments.

## **2.3 IT governance and the IS discipline**

### **2.3.1 Difference between IT and IS**

This study is located within the Information Systems (IS) discipline, instead of other recognised computing disciplines such as Computer Science (CS), Software Engineering (SE) and Computer Engineering (CE) (Topi, 2019). Therefore, it is important to explicate the rationale that IT governance is one of the sub-fields within the IS discipline. This process

necessitates a deeper exploration of the IS discipline and the concepts that underpin it. In order to adequately cover all bases, one must first draw a distinction between the concepts of Information Systems (IS) and information technology (IT). While interrelated and sometimes used interchangeably, these two concepts are different. Any analysis that discounts the fundamental difference between the two concepts is likely to result in flawed conclusions.

This study adopted the following definitions of IT and IS: IT refers to “hardware, software, and telecommunications networks”; and it “facilitates the acquisition and collection, processing, storing, delivery, sharing and presentation of information and other digital content” (Peppard and Ward, 2016, p.3). Often, the term IT is used interchangeably with information and communications technology (ICT) to account for the merging of computing with telecommunications, as is the case in most organisations (DPSA, 2016; Peppard and Ward, 2016). IS, on the other hand, refers to the process by which humans interact with technology in order to “gather, process, store, use and disseminate information” (Peppard and Ward, 2016, p.3).

Peppard and Ward (2016) and Jonathan, Rusu and Perjons (2020) take the discussion about the distinction further by noting that the use of the term “digital” should also be considered when delineating the relationship between IT and IS, and that its (i.e. digital) relationship with the IT and IS concepts should be properly situated. Consequently, the term “digital” encompasses how IS leveraged in conjunction with IT capabilities to meet the needs of organisations and other social actors (Peppard and Ward, 2016; Jonathan, Rusu and Perjons, 2020). Further, the digital era is notable for the merging of human experience with technologies, such that it is difficult to conceive of and defend their separate existence (Boell and Cecez-Kecmanovic, 2015b). This is premised on “relational ontology according to which human beings, technologies and things, do not preexist with inherent properties but instead exist and acquire their properties only in relations” to each other (Boell and Cecez-Kecmanovic, 2015b, p.4965).

### **2.3.2 The evolution and present state of the IS discipline**

Prominent IS researchers have documented key events that mark the historical development and evolution of IS as a discipline. One such attempt emphasised the significance of the founding of the International Federation for Information Processing (IFIP) and the Association for Information Systems (AIS) in advancing the IS discipline (Davis, 2006; King and Galletta,

2010; AIS, 2021; Skinner, 2021). Another attempt offered a more comprehensive analysis of the eras, IS schools of thought, technological development and research themes that influenced the growth of the IS discipline (Hirschheim and Klein, 2003; 2012).

According to Davis (2006), who was instrumental in the conceptualisation, development and advancement of the IS discipline in the US (Hirschheim and Klein, 2012), some of the key events that facilitated the international appeal and character of the IS discipline include the following:

*1) The formation of the IFIP and its Technical Committee TC8 (Information Systems)*

The IFIP is a global non-profit federation of societies of IT professionals. It is recognised by the United Nations and other world bodies. The main aim of the IFIP is “to achieve the worldwide professional and socially responsible development and application of information and communication technologies” (IFIP, 2021a). The Federation represents IT societies from 38 countries/regions with a total membership of over 500 000, linking more than 3500 scientists from academia and industry. The first IFIP Council Meeting was convened from 16–17 June 1960 under the auspices of UNESCO and was attended by representatives of IT societies in Belgium, Denmark, France, Germany, Japan, Spain, Sweden, Switzerland, the United Kingdom (UK) and the US (Speiser, 1960). Representatives from Canada, Czech Republic, Slovakia, the Netherlands and the former USSR were not able to attend. The structure of the IFIP includes technical committees and working groups: TC8 is the technical committee responsible for IS. The overarching objective of TC8 is to “promote and encourage interactions among professionals from practice and research and advancement of investigation of concepts, methods, techniques, tools, and issues related to information systems in organisations” (IFIP, 2021b). TC8 international conferences were instrumental in facilitating crucial discussions and understanding among IS researchers regarding the IS discipline research paradigm. As of 2021 TC8 has 12 working groups:

- WG8.1 – Design and Evaluation of Information Systems
- WG8.2 – The Interaction of Information Systems and the Organization
- WG8.3 – Decision Support
- WG8.4 – E-Business Information Systems: Multidisciplinary Research and Practice
- WG8.5 – Information Systems in Public Administration

- WG8.6 – Transfer and Diffusion of Information Technology
- WG8.8 – Smart Cards
- WG8.9 – Enterprise Information Systems
- WG8.10/6.12/2.14 – Service-oriented Systems
- WG8.11/11.13 – Information Systems Security Research
- WG8.12 – Industrial Information Integration

The English language was adopted as the language for the IFIP, considering that it remains the dominant language for international commerce, research and education in many fields. To moderate the benefits of the dominance of the English language, it should be noted that this dominance comes at a cost. The proliferation of the English language and its use in the South African context was forged by acts of colonialism and the resultant decimation of indigenous languages and culture (Welch, 2018); hence the call for the Africanisation of the IS discipline (Kroeze, 2019).

2) *The founding of the International Conference on Information Systems (ICIS)*

Up until the founding of the ICIS in 1980, there was “no general, well-accepted, high quality information systems conference” that pulled IS researchers together from the various disciplines to which they belonged at the time, such as “management science, operations research, and decision sciences” (Davis, 2006, p.20).

3) *The founding in 1995 of the AIS with an international governance structure*

A poll taken among those attending the ICIS in 1989 showed that views on the formation of an global organisation that was exclusively dedicated to the academic field of IS were evenly split (Davis, 2006). However, ongoing discussions among academics eventually resulted in the formation of exactly such an organ in 1994, the AIS, with 1000 charter members (Ping Zhang, 2015). In 2001 the ICIS and AIS merged. AIS journals are regarded as high quality journals that provide for communications about IS pedagogy, curriculum and other IS research-related issues (Davis, 2006). The current journal collection of the AIS includes the following: *Journal of the Midwest Association for Information Systems (JMWAIS)*, *The Journal of the Southern Association for Information Systems (JSAIS)*, *Latin American and Caribbean Journal of the AIS (RELCASI)*, *Scandinavian Journal of Information Systems (SJIS)*, *Journal of the Association for Information Systems (JAIS)*, *Communications of the Association for Information Systems (CAIS)*, *AIS Transactions on*

*Human-Computer Interaction (THCI)*, *AIS Transactions on Replication Research (TRR)*, *Pacific Asia Journal of the Association for Information Systems (PAJAIS)* and *MIS Quarterly Executive (MISQE)* (AIS, 2021). A comprehensive timeline of the history and development of the IS discipline is currently being documented under the auspices of the AIS. The timeline focuses on the major influences on the IS discipline emanating from journals, conferences, universities, awards and associations (Skinner, 2021).

Hirschheim and Klein (2012) provided a more comprehensive account. In the first instance they put forward a useful debate about the schools of thought that have defined the IS discipline since its emergence. It is interesting to note that the socio-technical school of thought that was developed in the 1960s maintains a strong relevance in current IS research and is fundamental to the conceptualisation of the IS artefact (Boell and Cecz-Kecmanovic, 2015a; Kroeze, Travica and Van Zyl, 2019). Additionally, it is the preferred view of the IS discipline in this study. A summary of the IS schools of thought is presented in Table 2–3 below:

Table 2–3: IS schools of thought (adapted from Hirschheim and Klein, 2012)

<b>IS SCHOOLS OF THOUGHT</b>		
<b>#</b>	<b>Concept</b>	<b>Origin/Source (Hirschheim and Klein, 2012)</b>
1	Datalogical and infological systems	In the 1960s, Börje Langefors “developed a set theoretical representation of IS that embraced set transformations and metrics ...”. The basic idea of this approach was to differentiate between an “infological problem” (i.e. determining what information the system should provide in order to satisfy users’ information needs) and a “datalogical problem” (i.e., determining how the information and system should be structured using IT)” (Hirschheim and Klein, p.198).
2	Reporting and control systems	In the late 1960s, Sherman Blumenthal theorised IS “primarily as a modular, incremental design strategy for building reporting and control systems on top of transaction-based systems” (p.200).
3	Socio-technical systems	In 1965, Emery and Trist “contended system thinking was technical in nature and could not explain the impacts of systems on the work environment. They argued that in order to better understand the complete picture, one needs to also look at the social dimensions of the system. They used the term “social-technical system” (STS) to capture the need to consider jointly social and technical issues in systems design” (p.199).
4	Formal specified technical systems	In the 1970s, Daniel Teichroew developed a “computer-based information processing systems by using the computer itself in the

		process, and by applying management science and systems theory techniques to the problem” (p.198).
5	Inquiry systems	In the early 1970s, C. West Churchman proposed that to “conceptualize a problem, one has to conduct an inquiry. This inquiry will address the nature of the problem and will collect information about the problem” (p.198).
6	Behavioural systems	In the late 1970s, Gordon Davis and Gary Dickson’s “ interest in IS analysis and the behavioral aspects associated with it led them to conceive a series of laboratory experiments to develop a knowledge base about IS specifically on the topic of the relationship between the decision, the decision maker, and the IS supporting the decision” (p.200).
7	Human activity systems	In 1972 and 1981, Peter Checkland introduced “his famous Soft System Methodology (SSM) ... a learning system that provides a way of conceptualizing the social processes that a particular group of people is involved in within a particular organizational context. It stresses the importance of differentiating the various meanings attributed by individuals to the same phenomena” (p.199)

Further, Hirschheim and Klein (2012) categorised the developments in the IS discipline into four eras. In each of the eras key developments are presented, including the attendant technology developments and research themes. This categorisation has made it easier to interact with and formulate a clearer understanding of the growth of the IS discipline. A summarised adaptation of the eras is presented in Table 2–4 below:

Table 2–4: Summary of eras of the IS discipline (adapted from Hirschheim and Klein, 2012)

<b>FOUR IS DEVELOPMENT ERAS</b>				
#	<i>Eras</i>	<i>Management/ Governance</i>	<i>Technology</i>	<i>Research Themes</i>
1	<b>First era</b> (mid-1960s to mid-1970s)	Centralisation; IS reporting relationship under control of Accounting	Third-generation mainframe (IBM 360) Languages: Assembler, Fortran, COBOL; Database; Ethernet	Decision support systems; human–computer interaction; early frameworks; sceptics; stages of growth of IS; what is the real value of IS?
2	<b>Second era</b> (mid-1970s to mid-1980s)	Steering committees; user-led IS development projects	Minicomputers; mid-range computers; PCs; Fifth Generation Computer project	New frameworks; defining the field; impact of IS success; competitive advantage; IT & organisational change; IS in the public sector; participative design
3	<b>Third era</b>	Departmental computing/	Internetworking leading to the	IT productivity/economic performance; IT value;

	(mid-1980s to mid/late 1990s)	decentralisation; emergence of the CIO	emergence of the Internet	technology acceptance; GDSS (Arizona and Minnesota); Process-based view of IT implementation; outsourcing; aligning IT strategy with organisational strategy
4	<b>Fourth era</b> (late 1990s to today)	Management of widely distributed technologies and personnel (including offshore vendor staff)	Internet Age; ubiquitous computing (laptops, netbooks, tablets, smartphones, etc.); search engines; social media	Adoption of internet/e-commerce; globalisation and cross-cultural studies; IT in developing countries; virtual teams; knowledge management; IT personnel; business intelligence; IS research productivity; design science; IS journal practices and ratings; new disciplinary frameworks <i>Discipline critiques:</i> - Is there a future for the field? - Relevance vs rigour

As can be gleaned from the above historical background, the four eras of the evolution of the IS discipline are aligned to the three eras of IS development as articulated by Peppard and Ward (2016). Since IS addresses the interaction between social actors and technology it became necessary for researchers and practitioners to adopt a socially inclusive view of IT use (March and Niederman, 2012). The social aspects distinguish the IS discipline from disciplines such as Computer Science and Software Engineering which are focused on technology (Avgerou, 2000). The recognition of the social aspect of the successful use of IT in organisations precipitated tensions between researchers in the technology-focused disciplines such as Software Engineering and those from Management Sciences – from which some of the earlier IS research emanated (Avgerou, 2000; Abedin, Jafarzadeh and Olszak, 2021).

The IS discipline found resonance in industry, as IS practitioners better understood the broader organisational objectives and challenges, and were skilled in facilitating the development of information and communication technologies as an enabler of business processes to meet its strategic objectives (Avgerou, 2000). IS researchers grappled with the idea of defining the character/identity of the IS discipline so as to improve its scholarly appeal beyond its industry relevance and utility. However, lingering doubts remained about the “fluid discipline identity” and maturity of IS as a discipline (Avgerou, 2000; Teo and Srivastava,

2007, p.518; Hirschheim and Klein, 2012). Below, the following central question is discussed: holistically, what should be considered to be a fundamental requirement for defining an IS discipline?

### 2.3.2.1 *What makes an IS discipline?*

In order to adequately address this question it is important to clearly identify the parameters of a discipline, and then to explicate the conceptualisation of the IS discipline within those parameters. To this end, Teo and Srivastava (2007), using organisational theory as a lens, proposed a framework with discipline parameters compartmentalised primarily as constitutive and contextual in nature. The framework draws from varying perspectives put forward by IS researchers. Some researchers have approached the question of the IS discipline from perspectives such as “what it consists of”, “what it does”, “who are its stakeholders” and “how it is forged” (Teo and Srivastava, 2007, p.519). The framework parameters help with conceptualising the IS discipline from an epistemological perspective, and answer six fundamental questions about the IS discipline: contextual (why, when and where) and constitutive (what, who and how) (Teo and Srivastava, 2007). The contextual aspects address the following: *purpose* – the reasons for the existence of the IS discipline and its identity; *period* – the time period of the relevance, survival and growth of the IS discipline; and *place* – the extent of the applicability of the IS discipline regardless of geographic locale (Teo and Srivastava, 2007). Much of the contextual aspects has been discussed in the preceding sections. The constitutive aspects address the declarative and procedural dimensions of the IS discipline. Primarily, the focus is on the following:

- *Periphery* – considers the topics studied in the IS discipline which explain *what* the IS discipline is about and what IS research should include or restrict in order to secure its long-term survival and growth. The question considered by IS researchers was on the locus of IS research and whether it should be “restricted to the IT artefact as the prime component or can be extended to include IT and its related relevant (to the business, organization, and society) contexts, structures, and tasks as the prime phenomenon” (Teo and Srivastava, 2007, p.522). Teo and Srivastava (2007) argued that IS researchers should have the latitude to decide the agenda for their research as long as their research topic is “academically and practically relevant, and serves to prevent commoditization of IS” (p.522). This study is aligned to the notion that the research agenda of any IS researcher should not just focus on the IT artefact; it must include related contexts, structures and

tasks and must create an impact on business, organisation and society (Teo and Srivastava, 2007).

- *Perspective* – considers the key stakeholders of the IS discipline *whose* perspectives shape the character of the discipline. Internal stakeholders include IS academics and IS practitioners (Teo and Srivastava, 2007). External stakeholders include academics from other disciplines, deans of business schools and relevant faculties, non-IS practitioners and funding agencies (Teo and Srivastava, 2007). Internal stakeholders typically need the freedom to choose their research agenda for maximum impact. However, they need to do this in a way that caters to the needs of external stakeholders such as choosing research topics that advance the interests of such stakeholders, following the accepted methodology and publishing within the guidelines that generate profit for their organisations (Teo and Srivastava, 2007). The needs of all stakeholders should be balanced fairly for the IS discipline to continue to survive and grow.
- *Process* – considers the process of forging the identity of the IS discipline. This process is based on four sub-processes: copy (i.e. replicating existing discipline structures to make the discipline acceptable to the academic community by demonstrating the sameness), consolidate (i.e. systematically developing a cumulative tradition for the discipline which surfaces in the form of grounded theories, rules, laws, axioms and principles), differentiate (i.e. demonstrate its uniqueness from parent discipline(s)), and demonstrate (i.e. communicating the value it adds to the body of learning and practice) (Teo and Srivastava, 2007).

### 2.3.2.2 *Interdisciplinary character of the IS discipline*

IS researchers are still debating the exact nature of the IS discipline identity, the consensus view being that the IS discipline suffers from a crisis of identity, as the identity of the IS discipline remains “fluid” (Avgerou, 2000; Cecez-Kecmanovic, 2002; Teo and Srivastava, 2007; Córdoba, Pilkington and Bernroider, 2012; Hirschheim and Klein, 2012; Lee, Thomas and Baskerville, 2015). This uncertainty about the identity of the IS discipline has raised concerns about its survival, with one researcher noting that the possibility cannot be dismissed that the IS discipline could be merged into other disciplines (Hirschheim and Klein, 2012). Other researchers, as observed by Hirschheim and Klein (2012), noted that deans of business

schools claim that there is no need for a separate area of IS study since IS within organisations exists as a support function for other organisational units such as Finance, Management and Marketing. Other researchers welcome the fluidity of the discipline as a strength as it allows for flexibility and variety in responding to new challenges and opportunities without restricting researchers to hardened boundaries of what constitutes IS knowledge (Teo and Srivastava, 2007; Córdoba, Pilkington and Bernroider, 2012).

The roots of the IS discipline inform much of its current “fluid” identity. The discipline is widely considered to be interdisciplinary, meaning that it draws insights from other disciplines and integrates them but remains distinct from its reference disciplines (Avgerou, 2000; Kandjani and Bernus, 2013; Kroeze and Van Zyl, 2014). An interdisciplinary approach requires that the object of research be multifaceted and must cohere (Newell, 2001; Welch, 2018). A discipline is considered to be interdisciplinary if its multifacets require integration, in addition to coherence; otherwise multidisciplinary may suffice as an appropriate approach (Newell, 2001; Welch, 2018). Other attributes of IS interdisciplinarity include collaboration by researchers from various disciplines as the IS research objects are considered complex phenomena which cannot be addressed within a single discipline, and require integrating and synthesising various insights into the new discipline (Newell, 2001; Kroeze and Van Zyl, 2014; Welch, 2018). The diverse reference disciplines from which the IS discipline draws insights justify the multifaceted nature of the IS discipline (Kandjani and Bernus, 2013).

The process by which the IS discipline achieves its interdisciplinary nature has been analysed from two different perspectives that are complementary and enrich the understanding of the evolution and current state of the IS discipline. Firstly, using institutional theory, Teo and Srivastava (2007) observed that there are four fundamental processes through which the IS discipline is evolving and maturing its identity: copy, consolidate, differentiate and demonstrate (see Figure 2–1 below):

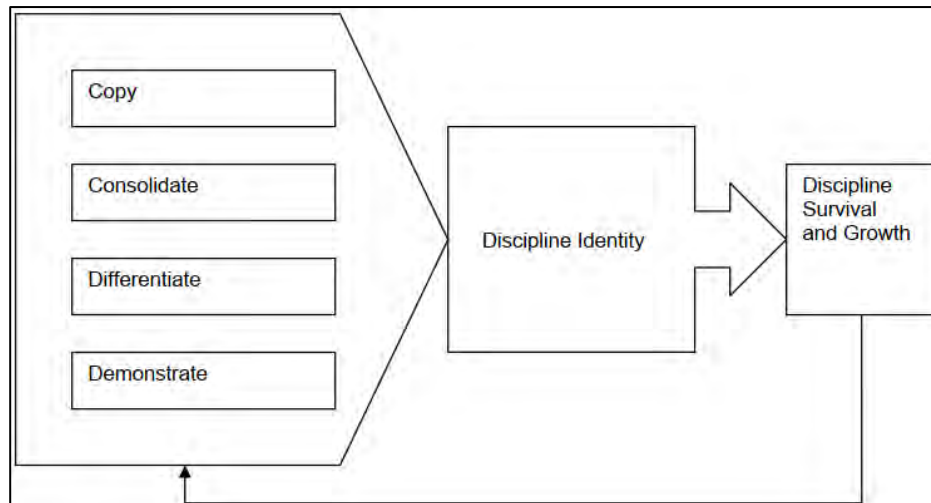


Figure 2–1: IS discipline identity process (Teo and Srivastava, 2007)

Secondly, Córdoba, Pilkington and Bernroider (2012) proposed stages of IS discipline development using Abott’s notions of discipline development. The stages of the IS discipline growth entail the following: 1) *Differentiation* – a discipline claims “jurisdiction” (i.e. territory or ownership) over specific problem areas that are being vacated by others. Their study found the existence of different clusters in co-citations where weak connections between clusters represented distinctions originating to and from several distinctive journal articles or book; 2) *Competition* – the different distinctions made about problem diagnoses and treatments generate competition within and between disciplines. Their study concluded that there were clusters of co-citations connected to articles or books which had intra-connections from a previous period. They suggested that the strength of intra-cluster connections indicated a set of prominent distinctions (i.e. collaboration or dispute between IS groups) used by a particular group in IS to protect or expand their current jurisdiction. 3) *Absorption* – this stage manifests itself when one set of distinctions and the connections between them absorbs or ingests others which were previously their competitors.

Córdoba, Pilkington and Bernroider’s (2012) study used bibliographic citation and co-citation analyses of the *Management Information Systems Quarterly* (MISQ) and *European Journal of Information Systems* (EJIS) journals, both of which are from the AIS basket of journals and are highly regarded (Córdoba, Pilkington and Bernroider, 2012). The data was analysed in three five-yearly tranches of citations between 1995 and 2008. A summary of key findings from Córdoba, Pilkington and Bernroider’s (2012) study show that during the first period (i.e. 1995–1999) the IS discipline pushed the boundaries of knowledge by linking both technology and people aspects to the successful use of IT, thereby claiming ownership of

issues which were traditionally associated with disciplines such as Management Science and Computer Science. During the middle period (i.e. 2000–2004) the data shows further differentiation and some signs of internal competition within the IS discipline. The IS discipline provided alternative diagnoses and treatments for organisational themes related to IS adoption and use. In addition, there was a surge of qualitative and interpretive IS research output with research approaches that used qualitative data analysis, as well as building of theory from case studies. However, internal competition ensued in relation to how people adopt and use IS in organisations. One stream of research espoused sociological theories and another cognitive theories to explore the design, adoption and use of IS by people in organisations. This period also saw the expansion of IS research in areas such as IS diffusion, investment decisions, success, satisfaction and acceptance. For the last period (i.e. 2005–2008) the data showed strong absorption traits of the IS discipline. IS acceptance, as an update to IS success/satisfaction, was more dominant in IS research that was aimed at exploring IS/IT effectiveness, but maintained its links to the diffusion of innovation (DOI) theory and the DeLone and McLean success model. While continuously expanding, the IS discipline can be argued to still be in a stage of absorption while distinctly positioned to advance the adoption and use of IS in organisations (Córdoba, Pilkington and Bernroider, 2012).

### **2.3.3 Socio-technical character of the IS discipline**

Over the years the IS discipline has adopted a broad epistemological range that includes the “science of the social, the economic and the socio-technical” (Willcocks, Sauer and Lacity, 2015, p.7). It is important to note that this study is premised on the socio-technical view of the IS discipline. It holds that the IS discipline is concerned with “more than just the technological system, or just the social system, or even the two side by side” (Lee, 2001, p.iii), but with the “rich phenomena that emerge whenever the technological and the social come into contact with, react to, and transform each other” (Lee, 1999, p.v). This understanding is underpinned by the concepts of systems theory and systems thinking<sup>1</sup>.

The IS literature is replete with definitions of IS. These wide-ranging definitions are as a result of researchers approaching the conceptualisation of the IS discipline from different

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<sup>1</sup> See Appendix P for a presentation of key General Systems Theory concepts

points of view. However, a wide range of definitions could also be an indication of a crisis relating to a “fluid” discipline identity (Teo and Srivastava, 2007). To help address this concern, Boell and Cecez-Kecmanovic (2015b) synthesised a total of 34 IS definitions from the IS literature and proposed that those definitions could be conceptualised into four main views, namely:

#### 2.3.3.1 *Process view*

This view emphasises that “IS are related to the particular information processing activities they perform and support” (p.4961). The utilitarian role of IS includes premised processes such as “using, storing, creating, exchanging, communicating, collecting, disseminating, transmitting, manipulating, providing, retrieving, etc. which are all associated with activities that are supported, facilitated or enabled by an IS” (p.4963). This view has attracted criticism for lacking critical assessment of the broad organisational context that underpins these processes; and it does not adequately consider the role of social actors in performing these processes using technology.

#### 2.3.3.2 *Technology view*

This view emphasises the importance of IT in an organisation by focusing on hardware, networks and software over all other aspects (p.4961). A key criticism of this view is that by preferring the IT artefact as the dominant object of focus, it undermines the impact of other aspects of IS such as the social actors’ influence in the investment decisions and the use of IT in organisations. Research related to this view is largely premised on IT adoption in organisations, the relationship between IT investments and organisational performance, and IT success.

#### 2.3.3.3 *Social view*

This view emphasises the absolute importance of social actors and their ability to create, share and interpret information and associate meanings with IS. It asserts that IS and their meanings and use are socially determined in that it is humans who “use IS, interpret information generated by the system, create meanings and undertake actions” (p.4962). Further, this view notes that IS a human activity that “enables organizations to deploy IT to achieve their goals and, more importantly, set the goals themselves as part of strategies for future development” (p.4962). Much of the research generated under the social view focuses on the role of power

and IT, technology acceptance and human–computer interaction and usability (p.4963). A major criticism of this view is that it overestimates the assumption that the specification and use of technology is determined by organisational strategic objectives and processes, but undercuts the role that technology can play in driving business objectives, as is the case in some industries, such as the use of social media as a banking channel in the financial industry.

#### 2.3.3.4 *Socio-technical view*

The socio-technical view is the most promising among the views as it is closely modelled after real life, which is itself socio-technical (Kroeze, Travica and Van Zyl, 2019). This view emphasises the interaction between technology and social systems such that the resulting IS more than the sum of its parts (p.4961). A sociotechnical system includes “a technological artifact (such as a computer, cell phone, or car), plus the people, social customs, infrastructure, regulations, and protocols associated with that artifact” (Miller, 2013, p.57). Although this view is largely concerned with the emergent phenomenon during the development and implementation of IS, when technology interacts with social systems, it nonetheless assumes an ontological separation between the two (i.e. technology and social systems). That assumption is becoming gradually more difficult to sustain in the era of a digital revolution where the line of separation is increasingly blurred between the physical, digital and biological spheres (Schwab, 2016; Chatterjee et al., 2017).

The sociotechnical view is fundamental to the development of the IS discipline. It is considered as its “axis of cohesion” in that it has been a crucial contributor to the IS discipline’s distinctiveness and growth (Avgerou, 2000; Sarker et al., 2019). However, a review of leading IS journals for the period 2000–2016 revealed that much of IS research exhibited limited focus on the sociotechnical character of the discipline (Sarker et al., 2019). This is one of the factors that contributed to the “fluid” discipline identity of IS.

#### 2.3.4 **The IS artefact**

The key concepts of GST apply to the IS discipline; it is, after all, an Information *Systems* discipline. Lee, Thomas and Baskerville (2015) utilised GST to introduce the concept of an IS artefact as a deliberate departure from and to improve the relevance of the IT artefact in IS research. Other researchers picked up the baton and expressed supportive sentiments for and constructive criticism of the IS artefact (Alter, 2015; Iivari, 2017; Chatterjee et al., 2021). There are two main points that precipitate the need to define the IS artefact: (a) the IT artefact

has lost its meaning in IS research owing to its broad definition which was occasioned by Orlikowski and Iacono's observation in 2001 that there was a dearth of the IT artefact in IS research (Lee, Thomas and Baskerville, 2015). In a surge of subsequent publications researchers sought to close this gap, but did so by broadening the meaning of the IT artefact in order to account for IS-related aspects such as the social and organisational contexts (Lee, Thomas and Baskerville, 2015). The other point is that (b) "information" is a fundamental aspect of IS but it has received scant attention in the conceptualisation of the IT artefact, with the attention falling more on the technology aspect of IT (Lee, Thomas and Baskerville, 2015; Chatterjee et al., 2017).

The IS artefact is a system consisting of the following subsystems: the IT artefact, the information artefact and the social artefact (Lee, Thomas and Baskerville, 2015; Chatterjee et al., 2021). The IS artefact is named thus owing to its GST-influenced origins; it is greater than the sum of its parts and its "constituents are not separate, but interactive, as are any subsystems that form a larger system" (Lee, Thomas and Baskerville, 2015, p.12) (see Figure 2–2 below). These subsystems could be defined as follows: an *IT artefact* does not have to be about information and it could be "digital or electronic (such as a mobile phone, a Facebook page, a memory stick, a pdf file, and a hardware-software-data-network system) ... [and] non-digital and non-electronic (such as a face-to-face meeting, a billboard, a person's memory, a book, and a library)" (Lee, Thomas and Baskerville, 2015, p.11); The *information artefact* is an instantiation of information "through a human act either directly (as could happen through a person's verbal or written statement of a fact) or indirectly (as could happen through a person's running of a computer program to produce a quarterly report)" (Lee, Thomas and Baskerville, 2015, p.11); and finally, the *social artefact* is premised on relationships between individuals. The social artefact could include "persistent social objects that involve already established relationships (such as kinship structures, institutions, roles, cultures, and laws) as well as one-off ephemera in one-off interactions (such as an utterance in a conversation, a decision made in a committee meeting, a purchase made in a retail transaction, and a charitable act)" (Lee, Thomas and Baskerville, 2015, p.12). However, one researcher differed with Lee, Thomas and Baskerville's (2015) design-science-oriented conceptualisation of the IS artefact by criticising its usefulness as a unit of design (Iivari, 2017). The problem, as Iivari (2017) notes, is in the vast differences of the "designability" of the IS artefact's components. Instead, Iivari (2017) proposed that the IS artefact could be "helpful as an analytical concept to be used in

behavioural science research on the interplay of IT artefact, information artefact and social artefact” (p.753).

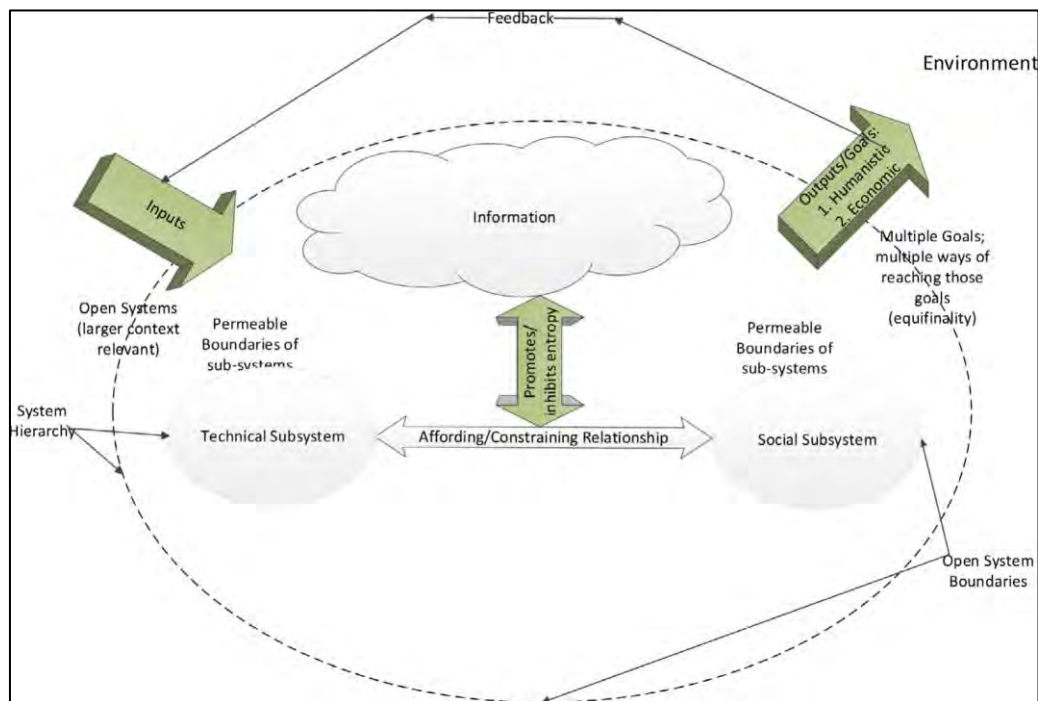


Figure 2–2: GST-inspired IS conceptualisation of an IS artefact (Chatterjee et al., 2017; 2021)

Chatterjee et al. (2021) further utilised GST key concepts to define four meta-principles that further illuminate the characteristics of the IS artefact (see Figure 2–2 above). The meta-principles contribute towards an improved understanding of the practical implications of the IS artefact, and are as follows (Chatterjee et al., 2021, p.559):

- *Meta-principle 1:* “the IS artifact is composed of inter-related and permeable subsystems combined in a holistic and synergistic manner”. An example of this when users require the IT to process data. The IT accepts input, processes it and provides the user with the required output.
- *Meta-principle 2:* the “IS artifact comprises of a purposive system that seeks multiple goals through multiple paths (multifinality and equifinality)”. An example of this is when an organisation embarks on innovation that may result in a new product or service. “There could multiple new products and services of the innovation system (multifinality) and there could also be multiple ways in which these new products and services are designed or implemented (equifinality).”

- *Meta-principle 3*: the “IS artifact is best represented by an open system that receives inputs from the environment and produces outputs for that environment”. The same innovation could “receive inputs from the environment (i.e., what new products or services do to the customers demand) and use it to produce those new products and services for the customers who are part of the outside environment”.
- *Meta-principle 4*: the “IS artifact is composed of mutually adaptable subsystems for promoting dynamic equilibrium and managing entropy”. An example of this is “when a new technology is adopted, users may be required to undergo special training to gain proficiency in using that technology”.

The preceding discussion raises an interesting observation: the IS/IT definitions could suggest that the concept of IT governance, at face value, appears to narrowly focus on technology to the exclusion of related IS aspects. It would seem it would have been more appropriate to label the concept “IS governance” instead of “IT governance”. To clear up this misconception, it is important to note that the concept of “IT” in IT governance literature is associated with the IT department and its functions in organisations and “is treated as a broad concept that encapsulates technical infrastructure, the supporting organizational structure, and IT management capabilities and processes” (Davis, 2006; Turel and Bart, 2014). Therefore, IT governance is exercised through IT management capabilities and processes in organisations.

### **2.3.5 The management of IS in organisations**

The social aspect where human and other social actors play a crucial role is the quality that differentiates the IS discipline from others. Therefore, the IS discipline has also been described as “the effective analysis, design, construction, delivery, *management* and use of information and information technology in organisations and society” [my emphasis] (Davis, 2006; Mukesh and Dixit, 2010, p.781; Boell and Cecez-Kecmanovic, 2015b). Thus, IS management is firmly placed as a subfield within the IS discipline. Some researchers note that management of IS was one of six core areas of focus in IS research which included: “IS research infrastructure, IS development, design science theories and research practices, *management of IS*, social and organizational IS research, and IS, globalization and developing countries” (Avgerou, 2000; Lee, 2015, p.20). IS management is primarily about “the formation of strategy regarding information systems, aligning information systems development with

business objectives, using IT to achieve desirable organisational change, [and] using IT to manage multinational corporations in the emerging global economy” (Avgerou, 2000, p.570). Davis (2006) later concurred by proposing that IS management in organisations encompassed “planning and co-alignment of information systems strategy and organisation strategy and the evaluation and justification of organisation investment in IS” (p.12).

An analysis of IS research in 2008 identified five core areas of research: “IS development, IT and individuals, IT and groups, IT and organizations, IT and markets” (Iivari, 2015, p.520). A recent analysis of IS research covering the period between 1984 and 2020 shows that IS management is further concerned with “core IS topics such as Information Systems Use & Management and Organizational Management & Performance”, including emerging topics such as “Artificial Intelligence and Data Analytics, Research Methods, and Social Media research” (Abedin, Jafarzadeh and Olszak, 2021, p.151). Viewed together, the above aspects of IS management provide a holistic view of IS management focus areas to date, but fall short of directly identifying IT governance as a key factor. Even though much of the contemporary IS management literature discusses key IT governance concepts such as IS strategy, alignment between IT and business objectives, IS use and organisational performance, the relationship between IT governance and IS management is not explored directly nor in any great detail. Herein lies a deficiency in the IS management literature. As an example, Abedin, Jafarzadeh and Olszak (2021) note that of the top 20 cited articles published in the *Information Systems Management* journal between 1984 and 2019, only three discussed IT governance directly. Even so, the phrase “IT governance” does not appear among the dominant themes in the *Information Systems Management* journal for the period 1996 to 2019 (Hirschheim and Klein, 2003; Abedin, Jafarzadeh and Olszak, 2021). Indeed, even in a study of highly cited IS research in the *Management Information Systems Quarterly* and *Information Systems Research* journals for the period 2009 to 2018, “IT governance” did not directly feature as a dominant theme (Hajiheydari, Delgosha and Talafidaryani, 2019). Therefore, it is appropriate to label IT governance research as still being in an emerging phase, in particular as it relates to the public sector.

This study does not distinguish between the terms “information systems management” and “management information systems”; it assumes that the meaning of these terms is interchangeable, much like the use of the terms “IS discipline” and “IS field” (Davis, 2006; Hirschheim and Klein, 2012). Indeed, in the early phase of the emergence of the IS discipline it was routinely labelled by various scholars as Management Systems, Management

Information Systems, Information Management, Management of Information Systems, Informatics, IT, IS and Information Science (Davis, 2006; Hirschheim and Klein, 2011; Galliers, Leidner and Simeonova, 2020). Over the years IS researchers developed various frameworks to explicate the concepts of IS management in organisations. One such framework is presented in Figure 2–3 below, and is premised on the broad themes of societal, economic and technology-related considerations (Rainer, Prince and Watson, 2013). Within these broad themes the framework explores the interaction between the business environment pressures, organisational performance responses, and the nature and level of IT support required.

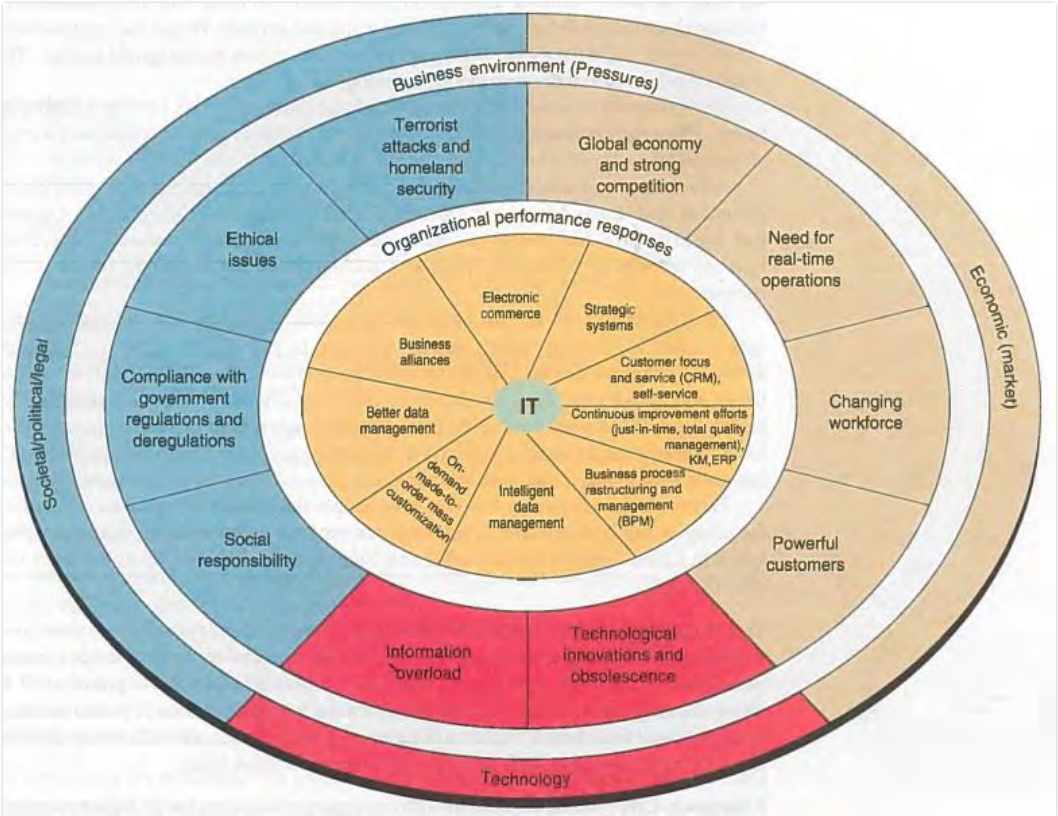


Figure 2–3: Management of Information Systems framework (Rainer, Prince and Watson, 2013)

Other IS researchers (Bidgoli, 2017; Laudon and Laudon, 2018) have premised their conceptualisations of IS management on closely related themes which are summarised in Figure 2–4 below:

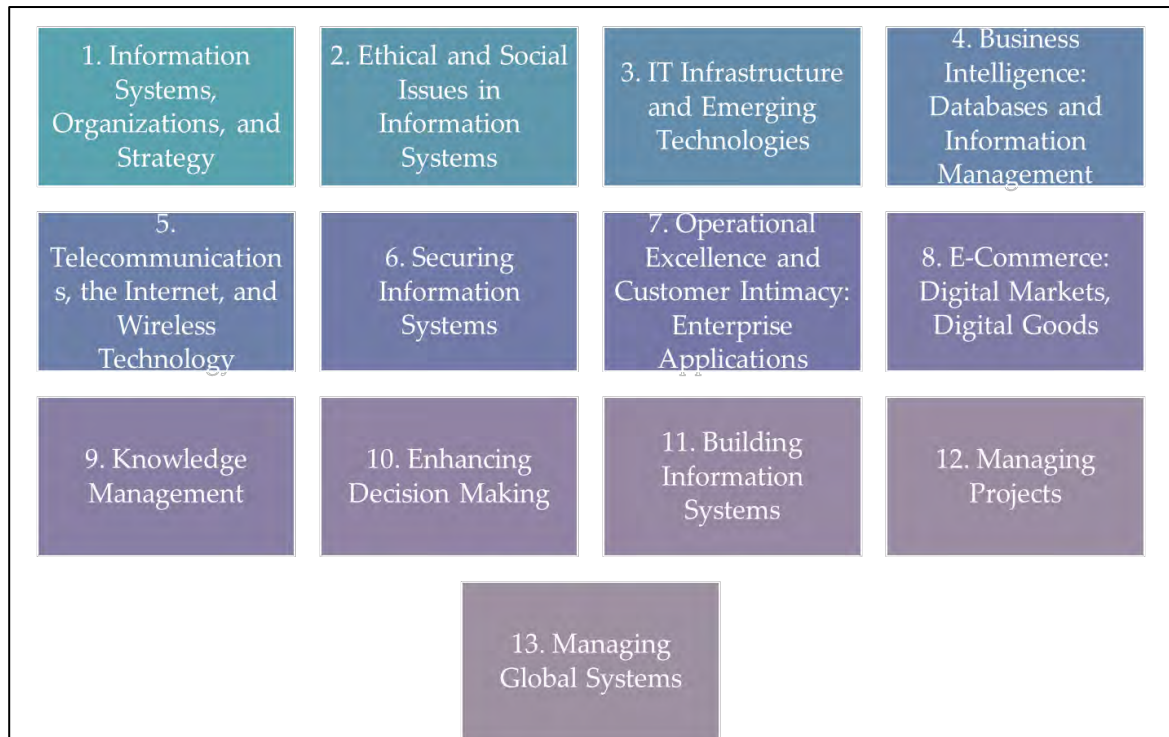


Figure 2–4: Management of Information Systems themes (adapted from Bidgoli, 2017; Laudon and Laudon, 2018)

As noted previously, whereas these themes address topics that are related to IT governance, they do not directly explore the correlation between IS management and IT governance, with the notable exception of Pearlson and Saunders (2013) and Peppard and Ward (2016), who, in their respective books, explored IT governance in a chapter titled *Governance of the information systems organization* and a section titled *IS/IT governance and why it is important*, respectively. This dearth of dedicated focus on IT governance emphasises the conclusion that scholarly IT governance research is still emerging.

Although IS management frameworks do not directly explore this relationship to a comparable degree of depth, the demonstration of the correlation between IT governance and IS management is proffered more boldly in the ISO 38500:2015 standard, Calder-Moir Framework and COBIT2019 – all of which are the leading and globally recognised IT governance standard, model and framework, respectively. All these IT governance resources are revisited and discussed in detail in Chapter 3. It is sufficient for now to note that the ISO 38500:2015 standard explores in depth the relationship between IT governance and management, both separately and combined.

## **2.4 IT governance and corporate governance**

IT governance is a core component of corporate governance (Weill and Ross, 2004; Juiz, Guerrero and Lera, 2014; De Haes and Van Grembergen, 2015b; Turedi and Zhu, 2019). In the 2000s, numerous serious financial scandals occurred which necessitated an improved focus on governance in organisations globally. That focus accelerated the adoption of IT governance as many organisations recognised IT governance as crucial for improving organisational controls.

### **2.4.1 What is corporate governance?**

Corporate governance is the system by which companies are directed and controlled (Cadbury, 1992). It is also conceived of as “the framework of rules, relationships, systems and processes within and by which authority is exercised and controlled within corporations. It encompasses the mechanisms by which companies, and those in control, are held to account” (ASXCG Council, 2019). The King Code of Corporate Governance is more direct, defining corporate governance as the “exercise of ethical and effective leadership by the governing body towards the achievement of the following governance outcomes: Ethical Culture, Good Performance, Effective Control and Legitimacy” (IoDSA, 2016). Corporate governance is an important mechanism for addressing agency problems in organisations where ownership and management interests do not align (Juiz and Toomey, 2015). In public service, conflicts of interest between the political authority, executive management and other stakeholders (i.e. citizens, clients or users) can result in poor performance, as well as ethical lapses that lead to corruption and mismanagement of public funds (Juiz and Toomey, 2015).

The concept of corporate governance gained international prominence following the serious fraud and financial scandals in countries in developed economies such as the USA, UK and Italy (Matei and Drumasu, 2015). Within the South African private and public sectors, a number of corporate governance scandals justified the need for improved compliance to good governance practices, and also revealed how financially costly non-adherence can be. In recent times corporate governance failures have been experienced in Eskom, Fidentia and Steinhoff, as well as, previously, in Saambou (Chauke and Sebola, 2018). Auditing firms, which have an indispensable role as standard bearers, were also affected by these scandals, including KPMG in relation to contracted work performed at SARS and Deloitte in relation to Steinhoff (Chauke and Sebola, 2018). This revealed the depth of the compliance problem

for good corporate governance practices. Elsewhere in the world the collective consciousness of society pertaining to corporate governance failures was heightened following the Watergate scandal in the US in the 1970s (Matei and Drumasu, 2015). It was solidified when a number of listed companies in the UK declared bankruptcy (viz. Guinness in 1986; Polly Peck International in 1989; Maxwell in 1991; The International Trade and Credit Bank in 1991, Barings Futures in 1995 etc.) (Matei and Drumasu, 2015). Matei and Drumasu (2015) also note that financial scandals were experienced in the public service in such organisations as the Metropolitan Police in the UK in 1995, the Inland Revenue (UK) and the European Commission in 1999/2002.

However, the major corporate governance and accounting scandals (also aptly described as financial failures and fraud) that triggered an overwhelming response from regulators and policymakers relate to large corporations such as Enron, Tyco International, Adelphia, and WorldCom in the early 2000s (Willits and Nicholls, 2014; Chauke and Sebola, 2018; Cole, Johan and Schweizer, 2021). The impact on society (i.e. loss of public trust) and capital markets (i.e. loss of money/investments) that these and other later corporate governance failures (i.e. Volkswagen, Parmalat, and Lehman Brothers etc.) had was substantial (Cole, Johan and Schweizer, 2021). The response to these corporate scandals came in the form of legislation and corporate governance codes to regulate the fiduciary duties of directors and introduced punitive measures where criminal behaviour takes place as a result of a dereliction of that solemn duty (PWC, 2002). Globally, there are 409 corporate governance codes developed by different authority bodies in countries across the world (ECGI, 2021). The most recognised legislation and corporate governance codes are Sarbanes–Oxley in the USA, the Cadbury Code (Matei and Drumasu, 2015) and in the South African context the King Code of Corporate Governance:

#### **2.4.2 Sarbanes–Oxley Act (SOX)**

The Sarbanes–Oxley Act of 2002, commonly referred to as SOX, was promulgated in the United States of America on 30 July 2002 (Willits and Nicholls, 2014; Kecskés, 2016). The legislation applies to publicly listed companies and contains 11 titles with various sections that address specific corporate failures that precipitated the fraud scandals that occurred between 2000 and 2002 (Karanja and Zaveri, 2014; Kecskés, 2016). One of the key sections is the *Sarbanes–Oxley Section 404: Assessment of Internal Control* which mandates management to produce annual internal control reports that contain the outcome of an

assessment for the financial year regarding the effectiveness of the internal control structure and procedures of their organisation (Masli et al., 2010; Willits and Nicholls, 2014). This requirement led to the development and wide adoption of the Committee of Sponsoring Organizations of the Treadway Commission (COSO) internal control framework (PWC, 2002). There are two main criticisms levelled against the SOX legislation: (1) owing to the rushed process that led to its crafting and passage in the US House of Representatives and the Senate, its scope is too wide; (2) and the cost of complying with Section 404 outweighs the benefits (Willits and Nicholls, 2014; Kecskés, 2016).

### **2.4.3 The Cadbury Report**

The development of the Cadbury Code by the Committee on the Financial Aspects of Corporate Governance in 1991 was sponsored by the Financial Reporting Council, the London Stock Exchange and the accountancy profession (Cadbury, 1992). This followed a spate of sudden corporate failures that were not foreseen on the basis of the reporting of the affected organisations (Cadbury, 1992). The underlying factors were considered to be the looseness of accounting standards, the absence of a clear framework that directors could use to review the controls in their organisations and competitive pressures on auditors making it easier for auditors to accede to the influence of the boards (Cadbury, 1992). Companies listed on the London Stock Exchange were required to “comply or explain” in regard to the Cadbury Code.

### **2.4.4 King IV report**

The King IV Report is a South African code of corporate governance. It is defined as a set of voluntary principles and leading practices structured as a report that includes a code, with additional, separate sector supplements for small and medium enterprises, non-profit organisations, state-owned entities, municipalities and retirement funds (IoDSA, 2016). It was released on 1 November 2016. The key objectives of the King Code are to promote corporate governance; broaden its acceptance by making it accessible and fit for various sectors and organisational types; reinforce corporate governance as a holistic and interrelated set of integrated arrangements; encourage transparent and meaningful reporting; and present corporate governance as concerned with structure, process, and ethical consciousness and conduct (IoDSA, 2016). The underpinning philosophies of the King IV Report relate to sustainable development and include integrated thinking, the organisation as an integral part of society, stakeholder inclusivity and corporate citizenship (IoDSA, 2016). The integrated

and systems-thinking underpinnings of the King IV Report make it suitable for this study of IT governance in the public sector.

In essence, the ultimate goal of corporate governance is to provide a balance “of power between shareholders, administrators and executive management, with the purpose of preventing the appearance of new frauds and financial abuse, and especially of regaining the society’s trust in the business environment” (Clayman, Fridson and Troughton, 2012; Matei and Drumas, 2015, p.496). In the public sector, however, it is “concerned with the relationship between the policy-makers and/or trustees of public organizations and the senior managers given the task of making these policies a reality” (Osborne, 2010, p.6). This idea will be explored in detail in the next chapter, especially as it relates to the government’s policy framework on the corporate governance of IT (i.e. CGICTPF) within the South African public sector.

As noted above, the public sector is also susceptible to corporate governance failures. Considering that state-owned entities continue to play a critical developmental and service delivery role in the use of public resources, it is important to consider corporate governance in the context of the public sector – the concept of public governance. Osborne (2010) distinguishes between private and public sector governance and proposes that public governance comprises of administrative governance as a key component. The administrative governance aspect of public governance is based on the “generic practice of public policy implementation and public services delivery” (Osborne, 2010, p.7); which, as will be demonstrated in the next chapter, is a suitable perspective for this study.

## **2.5 Conclusion**

This chapter explored the historical emergence of IT governance by noting two key historical considerations: 1) managers were simply looking to improve controls in relation to IT-related organisational investments; and 2) owing to the substance of those investments, managers were looking to use IT to enhance their capacity for business process innovation. This era is characterised as the strategic information systems (SIS) where the sweeping use of IT was acknowledged to improve competitiveness and was changing the nature and conduct of businesses. Consequently, during the 1990s, IT governance was conceptualised primarily as a management process which entailed “the policies, procedures and systems for the allocation of design-rights to the key decision makers both within the organization as well as external

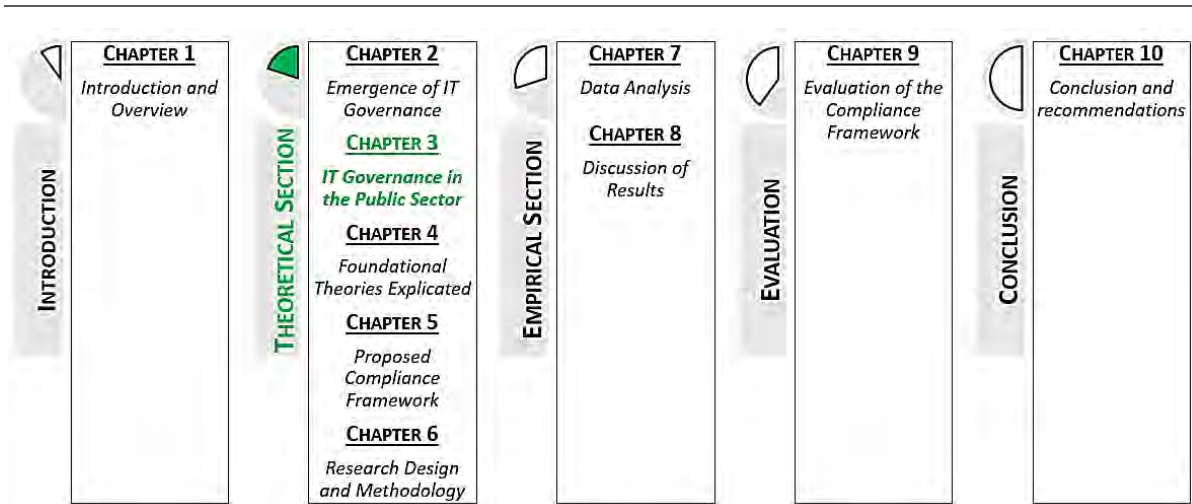
vendors and/or partners responsible for IT management.” (Venkatraman, Henderson and Oldach, 1993, p.144).

Secondly, this chapter justified the location of the study of IT governance within the IS discipline. This necessitated an explication of the difference between the concepts of IS and IT, where IT was noted to refer to hardware, software and telecommunications networks while IS denotes the process by which humans interact with technology in order to process, store, use and disseminate information. This further necessitated a detailed focus on what the IS discipline entails, and how it has evolved from the 1960s to its current state. In this context, the socio-technical character of the IS discipline including its underpinnings of systems theory and systems thinking was explored. Subsequently, the management of IS in organisations was discussed and this laid the foundation for the discussion on the relationship between IT governance and corporate governance.

Lastly, an exploration of the meaning and influence of corporate governance revealed that IT governance is a critical component of corporate governance, as set out in authoritative texts such as the Cadbury Report published in the UK and the Sarbanes–Oxley Act in the United States of America. In the South African context, the King Code of Corporate Governance, presently in its fourth iteration and titled the King IV Report, is the preeminent guide for corporate governance. The King IV Report dedicates one of its 17 principles, Principle 12, to the governance of information and technology, and focuses on the public sector through a dedicated supplement for state-owned entities.

# 3

## IT Governance in the Public Sector



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### 3.1 Introduction

This chapter presents an in-depth review of the literature on the meaning and necessity of IT governance. A specific focus on the role of IT governance in the public sector in South Africa is explored, drawing from the international frameworks that underpin the Corporate Governance of ICT Policy Framework (CGICTPF). The CGICTPF was published in 2012 and all public sector organisations are mandated to implement it. Therefore, this chapter further explores the drivers of public sector IT governance adoption and use. Considering the growing dependency on IT usage to dispense public services, this chapter also delves into the manner in which IT accrues public value for public sector organisations.

### 3.2 What is IT governance?

IT governance is a key component of corporate governance (see section 2.4.1), and is applicable to private and public sector organisations (Calder, 2009; ISACA, 2012; Juiz, Guerrero and Lera, 2014; IoDSA, 2016; Lunardi et al., 2017; ISACA, 2019). It is now vital for boards of directors, executive management and middle management to build competencies relating to IT governance considering that they have to make and monitor IT-related decisions, as organisations increasingly rely on information and technology to meet their strategic objectives (Calder, 2009; Valentine and Stewart, 2015). Such IT-related decisions relate to IT strategy, IT investments, IT risk management, IT architecture, IT alignment, information strategy and regulatory compliance (Weill and Ross, 2005; Calder, 2009; Valentine and Stewart, 2015). At its core, IT governance is concerned with IT-related decisions and the allocation of rights in an organisation in order to effect those decisions. In the process of making IT-related decisions, IT governance directs as to who must be *consulted* and/or *informed*, who is *responsible* for implementing those decisions, and who holds ultimate *accountability* for all such decisions (Levstek, Hovelja and Pucihar, 2018). IT-related decisions can be categorised into three levels: strategic planning, management and operational control (Marakas and O'Brien, 2013). Strategic planning decisions are vested in the board of directors and executive-level management, and are made based on unstructured information in order to produce long-term objectives and policies aimed at achieving organisational growth with optimal resource allocation (Marakas and O'Brien, 2013; Rainer, Prince and Cegielski, 2014). Management control decisions are tactical in nature, made by business unit managers based on semi-structured information for the purpose of acquiring the tools

necessary to meet the organisation's strategic objectives (Marakas and O'Brien, 2013; Rainer, Prince and Cegielski, 2014). Operational control decisions are vested in operational managers, team leads or supervisors who typically use the structured instructions issued by business unit managers to perform specific tasks efficiently and effectively (Marakas and O'Brien, 2013; Rainer, Prince and Cegielski, 2014). IT governance is concerned with strategic IT-related decisions (Ako-Nai and Singh, 2019). On this basis it differs from IT management, which is primarily concerned with the operational and tactical aspects of implementing those IT-related decisions (Levstek, Hovelja and Pucihar, 2018).

The extent of strategic IT-related decisions is predicated on five key domains: IT principles (i.e. clarifying the strategic role of IT in an organisation); IT architecture (i.e. defining an integrated set of technical choices to meet the organisation's business requirements); IT infrastructure strategies (i.e. centrally coordinated technical choices, directions and policies about shared IT services that provide the foundation for the organisation's IT capability); business application needs (i.e. specifying the business need for purchased or internally developed IT applications); and IT investment and prioritisation (i.e. choosing which initiatives to undertake and how much to spend) (Weill and Ross, 2004).

The process of strategic IT-related decision-making is influenced by intuition and politics (Kurnia et al., 2017). The board and executive managers may be susceptible to making rushed IT investment decisions based on biased, insufficient, inaccurate or untrustworthy information which could cause significant financial losses and threaten their organisation's survival (Kurnia et al., 2017). Within the Australian context, Tamm et al. (2014) offer three examples of such detrimental decisions where: (1) the executive leadership of a large organisation led an investment drive of A\$1,2 billion in IT-enabled transformation projects that failed to deliver the expected benefits, causing the organisation to suffer and eventually being taken over by another; (2) the executive leadership of a banking institution led an investment of more than A\$1,1 billion in a massive upgrade project from a legacy system to a "state-of-the-art" core-banking system – the benefits were not fully realised; and (3) a government transport authority projected to spend A\$749,1 million on replacing its ticketing system but this system was eventually delivered five years behind schedule at a total cost of A\$1,5 billion.

In the South African public sector context two examples of similar detrimental decisions can be cited: (1) the Integrated Financial Management System (IFMS) project was launched in 2005 jointly by the leadership of the State IT Agency (SITA), the Department of Public

Service and Administration (DPSA) and National Treasury to replace the aging and fragmented financial system across all tiers of government. However, after 12 years and over R1,2 billion expenditure, it had not yielded the desired benefits (Mzekandaba, 2017; Parliamentary Monitoring Group, 2018); and (2) the Department of Water and Sanitation (DWS) procured SAP system licences which, as it transpired, were not needed nor properly tendered – the overall SAP contract value was R950 million for licences and maintenance (SIU, 2019; Parliamentary Monitoring Group, 2020; Winning, 2020). Both instances are under active investigation by law enforcement authorities.

These examples illustrate some of the consequences of inadequate compliance with IT governance practices. What then is IT governance? There are many definitions of IT governance. A comprehensive collation of these definitions is presented in the IS literature (Levstek, Hovelja and Pucihar, 2018); among them is the following definition: “Specifying the decision rights and accountability framework to encourage desirable behaviour in the use of IT” (Weill and Ross, 2004, p.8). Other definitions sourced by this researcher from other IS literature include “IT governance is the process by which decisions are made around IT investments” (Alreemy et al., 2016, p.907); “the organizational 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” (Juiz, Guerrero and Lera, 2014, p.9); it is further defined as consisting of the “leadership and organizational structures and processes [to] ensure that the organization’s IT sustains and extends the organization’s strategies and objectives” (Altemimi and Zakaria, 2015, p.6). These definitions are convergent. Therefore, this study adopted the following definition as it best fits the public sector context:

*IT governance is the organisational capacity exercised by the board, executive management and IT management to make and monitor IT-related business decisions and investments to sustain and extend the organisation’s strategic objectives.*

To fulfil their duties in relation to IT governance, three core tasks are required of the board of directors, executive management and IT management, namely, Evaluate, Direct and Monitor (International Standards Office, 2015a). The compliance obligations are derived from the Monitoring task (ISACA, 2012). These tasks are discussed in detail in section 3.3.3 below.

### **3.3 IT governance framework and standards**

A steady stream of IS research publications has called for boards of directors to pay more attention to their changing role which now emphasises the need to provide digital leadership (International Standards Office, 2015a; Valentine and Stewart, 2015). The focus on enterprise or corporate aspects of IT governance impels the board and senior executive management to be involved in strategic and tactical IT-related decisions (De Haes, Van Grembergen and Debreceny, 2013; Valentine and Stewart, 2015). This, in turn, has resulted in some IS researchers and industry publications preferring, correctly, to name the concept “corporate governance of IT” or “enterprise business technology governance”, instead of just “IT governance” (De Haes, Van Grembergen and Debreceny, 2013; International Standards Office, 2015a; Valentine and Stewart, 2015). The board and executive management rely on frameworks and standards to guide the adoption and use of IT governance practices within their organisations. In this section five key frameworks are discussed, viz. the Calder-Moir meta-framework, King IV report, ISO 38500:2015, COBIT 5 and the IT governance decision matrix.

#### **3.3.1 The Calder-Moir meta-framework**

The Calder-Moir framework is an IT governance meta-framework that is rooted in the ISO 38500:2015 standard. It encapsulates all the major IT-related management frameworks, standards and methodologies to provide a holistic IT governance implementation toolkit for various types of organisation. The framework is premised on the notion that there are key drivers that motivate organisations to adopt and use IT governance, including the pursuit of competitive advantage, the proliferation of threats to information and technology assets, as well as regulatory compliance imperatives (Calder, 2009). To address these drivers and meet the competing needs of an organisation, organisations must develop a tailored IT governance framework for their specific context. The Calder-Moir meta-framework helps organisations overcome the overlapping and often competing aspects of the various IT-related frameworks, standards and methodologies when implementing IT governance (Calder, 2009).

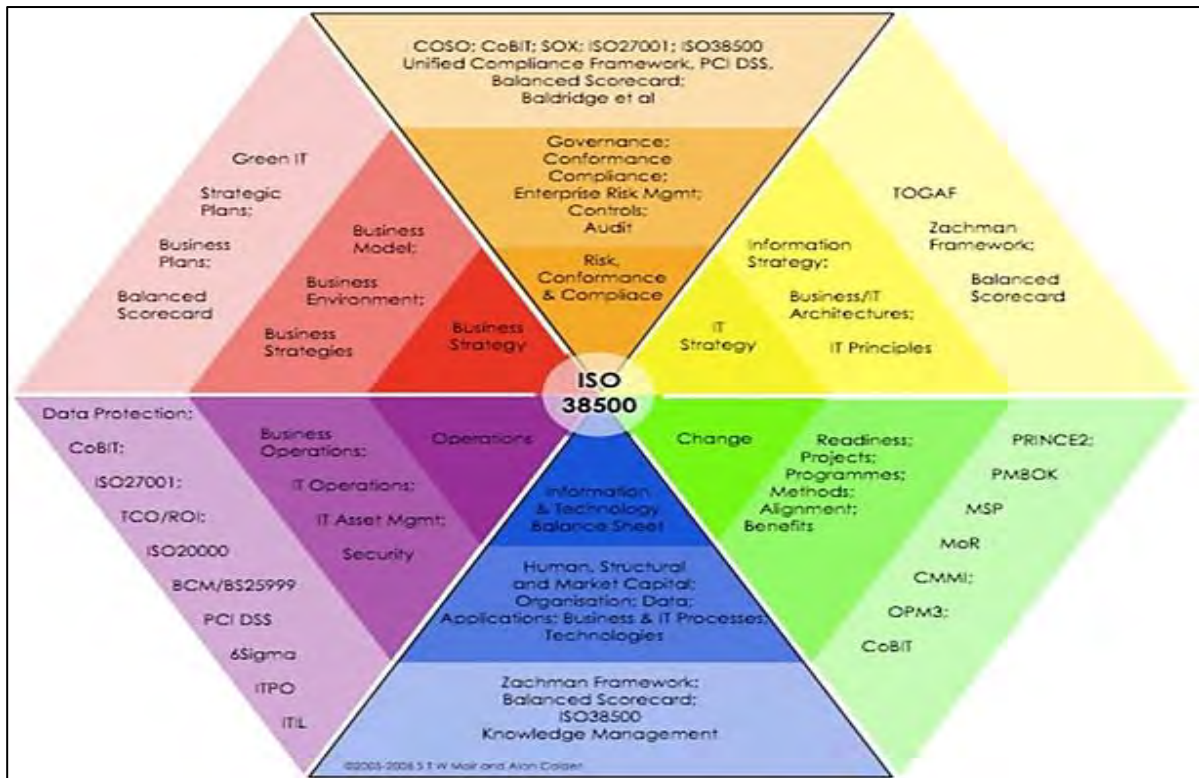


Figure 3–1: The Calder-Moir IT governance meta-framework

The Calder-Moir framework comprises six key areas which are broken down into more granular components with associated frameworks, standards and methodologies, as shown in Figure 3–1 above. The six areas (viz. Business Strategy; IT Strategy; Operations; Change; Risk, Conformance and Compliance; and Information and Technology Balance Sheet) are modelled on the principles of the ISO 38500:2015 standard.

### 3.3.2 The King IV Report

The King Code is structured on the basis of 17 principles and related practices. The origins and philosophy of the King IV Code are discussed in Chapter 2 section 2.4.4 above. In this section the discussion is centred on the IT-related aspect of the King Code, specifically Principle 12. Principle 12 is applicable to the public and private sectors, and any organisation type and sizes. It states that *the governing body should govern technology and information in a way that supports the organisation setting and achieving its strategic objectives* (IoDSA, 2016). Essentially, this principle enjoins the governing bodies to: (1) set the strategic direction for the organisation, including how the organisation should approach and address the use of information and technology; (2) approve policies that give effect to the effective, efficient and acceptable use of information and technology; and (3) delegate the effective management of technology to executive management (IoDSA, 2016). The King IV Report also has a dedicated

focus on state-owned enterprises through its state-owned enterprise supplement, which details the principles that are applicable to the public sector context. Principle 12 is applicable to state-owned enterprises without qualification or modification. In the South African public sector, the Principle 12 of the King Code is further given effect by the adoption of the ISO 38500:2015 standard through the CGICTPF.

### **3.3.3 The ISO 38500:2015 standard**

The ISO 38500 is the first international standard that is focused on providing guidelines for the corporate governance of IT, wherein the emphasis is on the business use of IT and related business outcomes, instead of merely describing IT management systems and processes (Juiz and Toomey, 2015). The first iteration of the standard was the ISO 38500:2008, published in 2008. This was derived from the Australian AS 8015 standard (published in 2005) which introduced broad principles for the governance of IT that business leaders could easily grasp (Juiz and Toomey, 2015). The second iteration, the ISO 38500:2015 (also SANS 38500:2016), built on that foundation and further clarifies the role of the governing body as exercising fiduciary care and being accountable for the organisation meeting its strategic performance objectives and regulatory obligations (International Standards Office, 2015a; Juiz and Toomey, 2015). The standard serves the purpose of (1) providing assurance to stakeholders that if the standard is followed they can have confidence in the organisation's governance of IT by the governing body; (2) using principles and practices to inform and guide governing bodies in the use of IT, and (3) establish a common language between business and IT for the governance of IT for optimal alignment between business and IT (International Standards Office, 2015a). The standard further clarifies the distinction between governance and management by identifying the key responsibilities and interface between these functions, as shown in Figure 3–2 below.

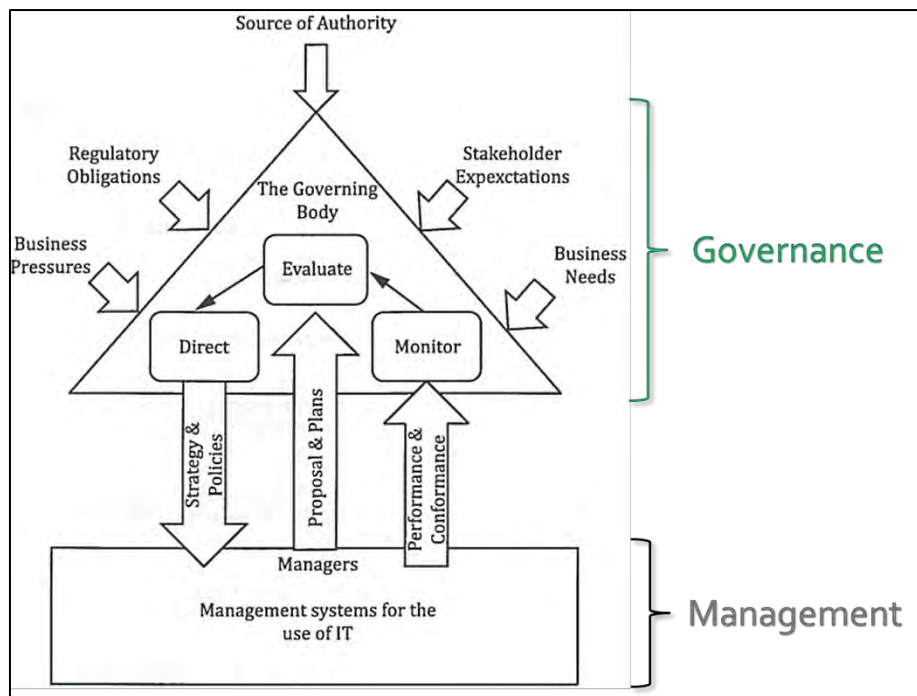


Figure 3–2: Model of the governance of IT (adapted from International Standards Office, 2015a)

The ISO 38500:2015 standard applies to both the private and public sectors, and enjoins governing bodies (i.e. political authorities, owners, directors, partners, accounting officers, executive management etc.) to exercise three core functions of governance: Evaluate, Direct and Monitor (International Standards Office, 2015a; Juiz and Toomey, 2015). Governing bodies must *Evaluate* the proposals and plans relating to the current and future use of IT in their organisations while taking into account the organisations’ internal and external environmental context, including the legitimate stakeholder needs and political influences, technological advances, economic and social pressures, and regulatory requirements; *Direct* by delegating to management the development and implementation of organisational strategy and policies for IT investments, performance objectives and responsible use of IT; *Monitor* the performance of all aspects of IT within the organisation to ensure that they align to the set strategic objectives and conform to regulatory requirements (International Standards Office, 2015a; Juiz and Toomey, 2015).

The *IT management* aspect is the responsibility of the organisation’s management layer which is concerned with the implementation of the strategies and policies set by the governing body for the efficient, effective and acceptable use of IT within the organisation (International Standards Office, 2015a). The role of executive and middle management from business and IT involves the planning, building, running and monitoring of IT-enabled business processes in alignment with the strategic direction set by the governing body (ISACA, 2012; Juiz and

Toomey, 2015). While the ISO 38500:2015 standard addresses the governance of IT from a strategic management perspective, the COBIT 5 framework goes into greater detail to address the management of IT from tactical and operational perspectives (ISACA, 2012; Coertze and Von Solms, 2014).

### 3.3.4 COBIT 5

Control Objectives for Information and related Technology (COBIT) is an ISACA framework. The Information Systems Audit and Control Association (ISACA) is a professional body and the COBIT framework is a comprehensive business framework that supports organisations to align business and IT objectives through the governance and management of enterprise IT (ISACA, 2019). Since its first publication in 1996 as an IT audit framework, COBIT has been progressively evolving and expanding in scope from an IT audit framework into a holistic governance of IT framework (ISACA, 2019), as depicted in Figure 3–3 below. COBIT 5, as a suite of publications, contains the COBIT 5 Business Framework for the Governance and Management of Enterprise IT, COBIT 5 enabler guides for processes and information, and professional guides for COBIT 5 implementation, assurance, information security and risk management. These products demonstrate the depth of granularity of the COBIT 5 framework, which is the catalyst for detailed guidance on the implementation of governance controls and practices for the entire adopting organisation.

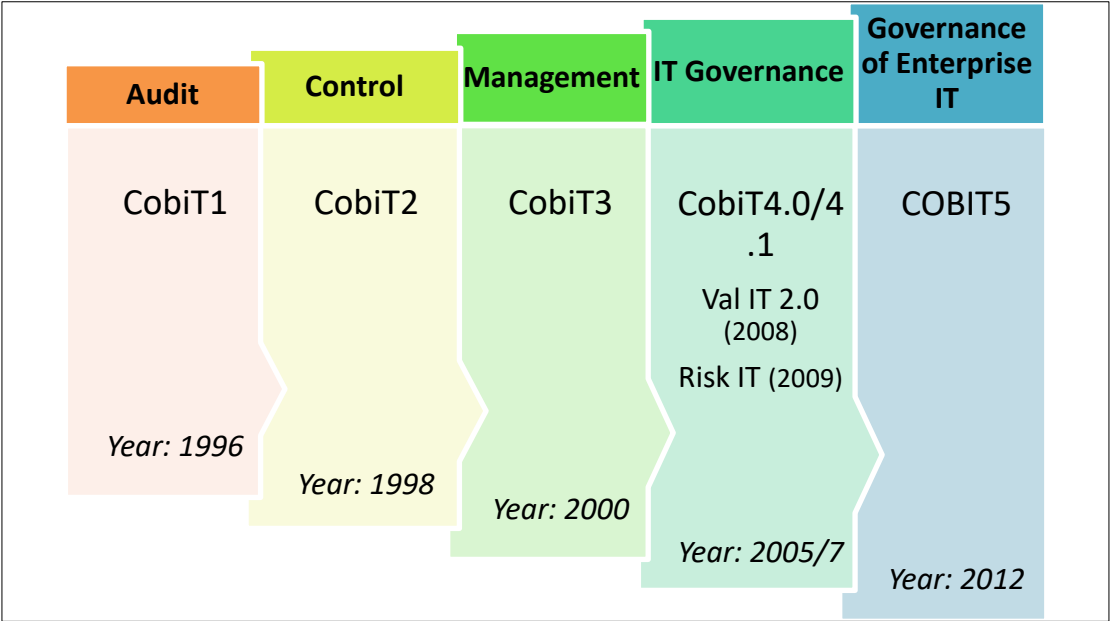


Figure 3–3: COBIT evolution (adapted from ISACA, 2012)

IS researchers have been increasingly exploring COBIT and it has been gradually gaining wider acceptance in the IS literature (De Haes, Van Grembergen and Debreceeny, 2013). Some IS researchers, including Wim van Grembergen, are also contributors to the development of the last few versions of the COBIT framework. The framework is process-oriented and operationalises other key frameworks and standards through its detailed mapping to the ISO 38500 standard, COSO, ITIL, TOGAF, PMBOK and PRINCE2 (ISACA, 2012). It comprises 37 processes which are compartmentalised into the Governance and Management of Enterprise IT zones, respectively. The processes are further categorised into five domains: *EDM* (Evaluate, Direct and Monitor), *APO* (Align, Plan and Organise), *BIA* (Build, Acquire and Implement), *DSS* (Deliver, Service and Support) and *MEA* (Monitor, Evaluate and Assess) (ISACA, 2012; Atkinson and Aucoin, 2015). A selective and tailored approach must be applied when implementing processes; this is to ensure that only those that are relevant to a specific environmental and organisational context are prioritised. In the South African public sector context, 12 key COBIT 5 processes have been prioritised for implementation through the CGICTPF implementation guidelines (DPSA, 2012). The CGICTPF is discussed in depth in section 3.4.

The latest version of the framework is COBIT2019, published in 2019. The key differences between COBIT 5 and COBIT2019 include six (instead of 5) governance principles in COBIT2019, 40 (instead of 37) processes, and added governance framework principles and design factors. In addition, enablers have been renamed as components (Harisaiprasad, 2020).

### **3.3.5 A theoretical model for IT governance from the IS literature**

The preceding frameworks are industry-driven and industry-sponsored frameworks. They complement models of IT governance from the IS literature and are deemed crucial to operationalising IT governance adoption and use in organisations of any size or industry. The seminal IT governance model in the IS literature was developed by Weill and Ross (2004) and is based on comprehensive empirical research. This remains instrumental in aiding our understanding of the patterns of adoption and use of IT governance by organisations both in the public and the private sectors. The Weill and Ross decision model, depicted in Table 3–1 below, is underpinned by three key components presented in a decision matrix: governance archetypes for allocating IT-related decision rights, IT-related governance decision domains and IT governance mechanisms for implementing IT governance (Weill and Ross, 2004). The

matrix plots the five governance archetypes against the IT-related decisions. This eases the complexity of designing an IT governance approach for an organisation as it makes it easy to assign or identify the locus of IT-related decisions and the governance mechanisms that reinforce those decisions.

Table 3–1: IT governance matrix (adapted from Weill and Ross, 2004)

Governance Archetype		Decision Domain									
		IT Principles		IT Architecture		IT Infrastructure Strategies		Business Application Needs		IT Investment	
		Input	Decision	Input	Decision	Input	Decision	Input	Decision	Input	Decision
Business Monarchy											
IT Monarchy											
Feudal											
Federal											
Duopoly											
Anarchy											

The governance archetypes that typify the people involved in making IT-related decisions include the following (Weill and Ross, 2004):

- 1) Business monarchy (i.e. individual or committees of business executives)
- 2) IT monarchy (i.e. individual or group of IT executives and specialists)
- 3) Feudal (i.e. heads of business units and key business process owners)
- 4) Federal (i.e. combination of executive management and heads of business units – with or without IT executive involvement)
- 5) IT duopoly (i.e. IT group and one other group such as business executives or business unit managers or process owners), and
- 6) Anarchy (i.e. isolated individual users) (Weill and Ross, 2004).

The IT-related decision domains entail (Weill and Ross, 2004) (1) IT principles (i.e. clarifying the strategic role of IT in an organisation); (2) IT architecture (i.e. defining an integrated set of technical choices to meet the organisation’s business requirements); (3) IT infrastructure strategies (i.e. centrally coordinated technical choices, directions and policies about shared IT services that provide the foundation for the enterprise’s IT capability); (4) business application needs (i.e. specifying the business need for purchased or internally

developed IT applications); and (5) IT investment and prioritisation (i.e. choosing which initiatives to undertake and how much to spend).

Governance mechanisms include (1) decision-making structures such as committees, teams and specific roles that are responsible for making IT-related decisions in the organisation; (2) alignment processes such as formalised IT investment proposals, enterprise architecture processes and service-level agreements that provide input for decision-makers based on approved IT policies; and (3) relational mechanisms that involve the organisational communication channels to disseminate IT-related decisions and policies (Van Grembergen, De Haes and Guldentops, 2004; Weill and Ross, 2004; De Haes and Van Grembergen, 2009; 2015b).

### **3.4 The Corporate Governance of ICT Policy Framework (CGICTPF)**

IT governance adoption and use in state-owned entities is mandated through the CGICTPF. The language of the CGICTPF directive targets and enjoins government departments to adopt and implement the framework. The configuration of state governance is such that political accountability over state-owned entities and enterprises is exercised through government departments. Therefore, considering that state-owned entities are extensions of government departments, they are obligated to comply with the CGICTPF. That reasoning alone would have been sufficient cause for the mandated adoption and implementation of the CGICTPF by state-owned entities. However, section 3.1 of the directive also explicitly mandates that the CGICTPF is applicable to “every sphere of government, organs of state and public enterprises” (DPSA, 2012, p.1).

The Presidential Review Commission (PRC) report of 1998 recommended that key IT-related decisions in all spheres of government and state-owned entities and enterprises must be based on a common enabling governance framework, and that all accountability for such decisions should be vested in senior political and executive management. This was to ensure that it is not IT managers and specialists who make such key decisions. In essence, the PRC recommendation relocated the approach of the government from an IT monarchy arrangement to an IT duopoly, where IT-related strategic decisions are made jointly by IT and business management. Further, it was recommended that the management of IT resources be elevated to a strategic level in government by creating the Government Information Technology

Officer (GITO) position for all government departments, which was done in 2000 (DPSA, 2012).

In the 2010/11 financial year, the AGSA conducted a review and found that poor levels of IT governance implementation still persisted, with only 21% of departments having implemented adequate controls (DPSA, 2012). Recognising the gap and a need for improved IT governance controls using a government-wide IT governance framework to guide that implementation, the CGICTPF was published following a recommendation from the AGSA in alignment with the PRC recommendation. The AGSA recommended that (1) “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 (2) “the Governance of ICT roles and responsibilities should be defined and implemented to ensure adequate Public Service ICT enablement” (DPSA, 2012, p.iii). In addition, the stated purpose of implementing the CGICTPF is to embed IT governance as an integral part of corporate governance. However, a key barrier to the adoption of the CGICTPF relates to management aspects such as a lack of requisite IT governance competencies among board members and poor support from top management (Valentine and Stewart, 2015; AGSA, 2019b). The CGICTPF is based on elements of COBIT 5, the ISO 38500 standard and the King III Report. The integration of these frameworks is intended to provide a comprehensive guide to improve implementation and compliance outcomes.

### **3.4.1 Contributing towards the NDP and SDGs**

IS and technology have played a crucial catalytical role in attaining the United Nations Sustainable Development Goals (SDGs) since their adoption in 2015 (Leong, Tan and Ahuja, 2020). The primary motivation for the adoption of the CGICTPF is to institutionalise the corporate governance of ICT in the public sector and to technologically enable the state to achieve its strategic objectives to improve service delivery to the public (DPSA, 2012). The CGICTPF is aligned to the SDGs through a series of correlated values and strategic objectives. At a basic level the CGICTPF is anchored on the mapped correlation between public sector

ICT values<sup>2</sup> and 12 public sector strategic outcomes<sup>3</sup> (DPSA, 2012). These 12 strategic outcomes are closely aligned to the National Development Plan (NDP) 2030 (Statistics South Africa, 2019). The NDP is South Africa’s attempt at a coherent vision for economic growth and development, with the broad objectives of reducing unemployment, eliminating poverty and reducing inequality (Statistics South Africa, 2019). To meet these objectives, the NDP proposes that government, business and society collaborate to tackle nine focus areas in order to create employment; expand infrastructure; transition to a low-carbon economy; transform urban and rural communities; improve education and training; ensure quality healthcare; build a capable state; fight corruption and improve accountability; and consolidate social cohesion (Statistics South Africa, 2019). Statistics South Africa confirmed that there was a 74% convergence between the NDP and the SDGs, and that 68% of South African private sector organisations had also directly included the SDGs in their organisational strategies and reporting (Statistics South Africa, 2019; United Nations, 2019).



Figure 3–4: Sustainable Development Goals (United Nations, 2019)

<sup>2</sup> 1: Lowering the cost of delivering and receiving public services; 2: improving citizen convenience when interacting with the state; 3: increased productivity by public servants; 4: improving government ICT architecture; 5: providing secure and reliable services to the public; 6: entrench interoperability to reduce silos for improved turnaround times; 7: reduce duplication to provide a single view of the customer/client/citizen; 7: improve economies of scale; and 8: actively pursue digital inclusion.

<sup>3</sup> See Appendix O

In addition, it is important to note that all ISO standards contribute in varying degrees to all 17 SDGs (shown in Figure 3–4 above) (International Standards Organisation, 2021). In particular, the ISO 38500 standard, which is a critical component of the CGICTPF, contributes to the Sustainable Development Goal 9: Industry, Innovation and Infrastructure (International Standards Organisation, 2021). This goal promotes resilient infrastructure, inclusive and sustainable industrialisation, and the importance of innovation in enhancing organisational sustainability (International Standards Organisation, 2021). The CGICTPF components are discussed in the next section, and they further illuminate its role in creating an enabling IT environment for the government to achieve its strategic objectives.

### **3.4.2 The CGICTPF components**

The unit of analysis for this study is the organisation in the form of two state-owned entities, not a government department. Therefore, the three interrelated layers of IT governance proposed by the CGICTPF have been adapted to the entities' governance structure. The three layers of IT governance are (1) *corporate governance* (strategic level), (2) *corporate governance of ICT* (strategic level) and (3) *governance of ICT* (tactical and operational levels). This conceptualisation of IT governance draws from the ISO 38500:2015 standard and affirms IT governance as a component of corporate governance, as depicted in Figure 3–5 below. The CGICTPF envisages corporate governance as the responsibility of the board of directors, is concerned with the strategic governance of the entire organisation and should be guided by the King IV Code of Corporate Governance. The board of directors (i.e. governing body) takes into consideration the objectives mandated to the state-owned entity through legislation and annual performance plans from political leadership, and translates those into the strategic direction of the organisation that must be achieved within given budgetary parameters and time forecasts. The board of directors further governs ICT through a dedicated committee of the board, and delegates the management of IT to executive management. The board approves and evaluates IT proposals and plans against the organisational strategic objectives and monitors IT return on investment.

Corporate governance of ICT is the domain of the board of directors and executive management – both from IT and business – and should be guided by the principles of King IV and the ISO 38500 standard. Executive management establishes structures and other mechanisms that reinforce the collaboration of IT and business management in aligning business needs to IT-related investment proposals at a tactical level. The governance of ICT

is the responsibility of IT management – the chief information officer (CIO) and senior IT managers – and is guided by COBIT processes primarily concerned with day-to-day operational decisions related to planning, building and running IT infrastructure and applications to meet organisational needs. The CGICTPF is depicted in Figure 3–6 below and illustrates the IT governance layers.



Figure 3–5: IT governance layers (adapted from DPSA, 2012)

The current phase of CGICTPF implementation, as of April 2015 onwards, is Phase 3. This phase is characterised by continuous improvement in the adoption and use of the IT governance imperatives imposed by Phases 1 and 2. In Phase 1, public sector organisations were expected to establish an enabling environment for the corporate governance and governance of ICT by developing and implementing “strategies, architectures, plans, frameworks, policies, structures, procedures, processes, mechanisms and controls, and ethical culture” (DPSA, 2012, p.24). In Phase 2, the focus was on ensuring that strategic alignment between business and ICT was adequate for the purpose of value creation, benefits realisation, and resource and risk optimisation (DPSA, 2012).

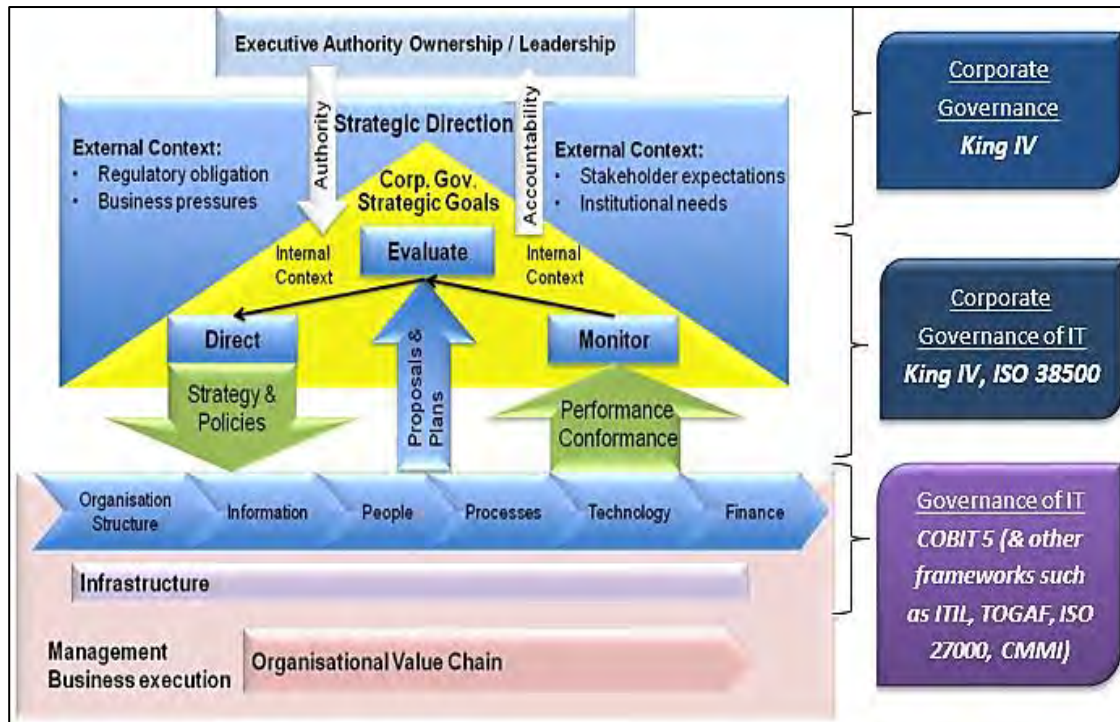


Figure 3–6: The Corporate Governance of ICT Policy Framework (adapted from DPSA, 2012)

In relation to the corporate governance of IT, Principle 12 and related practices of King IV directly enunciate how the governing body should meet its fiduciary obligations. Although the CGICTPF refers to King III, in this study the researcher elected to place emphasis on King IV because this is the version that underpins all organisational reporting by organisations that form part of this study. The ISO 38500:2015 standard is entirely dedicated to the corporate governance of IT and is applied through its six principles: Responsibility, Strategy, Acquisition, Performance, Conformance, and Human Behaviour. Whereas organisations implement many more COBIT 5 processes, the CGICTPF mandates a minimum of 12 processes for the public sector context: EDM01: Governance framework setting and maintenance; APO01: Manage the ICT management framework; APO02: Manage strategy; APO03: Manage enterprise architecture; APO05: Manage portfolio; APO10: Manage suppliers; APO12: Manage risk; APO13: Manage security; BAI01: Manage security: manage programmes and projects; DSS01: Manage operations; DSS04: Manage continuity; and MEA01: Monitor, evaluate and assess performance and conformance (DPSA, 2012). Collectively, these processes help public sector IT management to cover all key areas of the IT organisation’s operations.

## **3.5 Drivers of IT governance in the public sector**

The use of IT governance in most organisations (both in the private and public sectors) is based on two imperatives: regulatory compliance and strategic alignment (Novotny, Bernroider and Koch, 2012). These two imperatives are complementary and they may enjoy different levels of prominence in an organisation depending on the nature of IT governance adoption exercised. Based on the nomothetic nature of CGICTPF adoption, the regulation-intensive environment and the public value goal of the public sector (Winkler, 2013; Hartley et al., 2017), the regulatory compliance imperative assumes emphasis in the public sector a lot more than it does in the private sector. However, it should be noted that one of the key outcomes of IT governance is strategic alignment (De Haes et al., 2020). Organisations that meet compliance requirements by using the CGICTPF are also able to use IT efficiently and effectively to meet organisational strategic objectives (De Haes et al., 2020).

### **3.5.1 Strategic alignment**

The CGICTPF regulatory directive emphatically expresses the intended outcome of its implementations as the attainment of strategic alignment between ICT and business (DPSA, 2012):

- Section 8 outlines the benefits of the CGICTPF and in clauses (g) and (j) states “[c]ontinuous improvement of business and ICT alignment” and “increased alignment of investment towards strategic goals” (p.8).
- Section 13 outlines the objectives of the CGICTPF and in clause (c) states as follows: “Create business value through ICT enablement by ensuring business and ICT strategic alignment” (p.15).
- Section 14 outlines the principles of the CGICTPF and Principle 4 is about ICT strategic alignment, stating “ICT service delivery must be aligned with the strategic goals of the department” (p.16).
- Section 14 outlines the practices of the CGICTPF and Practice 3 enjoins the head of department to “ensure alignment of the ICT strategic plan with the departmental and business strategic plans” (p.17).
- Section 20 outlines the implementation approach of the CGICTPF and clause 20.4(b) states that Phase 2 must be dedicated to “plan and implement business and ICT strategic alignment” (p.24). Clause 20.6(a) states that it is important that “alignment

of business and ICT strategies is done in line with approved South African Government planning frameworks such as the National Treasury ‘Framework for Strategic Plans and Annual Performance Plans’, Service Delivery Framework and Methodology of the DPSA and the Government-wide Enterprise Architecture (GWEA)” (p.27).

- Clause 20.5(vi) states that a governance champion from the Business must be appointed to drive the implementation of the CGICTPF, and the governance champion must “facilitate the alignment process between business and ICT strategy and plans” (p.25).

These policy statements show how strategic alignment is entrenched and underlies the CGICTPF. They further demonstrate an understanding by policymakers that IT governance is a crucial element to effect IT alignment between business and IT (Luftman, 1996). However, this understanding is not consistently translated by state-owned entity management into organisational and technological capabilities to produce public value from the significant IT-related investments. This is often as a result of lack of will and competence in relation to the components of IT alignment and how they correlate. IT alignment has been explored since the 1970s and the foremost IT alignment model is the strategic alignment model (SAM) proposed by Henderson and Venkatraman (1990; Venkatraman, Henderson and Oldach, 1993; Luftman, 1996). The SAM conceptualises IT alignment as a strategic and functional fit between 12 components of alignment across the business and IT domains, as shown in Figure 3–7 below (Luftman, 1996; Gerow, Thatcher and Grover, 2015).

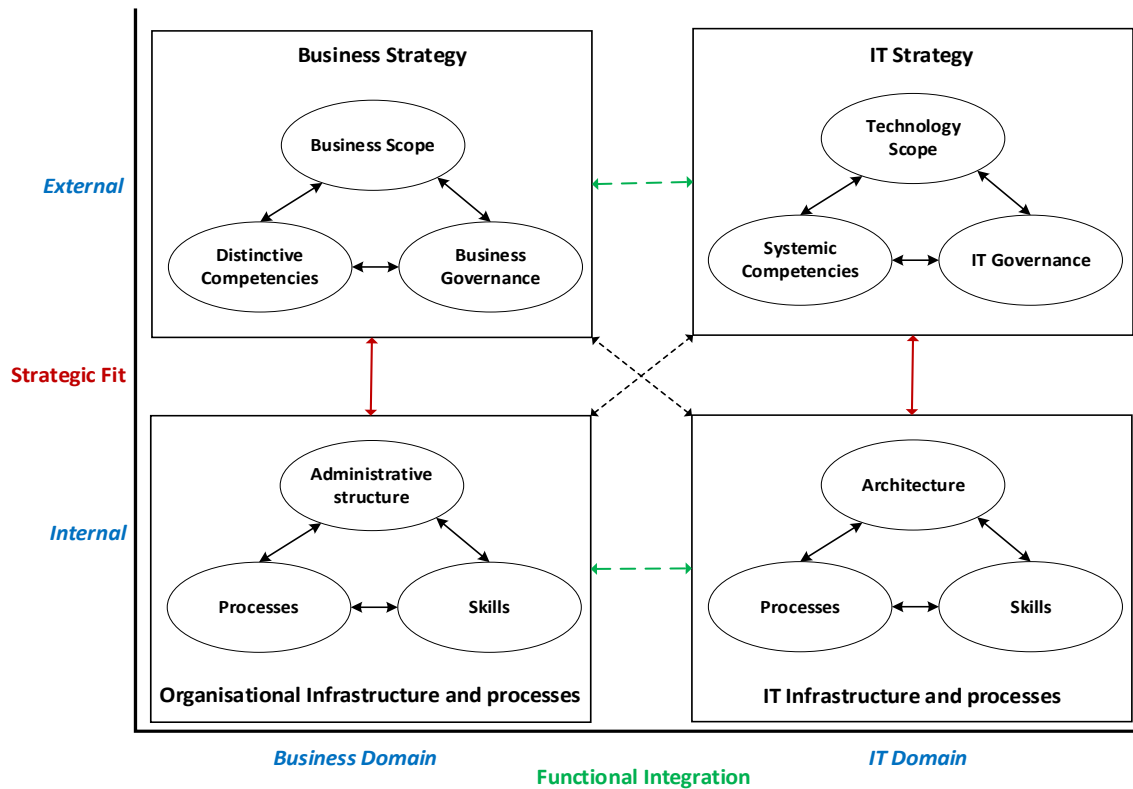


Figure 3–7: The strategic alignment model (SAM) (adapted from Venkatraman, Henderson and Oldach, 1993; Van Grembergen, De Haes and Guldentops, 2004)

Members of boards of directors and executive management in state-owned entities are obligated to oversee and execute the functional and strategic integration of IT alignment components in their organisations. The 12 components are categorised into four constructs: business strategy; IT strategy; organisational infrastructure and processes; and IT infrastructure and processes. A summary of the components is presented below (Venkatraman, Henderson and Oldach, 1993; Luftman, 1996; Peppard and Ward, 2016):

- Business strategy. *Business scope* includes choices pertaining to products, markets, services, customers/clients and location(s) where the organisation operates; *distinctive competencies* are the distinctive attributes of the strategy, critical success factors and core competencies that help organisations to create public value; and *business governance* includes the structural mechanisms that define the relationship between the political authority, the board of directors and management.
- Organisational infrastructure and processes. *Administrative structure* refers to the structure, roles and reporting relationships within the organisation. This includes considerations of whether the organisation is organised as centralised or decentralised and what provincial footprint it has (if any); *processes* refers to the business processes

that articulate the workflows carried out by employee activities; and *skills* relates to the human resources considerations in relation to recruiting, motivating and training, and a culture that promotes the capabilities of individual staff members in the organisation to carry out tasks that support the business strategy.

- IT strategy. *Technology scope* refers to the critical information and communication technologies and applications that support or shape the strategic objectives of business; *systemic competencies* focus on the capabilities and distinctive attributes of the IT strategy (i.e. access to information, higher availability of systems, interconnectivity etc.) that contribute to attaining business strategic objectives; and *IT governance* refers to the allocation of decision-making rights in relation to IT-related resources, risks, investments, project selection and prioritisation between business and IT.
- IT infrastructure and processes. *IT architecture* refers to the policies and decisions relating to software, data, network and hardware configurations that integrate business and IT processes; *processes* relates to formalised practices and activities for system development, maintenance, and monitoring and control systems; and *IT skills* relates to the IT human resources considerations in relation to recruiting, motivating and training, and a culture that promotes the knowledge and capabilities required to effectively manage IT within the organisation.

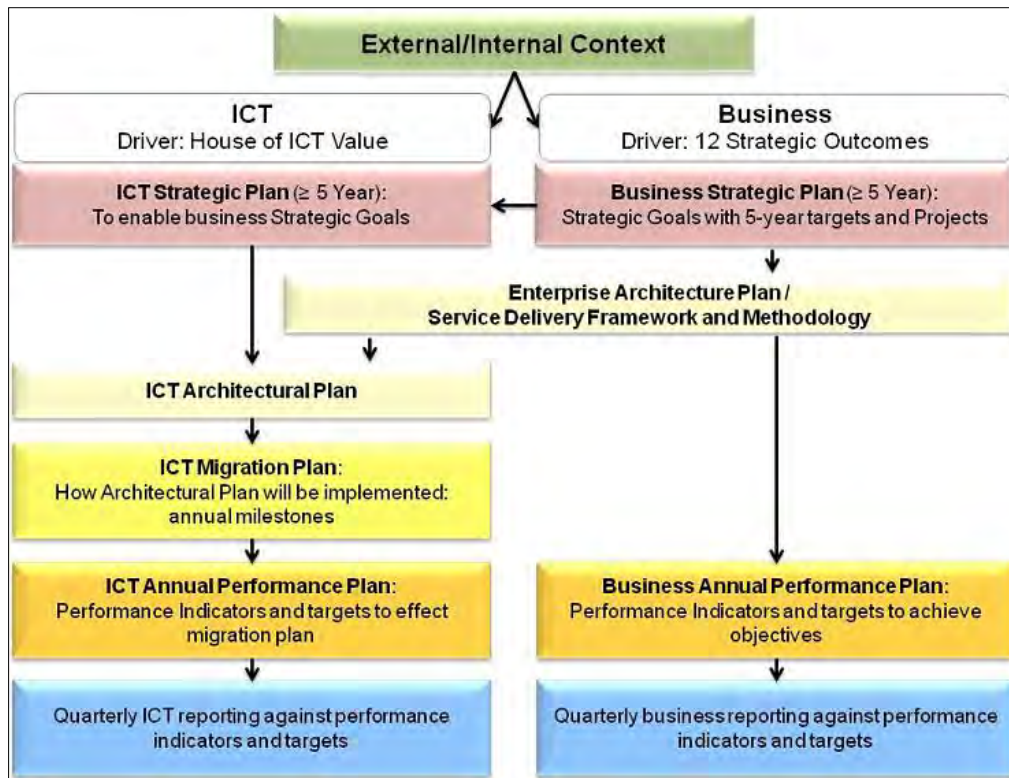


Figure 3–8: Public sector business and IT alignment process (DPSA, 2012)

Within the CGICTPF, IT alignment finds conceptual expression as illustrated in Figure 3–8 above. Public executive management is compelled to execute IT alignment at strategic, tactical and operational levels using business and ICT strategic plans linked to the governmental budget cycle, enterprise architecture (EA), and business and ICT annual performance plans. Regular reporting to management structures within the organisation and the board is an absolute necessity.

The business strategic plan must articulate the organisation’s vision and mission which are typically derived from the relevant Act that underlies the existence and mandate of the entity. The Road Accident Fund was created through the Road Accident Fund Act of 1996 (Act No. 56 of 1996) and its given mandate is “the payment of compensation in accordance with the Act for loss or damage wrongfully caused by the driving of a motor vehicle” (RAF, 2020). On the other hand, the Financial Sector Conduct Authority (FSCA), previously the FSB (Financial Services Board), was created by the Financial Sector Regulation Act of 2017 (Act No. 9 of 2017), its core mandate being “a statutory body performing a public function in the field of market conduct regulation and supervision of the financial sector” (FSCA, 2020a).

The board of directors is appointed by the ministry that oversees the particular state-owned entity and falls under the political authority of the relevant minister. The board is responsible for appointing executive management. The task of the respective boards of directors and executive management is to translate the respective mandates into specific and measurable strategic objectives that validate the public value contribution of the entities. The plans are drafted on the basis of a five-year cycle and articulate the outputs, performance indicators and annual targets to be achieved within that time period. The IT strategic plan must also be approved by the board, and it must provide an electronic enablement (e-enablement) vision and mission that coheres with the business strategy. Similar to the business strategy, the IT strategy also articulates clear and measurable objectives, outputs, performance indicators and annual targets.

Enterprise architecture (EA) is driven by the Government-wide Enterprise Architecture (GWEA) framework which is based on TOGAF (The Open Group Architecture Framework). Ownership of the enterprise architecture processes is often misunderstood in the public sector. While the EA function resides in the IT department for functional reporting purposes, EA is an enterprise-wide undertaking. It is concerned with the principles guiding the design and evolution of the business and the IT components that make up the entire organisation, including the relationship between each of the components and the organisation's external environment. It is important that the business architecture (i.e. business structure, operations, standards, processes, information, data and data requirements), information systems architecture (i.e. structure of information, processes, process-related standards and applications) and technology architecture (i.e. infrastructure required to enable the information systems architecture) are clearly defined (DPSA, 2012). EA helps organisations map the "as-is" state of their business configuration to a desired "to-be" state. Business and IT management are required to devise operational implementation plans and processes to reach the desired state. These plans and processes inform the annual performance plans against which business and IT performance is judged. Budgeted amounts are committed to actual detailed proposals that are based on the tasks of the operational plans. The board performance plans are monitored by tracking expenditure and performance indicators on a quarterly basis, with the monitoring processes being more frequent at the level of executive and senior management. The quality information in the reporting process is crucial as management makes key decisions on the basis of the information that is contained in those reports.

To determine the configuration of IT alignment that can best serve the strategic objectives, it is important for management to consider the unique organisational circumstances and strategy. Management must exhibit the will and competence to execute IT alignment by understanding and applying the concepts of an IT alignment perspective that are most suited to their contexts. Consistent with the evolving role of ICT as a strategic enabler in the public sector, it is important to note that the dominant alignment perspective is that of *technology potential*, as depicted in Figure 3–9 below.

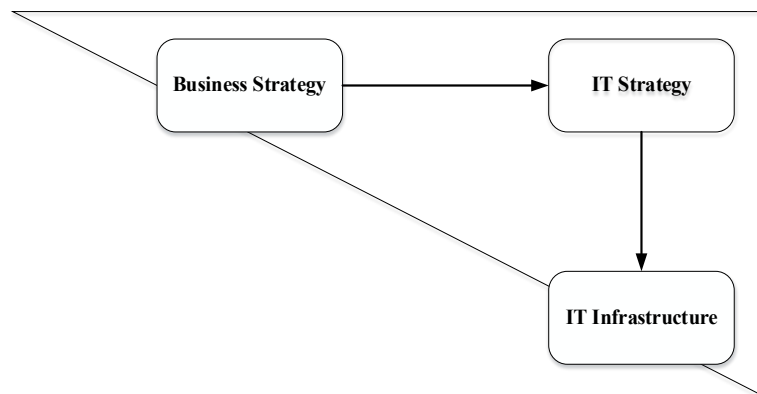


Figure 3–9: Technology potential perspective (adapted from Venkatraman, Henderson and Oldach, 1993; Van Grembergen, De Haes and Guldentops, 2004)

Of the four alignment perspectives (i.e. strategy execution, technology potential, competitive potential and service level) proposed by Venkatraman, Henderson and Oldach (1993), the technology potential is the most applicable to the South African public sector. Its design pattern affirms the public sector as having an IT duopoly governance arrangement where IT collaborates with business to determine the best strategic direction for IT to support business strategy in state-owned entities (Weill and Ross, 2005). Considering Figure 3–8 and Figure 3–9 together, it is easy to see how the public sector IT strategy is positioned as an enabler of business strategy. The business strategy is the driver of organisational IT strategy and architecture, and also influences the choices of the IT infrastructure, processes and competencies required to support it. Therefore, executive management is required to collectively understand the impact that a business strategy has on the IT strategy and related investment and prioritisation decisions. The CIO is responsible for designing and implementing the technology systems according to the requirements expressed by business executives. Technology leadership becomes a critical performance criterion as technology enables core business processes (Venkatraman, Henderson and Oldach, 1993; Peppard and Ward, 2016). The CGICTPF offers guidelines for management to define the appropriate

structures, processes and relational mechanisms to implement IT alignment (DPSA, 2012; De Haes et al., 2020).

### **3.5.2 Regulatory compliance**

The motivation to adopt new processes in public organisations needs to be clarified as this has a bearing on the success of the adoption (Walker, 2006). In this study it is important to consider this because it also reveals the nomothetic nature of CGICTPF adoption. In the South African public sector context, the adoption of the CGICTPF is mandatory and all public sector organisations must implement it (DPSA, 2012). Therefore, compliance with the CGICTPF is regulated. However, the CGICTPF itself also inspires compliance with all relevant laws, policies, frameworks and practices and all three framework constituents of the CGICTPF clearly articulate the compliance obligation. Under Principle 12 of the King IV Report, clause 13 states: “The governing body should exercise ongoing oversight of technology and information management and, in particular, oversee that it results in the following: ... (i) Compliance with relevant laws” (IoDSA, 2016, p.62). Further, Principle 5 of the ISO 38500 standard states that the governing body should ensure that “the use of IT complies with all mandatory legislation and regulations. Policies and practices are clearly defined, implemented and enforced” (International Standards Office, 2015a, p.6). In addition, one of the key objectives of COBIT is to assist organisations achieve “compliance with relevant laws, regulations, contractual agreements and internal policies”<sup>4</sup> (ISACA, 2012, p.15).

The public sector is highly regulated. Therefore, regulatory compliance is a bedrock of performance and the creation of public value. Non-compliance with regulatory obligations has reputational, financial and political implications and a lack of IT governance implementation “risks inappropriate investment, failure of services, and noncompliance with regulations” (Juiz and Toomey, 2015, p.60). Therefore, compliance is a critical performance indicator and strategic differentiator in an environment where adoption is mandated, as is the case with the CGICTPF in the public sector. On the surface, the notion of a strategic differentiator may appear unseemly for a public sector organisation, considering that there are no market or competitive forces at play. However, it is applicable as the reconfiguration of public entities

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<sup>4</sup> See Appendix H for a comprehensive list of regulations and codes that apply to the state-owned entities that are the focus of this study.

remains a possibility. With a change in political leadership within government administrations some entities may be moved to different ministries; others still merge and effectively subsume their mandate into better performing ones. Instances of state-owned entity restructuring were carried out as a consequence of the recommendations of the Presidential Review Committee Report of 2013 to reduce the number of state-owned entities and streamline their activities.

## **3.6 Public sector focus**

### **3.6.1 Public administration through state-owned entities**

There are key differences that distinguish the public from the private sector context, and these justify an idiosyncratic approach to IT governance in the public sector. The fundamental difference here is that all strategic planning and management practices in the public sector are in pursuit of generating and demonstrating public value, as opposed to shareholder value and profits (Campbell, McDonald and Sethibe, 2009; Winkler, 2013; Dawson et al., 2016). Three public sector administration approaches have been central to the creation and provision of public value: traditional public administration, New Public Management (NPM), and the emerging approach (Bryson, Crosby and Bloomberg, 2014). The traditional public administration approach originated in the USA in the 1900s as a response to the challenges of industrialisation, the rise of the modern corporation and concerns over market failures (Bryson, Crosby and Bloomberg, 2014). Its utility and support as an agent for public good was solidified after World War II. In this approach, efficiency is a key value driver and government agencies are the primary mechanisms for delivering public value (Bryson, Crosby and Bloomberg, 2014). The NPM arose in the 1980s and 1990s as a response to concerns relating to government failures. It was characterised by a strong belief in the efficacy and effectiveness of the markets and an economic rationality that preferred the privatisation of government agencies as a means to gain that efficacy and effectiveness (Bryson, Crosby and Bloomberg, 2014). In this environment managers in government agencies were encouraged to view the public as customers, be entrepreneurial and deliver public services in efficient and effective ways with as little red tape as possible (Bryson, Crosby and Bloomberg, 2014). However, challenges relating to the governance aspect of public administration persisted and necessitated that public administration be viewed from an inclusive and collaborative perspective among all stakeholders, with the government remaining the guarantor of public values (Bryson, Crosby and Bloomberg, 2014; Crosby, Hart and Torfing, 2017). Thus, a new

approach is emerging. Bryson, Crosby and Bloomberg (2014) outline the dimensions of the new emerging approach, as depicted in Table 3–2, drawing from a combination of Denhardt's New Public Service framework of 2011, Stoker's public value management of 2006, Bozeman's managing publicness of 2007, Osborne's new public governance of 2010, and Boyte et al.'s new civic politics of 2011 (Bryson, Crosby and Bloomberg, 2014).

Table 3–2: Emerging approach to public administration (adapted from Bryson, Crosby and Bloomberg, 2014)

<b>EMERGING APPROACH TO PUBLIC ADMINISTRATION</b>		
<b>#</b>	<b><i>Dimension</i></b>	<b><i>Perspective</i></b> <i>(Bryson, Crosby and Bloomberg, 2014, p.447)</i>
1	Definition of the common good, public value, public interest	What is public is seen as going far beyond government, though government has a special role as a guarantor of public values. Common good is determined by broadly inclusive dialogue and deliberation informed by evidence and democratic and constitutional values.
2	Role of politics	“Public work”, including determining policy objectives via dialogue and deliberation; democracy as “a way of life”.
3	Role of citizenship	Citizens seen as problem-solvers and co-creators actively engaged in creating what is valued by the public and is good for the public.
4	Role of government	Government acts as convener, catalyst, collaborator; sometimes steering, sometimes, rowing, sometimes partnering, sometimes staying out of the way.
5	Key objectives	Create public value in such a way that what the public most cares about is addressed effectively and what is good for the public is put in place.
6	Key values	Efficiency, effectiveness, and the full range of democratic and constitutional values.
7	Mechanisms for achieving policy objectives	Selection from a menu of alternative delivery mechanisms based on pragmatic criteria; this often means helping build cross-sector collaborations and engaging citizens to achieve agreed objectives.
8	Role of public manager	Plays an active role in helping create and guide networks of deliberation and delivery and helps maintain and enhance the overall effectiveness, accountability and capacity of the system. Responsive to elected officials, citizens and an array of other stakeholders. Discretion is needed, but is constrained by law, democratic and constitutional values, and a broad approach to accountability.
9	Approach accountability	Multifaceted, since public servants must attend to law, community values, political norms, professional standards and citizen interests.
10	Contribution to the democratic process	Delivers dialogue and catalyses and responds to active citizenship in pursuit of what the public values and what is good for the public. No one sector has a monopoly on public service ethos; maintaining relationships based on shared public values is essential.

To gain a deeper appreciation of the central idea of public value, it is important to first clarify the meaning of “public”. While there have been differing views by public

administration researchers about what constitutes the public (Bryson, Crosby and Bloomberg, 2014), Meynhardt (2009) proposed that there are various perspectives into which definitions of the public can be categorised, including the pluralist perspective (i.e. public as interest groups); public choice perspective (i.e. public as consumer); legislative perspective (i.e. public as the represented); service-providing perspective (i.e. public as client); and the public as citizen. Viewed together, these categorisations provide a comprehensive perspective of the public and, consequently, a clearer perimeter for the definition of public value. Owing to its comprehensive nature, this study has preferred the definition of public value as something that is collectively received and is deemed to be of value by the public, or is for the good of the public (Moore, 2013; Crosby, Hart and Torfing, 2017). Essentially, public value can be observed as the outcomes of public goods and services delivered by governments using institutions of state such as agencies (Bryson, Crosby and Bloomberg, 2014). Governments are often also required to step in to moderate failures of the market using agencies (Bryson, Crosby and Bloomberg, 2014). The two state-owned entities (i.e. RAF and FSCA) that were selected as case studies for this research are government agencies.

3.6.1.1 *Other key differences between the public and private sectors*

Besides the fundamental difference of the pursuit of public value, there are various other differences between the public and private sectors that further justify an idiosyncratic approach to researching IT governance in the public sector. These are most evident in the areas depicted in Table 3–3 below:

Table 3–3: Public vs private sector differences (adapted from Campbell, McDonald and Sethibe, 2009; Winkler, 2013; Dawson et al., 2016)

<b>PUBLIC VS PRIVATE SECTOR</b>			
<b>#</b>	<b>Area</b>	<b>Public Sector</b>	<b>Private Sector</b>
1	Goals	Public value	Shareholder value
2	Stakeholders	Many	Few
3	Environment	Legal and formal constraints	Less regulated
4	Incentives	Low	High/market-related
5	Risks	High aversion	Lower aversion
6	Competition	Low, intergovernmental cooperation	High
7	IT innovation	Treated as necessity	Competitive advantage

PUBLIC VS PRIVATE SECTOR			
8	IT competencies	Generally lower	Varying
9	IT sourcing	Complex tendering processes	Flexible contracting
10	IT resources	Shared IT resources	Proprietary IT

These differences have been noted mainly in the US, Australia and Germany. Nevertheless, they are material for the South African context as well since they provide for a richer grasp of the IT governance mechanisms and practices that are best suited to the South African public sector context. They also emphasise the material differences between state-owned entities (in this case government agencies) which are not driven by the profit motive and state-owned enterprises which do generate profit. Considering that state-owned entities are dependent entirely on the fiscus for their operations, they are most affected by government budget cycles regarding IT investments and meeting strategic objectives. They are also more susceptible to the disruptions of political and executive leadership changes which often tamper with governance practices (Armstrong, Jia and Totikidis, 2005; Torfing et al., 2021).

### 3.6.2 Public value strategy

Owing to the central role that the state must play in delivering public value, it is necessary to clarify the granular aspects of public value creation such as “to whom, and in what settings, responsibility for public value creation is conferred and the implications of this for public management” (Williams and Shearer, 2011, p.1380). To assist public managers to solve complex societal problems through a defined strategy (Cook and Harrison, 2015), the public value framework (PVF) was proposed by Moore (1995; 2013) as a framework that sought to offer an improvement to the NPM concepts which were adapted from and deemed suitable for private sector corporate management practices, economic models and techniques (Meynhardt, 2009; Alford and Greve, 2017). As depicted in the public value strategic triangle proposed by Moore (2013) and displayed in Figure 3–10 below, Moore (2013) argued that public managers’ success must be measured against their ability to define a public strategy that is aimed at creating public value, is legitimate and politically sustainable, and is operationally and administratively feasible (Bryson, Crosby and Bloomberg, 2014; Cook and Harrison, 2015; Alford and Greve, 2017).

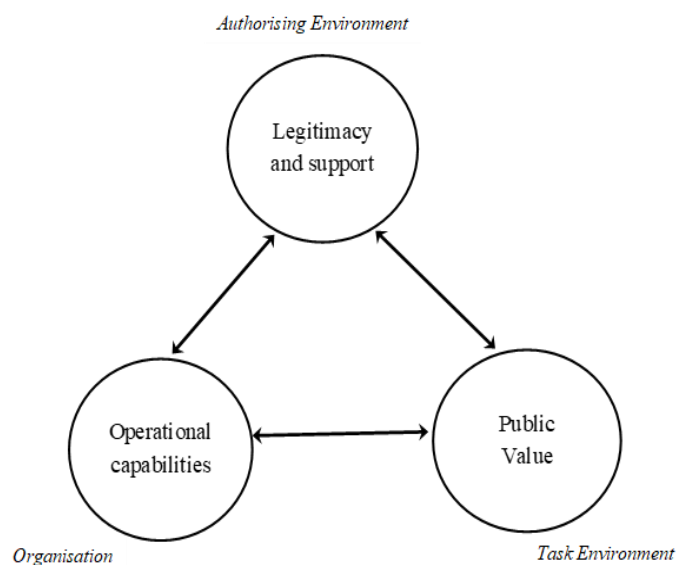


Figure 3–10: Public value strategic triangle (adapted from Moore, 1995; Ćwiklicki, 2016; Alford and Greve, 2017)

The triangle is premised on three core factors: *legitimacy and support* from the relevant authority (i.e. political authority, departmental leadership, executive leadership); *organisational capabilities* (i.e. skilled personnel, fit-for-purpose technology, policies, frameworks, practices) for creating public value, and *public value* (Crosby, Hart and Torfing, 2017). The PVF denotes the role of public management as that of dispensing public value through the provision of services, and achieving social outcomes while maintaining the trust of and legitimacy in the eyes of the public (Meynhardt, 2009). As is also the case in the South African public sector, government agencies are the mechanism through which public managers create and dispense public value (Bryson, Crosby and Bloomberg, 2014). This recognition motivated the choice of the case studies for this research. The hallmark of success for the government agencies is that they should be high-performing and service-oriented, efficient and effective in achieving desired social outcomes, and operate justly and fairly (Bryson, Crosby and Bloomberg, 2014). The objective of professionalising the South African government agencies through efficient and effective service delivery has led to the increasing reliance on IT as an enabling strategic partner (DPSA, 2012).

The PVF is not without criticism, one of which is that it underplays the link between policy design and public management where policy implementation takes place (Mintrom and Luetjens, 2017). Certainly, a manifestation of this is the disjuncture between the design of the CGICTPF and its implementation which resulted in the lack of improved IT governance practices in the public sector (DPSA, 2012). Mintrom and Luetjens (2017) agitate for a more

deliberate consideration of the intersection of policy design and public management practice within the underlying context of public value creation. Therefore, a fit must be attained between the functions of policy design and the public management of government agencies, seeing as the public value framework is about how middle and executive-level public managers in government agencies make sense of and negotiate their engagements with the public to create and dispense public value (Crosby, Hart and Torfing, 2017; Mintrom and Luetjens, 2017).

Another major criticism of the PVF, as bemoaned by Williams and Shearer (2011), was the lack of empirical research in relation to its propositions and efficacy. However, this criticism has since been increasingly addressed in the public management literature in the last few years through various research publications (Andersen et al., 2012; Bracci, Gagliardo and Bigoni, 2014; Modugno, Curiel and Ventin, 2014; Hartley et al., 2017; MacLean and Titah, 2021). Notwithstanding the gradual increase in empirical research in this area, the scope of the public management literature has not necessarily extended to include the way in which IT contributes to public value (Pang, Lee and Delone, 2014). Pang, Lee and DeLone (2014) propose that within the public sector there are five ways in which IT contributes to public value. Their framework of IT contribution to public value is discussed below, including its scope and relevance in South African government agencies.

### **3.7 The quest for IT value in the public sector**

As discussed in section 3.5.1, IT alignment is a function of good IT governance and its objective is to deliver a strategic and functional fit between business and IT. IT alignment is appraised in terms of the extent to which IT contributes to public value creation. Put differently, the measure of IT value in a public organisation is the extent to which IT helps the organisation to meet its strategic objectives of public value creation. However, IT value and the actual processes involved in creating value using IT have not been clearly articulated in the public sector context (Pang, Lee and Delone, 2014; Galliers, Leidner and Simeonova, 2020).

It is important to consider IT enablement in South African state-owned entities within the context of the National e-Government Strategy and Roadmap (e-Government Strategy) that was adopted in 2016 and which serves as the overarching strategy for creating public value using IT. The e-Government Strategy is aligned to the NDP objectives and SDGs, and it

emanates from a recommendation of the PRC of 1998 (Maphai, 1998). It evolved from the DPSA Electronic Government: The Digital Future – A Public Service IT Policy Framework of 2001, the DTSP Information Society and Development (ISAD) Plan of 2007 and the Batho Pele principles for improving the quality and accessibility of government services (Maphai, 1998).

The concept of e-government is necessarily about the use of ICT to provide online government services to create public value (Veit and Huntgeburth, 2014; Falk, Römmele and Silverman, 2017; Sandoval-Almazán et al., 2017). The first wave of e-government was noted across developed and developing countries from the early 2000s (Falk, Römmele and Silverman, 2017); however, IT has since the 1970s been considered a critical factor in public administration (Veit and Huntgeburth, 2014). Whereas the Organization for Economic Cooperation and Development (OECD) draws a distinction between “e-government” and “digital government” (OECD, 2014), these definitions are closely related and academics, policymakers and practitioners have not reached a consensus on the difference between these definitions (United Nations, 2020). The South African e-Government Strategy incorporates aspects of both the OECD definitions and assumes an interchangeable use of the terms, defining e-government/digital government as the “innovative use of communications technologies (including mobile devices), websites, applications and other ICT services and platforms to link citizens and the public sector and facilitate collaborative and efficient governance” (DTSP, 2017, p.11). The objective of the e-Government Strategy is to “guide the digital transformation of public service in South Africa into an inclusive digital society where all citizens can benefit from the opportunities offered by digital technologies to improve their quality of life” (DTSP, 2017, p.11).

The United Nations Department of Economic and Social Affairs conducts an annual benchmark of e-government development among its 193 member states using the survey-based E-Government Development Index (EGDI). Although there has been a general improvement among African states, South Africa ranks 78th in the world with a rating of H3 (i.e. high EGDI), and third regionally in the UN 2020 EGDI report. The H3 rating is respectable, but the ranking is down 10 points from the previous survey in 2018 (United Nations, 2020). This illustrates the problem faced by government in relation to the use of IT to provide the public with services efficiently and effectively. In particular, the EGDI survey assesses trends across three core areas: the Online Services Index (OSI), the

Telecommunications Infrastructure Index (TII) and the Human Capacity Index (HCI) (United Nations, 2020). The OSI measures the use of ICT by governments to deliver public services at a national level; the TII measures connectivity in the form of ICT infrastructure rollout and internet access; and the HCI measures the adult literacy rate of a member state. The country further dropped 18 places in the e-participation index between 2018 and 2020, obtaining a global ranking of 57. However, the e-participation ranking was the highest on the continent and this is a function of the effective partnership between government agencies, businesses and the citizenry who access online services (United Nations, 2020).

The e-Government Strategy contains a catalogue of e-services that government intends to rollout. This adds to the existing national e-services such as the SARS e-filing for tax management and collection, the Department of Labour (DoL) U-Filing to process claims to the unemployment insurance fund and related benefits, the Department of Home Affairs (DHA) smart identification card system, integrated electronic national transport information system (eNATIS) for car and licence registration/renewal, police crime administration system (CAS) etc. The e-Government services are targeted at the public in arrangements that fall under government-to-government (G2G), government-to-citizen (G2C), government-to-business (G2B) and government-to-employee (G2E) programmes (DTPS, 2017). The key objectives of the e-Government Strategy include improving access by the public to quality public services and government information from anywhere at any time, and reducing the cost of public administration in South Africa. The guiding principles include the interoperability of government systems to provide seamless information across various services while eliminating duplication, adequate IT security to protect government data assets from unauthorised access, adopting indigenous languages for the content of e-services platforms and applications, and digital inclusion (DTPS, 2017). In this context, the chosen channels for dispensing public services include the internet, cellphones, digital TVs, call centres and other common service centres such as mobile kiosks and the like.

IT enhances organisational performance and creates value in public-sector organisations through five key organisational capabilities (Pang, Lee and Delone, 2014). It has been observed that in the South African public sector, IT also enables these organisational capabilities through (1) a digitised administrative process (i.e. information systems and infrastructure that automate administrative tasks and transactional processing); (2) public intelligence analytics (i.e. technological tools to gather information from the public and the

environment and the ability to analyse and derive knowledge and insights from the information); (3) inter-organisational system integration (i.e. integrated systems and communication technologies that enable the exchange of information and intelligence with external organisations); (4) online public interactive interfaces (i.e. online interactive venues such as websites, social media or mobile channels and the ability to use these channels to interact with citizens and other stakeholders in real-time); and (5) public information dissemination (i.e. infrastructures and channels through which the public can have access to government information repositories and which have the ability to publish government information assets in a manner that is easily accessible and comprehensible to the public) (Pang, Lee and Delone, 2014). Certainly, these capabilities are harmonious with the manner of delivery of IT value discussed above, and more specifically, present and future capabilities of the state-owned enterprises that are within the scope of this study. Public sector executive management is tasked with executing IT strategy that yields government services that are easily accessible, more efficient and responsive at a reduced cost to the state and the public (DTPS, 2017). Executive management in the RAF and the FSCA drive the strategic use of IT in their organisations to improve interactive service delivery and information dissemination. The RAF is engaged in a three-phase project, to be completed in 2023, to modernise and integrate the outdated claims management system that is largely paper-based (RAF, 2020). The new integrated claims management system is intended to digitise the claim initiation and management process in a similar fashion to the SARS and UIF e-filing systems, and it must seamlessly interface with systems from the Department of Home Affairs, the South African Police Service and the Department of Health. The FSCA offers e-services through various online portals<sup>5</sup> to industry and regulated entities in order to ensure efficient and effective mechanisms for compliance and supervision. It also offers the online anonymous submission of whistleblower tip-offs. In addition, the FSCA is pursuing a data-driven digital (DDD) strategy to enable and support the achievement of the FSCA business strategy. The DDD strategy is underpinned by four key programmes: a Process Automation Programme (to digitise core and support processes of the business through the provision of simple, integrated seamless services supported by strong ICT capabilities to achieve operational efficiency); a Digital Transformation Programme (to embed a culture of business insight and analytical

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<sup>5</sup> <https://www.fsca.co.za/RegulatedEntities/Pages/E-Services.aspx>

decisions supported by evidence from the advanced analysis of consumer and customer data); a Cyber Security Programme (to ensure a cyber-resilient digital platform for the FSCA through a multilevel defence mechanism); and an IT Service Improvement Programme (to take advantage of current and emerging technologies to achieve a holistic customer experience for all FSCA stakeholders and to ensure consistency) (FSCA, 2020a).

The use of social media provides an additional channel for both organisations to be accessible to the public.

### **3.8 Conclusion**

In this chapter a definition of IT governance that is aimed at the public sector context was adopted, derived from a plethora of IT governance definitions that were found in extant literature. The definition that was adopted for this study is:

*IT governance is the organisational capacity exercised by the board of directors, executive management and IT management to make and monitor IT-related business decisions and investments to sustain and extend the organisation's strategic objectives*

This definition enjoins that IT governance is a strategic matter and the responsibility of boards of directors which are accountable for the exercise of their core tasks. These include *Directing* by delegating to management the development and implementation of organisational strategy and policies for IT investments, performance objectives and the responsible use of IT; *Evaluating* proposals and plans relating to the current and future use of IT in their organisations while taking into account the organisation's internal and external environmental context, including the legitimate stakeholder needs and political influences, technological advances, economic and social pressures, and regulatory requirements; and *Monitoring* the performance of all aspects of IT within the organisation to ensure that they align to the set strategic objectives and conform to regulatory requirements. Considering that there is a difference between governance and management, these tasks are different from the role played by management which executes the Plan, Build, Run and Monitor approach to implement the instructions of the board of directors.

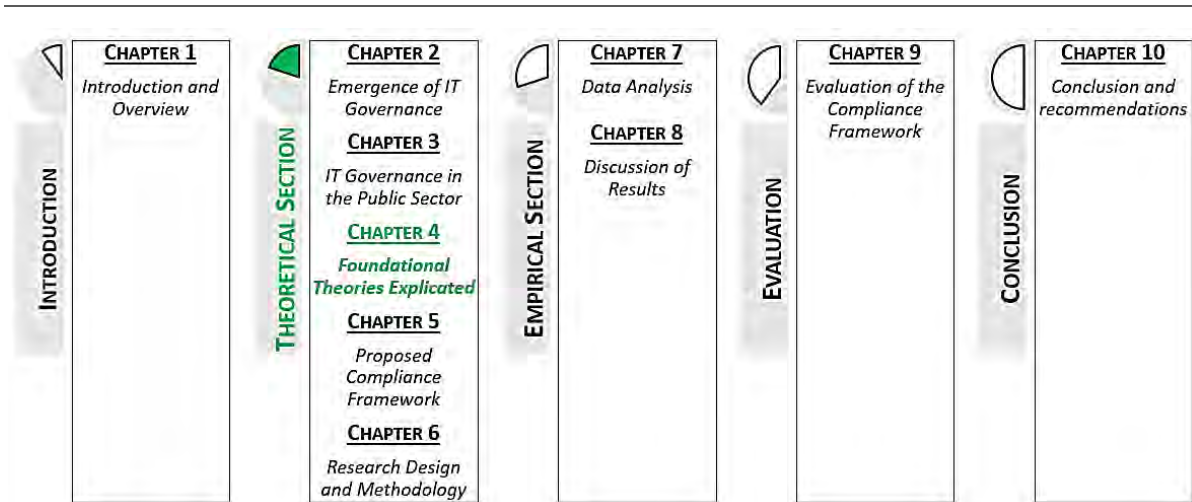
In order to perform their critical function effectively, the board of directors and management need to rely on the guidance of aligned international IT governance frameworks

and standards such as the: Calder-Moir meta-framework, the ISO38500 standard, the King IV Report, COBIT and other operational level standards and frameworks. These frameworks are industry-driven and industry-sponsored. They complement models of IT governance from the IS literature and are deemed crucial to operationalising IT governance adoption and use in organisations of any size or industry. The seminal IT governance model in the IS literature was developed by Weill and Ross (2004) and is based on comprehensive empirical research. It is underpinned by three key components presented in a decision matrix: 1) governance archetypes for allocating IT-related decision rights; 2) IT-related governance decision domains and 3) IT governance mechanisms for implementing IT governance (Weill and Ross, 2004).

The CGICTPF is based on the ISO38500 standard, the King III Report and COBIT 5, and must be implemented by all organs of state. In addition, it is geared to assisting public sector organisations to meet the NDP and SDG imperatives. The key drivers of IT governance adoption in the public sector were found to be the quest for strategic alignment and regulatory compliance. This chapter also noted that the use of IT by public organisations to dispense public services is a demonstration of public value. There are key differences that distinguish the public from the private sector context, which justify an idiosyncratic approach to IT governance in the public sector. This study takes these differences into account in order to draw accurate and relevant conclusions – which would be impossible if these differences were ignored.

# 4

## Foundational Theories Explicated



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## 4.1 Introduction

This chapter proposes that theory plays a critical role in providing a foundation for a study because it guides the process of formulating research questions and influences the research concepts, design and results (Ngulube, 2020). Actual theory application can reasonably be categorised within a range of minimum (i.e. citing theory in passing), moderate (i.e. using aspects of the theory without demonstrating their link to the study in question) and major (i.e. theory testing, application and generation) (Kumasi, Charbonneau and Walster, 2013; Ngulube, 2020). This study entails a major application of two IS adoption and use theories – the technology–organisation–environment (TOE) framework and the DeLone and McLean IS success model – to develop a compliance framework that was empirically investigated using a multi-case method. The use of an empirical approach sought to address a cautionary note raised by Ågerfalk (2014) that without empirical evaluation, theory makes a limited contribution.

## 4.2 CGICTPF adoption in the IS literature

In light of the preceding discussion, it is necessary to demonstrate the extent of the dearth of academic literature in relation to the study of the CGICTPF or IT governance in South African state-owned entities. Table 4–1 elucidates the literature search strategy and strings applied to extract public sector IT governance literature from credible databases:

Table 4–1: CGICTPF literature review search strategy for 2014–2020

<b>LITERATURE SEARCH</b>					
<b>#</b>	<b>Search String</b>	<b>SCOPUS</b>	<b>Google Scholar</b>	<b>Science Direct</b>	<b>EBSCOHost</b> <i>(Academic Search Premier, Business Source Premier)</i>
<b>#1</b>	"Information Technology governance" AND ("Adoption" OR "Implementation" OR "Use")	125 <b>[65]</b>  Reviewed 65 documents  <b>Sorted by Relevance</b>	7,420 <b>[3,940]</b>  Reviewed first 40 documents  <b>Sorted by Relevance</b>	65 <b>[44]</b>  Reviewed 44 documents  <b>Sorted by Relevance</b>	48 <b>[13]</b>  Reviewed 13 documents  <b>Sorted by Relevance</b>
<b>#2</b>	<b>(#1)</b> AND ("public sector" OR "state owned entities" OR "SOE")	8 <b>[6]</b>	1,730 <b>[1,050]</b>	20 <b>[17]</b>	3 <b>[1]</b>

LITERATURE SEARCH					
#	Search String	SCOPUS	Google Scholar	Science Direct	EBSCOHost <i>(Academic Search Premier, Business Source Premier)</i>
#3	(#2) AND ("South Africa")	0	360 [245]	4 [3]	0
#4	(#3) AND ("CGICTPF" OR "Corporate Governance of ICT Policy Framework")	0	30	1	0
<b>Inclusion Criteria</b>		<i>Date range:</i> 2014–2020	<i>Date range:</i> 2014–2020	<i>Date range:</i> 2014–2020	<i>Date range:</i> 2014–2020
		<i>Document Type:</i> Article, Conference Paper		<i>Article Type:</i> Research articles	<i>Full Text</i>
		<i>Source Type:</i> Journals, Conference Proceedings			<i>Database:</i> Academic Search Premier, Business Source Premier
		<i>Language:</i> English			Scholarly (Peer Reviewed) Journals
					<i>Language:</i> English

The table illustrates the incremental iterations of the search process, with each iteration giving the researcher the ability to narrow the results down (from #1 to #4) to the precise scope of this study. The databases utilised include Scopus, GoogleScholar, Science Direct and EBSCOHost. The inclusion criteria covered the date range (i.e. 2014–2020), document type (i.e. journal articles, conference proceedings) and only those publications that were presented in English. The numbers shown in brackets denote the volume of documents returned after applying the inclusion criteria. Only those publications that fell within the inclusion criteria were considered; however, of those that fell outside the inclusion criteria it was necessary to consider seminal IS publications and those that were highly cited in relation to IS adoption literature.

Owing to it being a uniquely South African and public sector configuration, it was prudent to specifically include the words “CGICTPF” or “Corporate Governance of ICT Policy

Framework” in the search string. However, the results showed a dearth of research publications that met these criteria, with only thirty journal articles being returned by GoogleScholar, one by the Science Direct database, and none by the Scopus and EBSCOHost databases. The Science Direct journal article was related to implementing IT change management, while those returned by GoogleScholar comprised diverse focus areas such as the application and validation of the CGICTPF in local government (i.e. municipalities, which are based on a different governance structure to that of state-owned entities which are the focus of this study), TVET colleges and higher education institutions generally. Even so, most of these articles make just superficial mention of the CGICTPF, and none of them explore the CGICTPF to the detailed extent that is done in this study. These results showed a gap in relation to IT governance research in state-owned entities. Specifically, CGICTPF implementation is not adequately theorised in the academic literature and, therefore, there are few academic contributions to assist practitioners and policymakers to improve its adoption and use.

### **4.3 Theoretical topography of IS adoption and use**

The concepts of technology adoption, acceptance and use are occasionally used interchangeably by some IS researchers, while others define adoption as encompassing acceptance and use (Thong, 1999; Rad, Nilashi and Dahlan, 2018). However, for this study it was important to clearly demarcate the idea of adoption from that of use as there are intricacies that are idiosyncratic to each such that, if not properly conceptualised, they may compromise the depth of the discussion and distort its conclusions. This consideration adds to the wider debate about the distinction and similarities of the concepts of diffusion and adoption (De Vries, Tummers and Bekkers, 2018). Adoption may take different forms depending on the context within which it takes place (DePietro, Wiarda and Fleischer, 1990). For the purposes of this study adoption refers to the decision to make a technology or framework available for use within an organisation (DePietro, Wiarda and Fleischer, 1990; Vatanasakdakul, Aoun and Chen, 2017).

The unit of analysis is “the entity described by the data collected and about which the analysis is conducted” (Casteel and Bridier, 2021, p.341). Accordingly, in this study it also influenced the appropriate usage of the concepts of technology adoption, acceptance and use. When reviewing the extant IS research literature, it is observed that where the unit of analysis is the individual, the focus on technology *acceptance and use* is the preferred approach

(Venkatesh, Thong and Xu, 2016; Rad, Nilashi and Dahlan, 2018), whereas if the unit of analysis is the organisation, then the focus on technology *adoption and use* is the prevailing approach (Venkatesh, Thong and Xu, 2016; Rad, Nilashi and Dahlan, 2018). This is a crucial thematic distinction and is ideated by the notion that technology *adoption* decisions are characteristically made by management at the level of the organisation, taking into consideration organisational, external/internal and other socio-technical factors (Bagozzi, 2007); meanwhile, technology *acceptance* occurs at the level of the individual within the organisation (Bagozzi, 2007; Chuttur, 2009). Both adoption and acceptance decisions are dependent on *continued use* to approximate their effectiveness in contributing towards organisations meeting their strategic objectives.

The decision to adopt a technology or framework does not inevitably lead to its optimal use. Put differently, the political pressure to adopt the CGICTPF does not necessarily directly inspire the actual and continued use of the framework in state-owned entities. Essentially, adoption is about the decision to make the CGICTPF available for use by a state-owned entity in order to meet its regulatory and strategic objectives. Accordingly, continued use denotes the action to implement and derive benefit from the framework following the adoption decision. The effective and continued use of the CGICTPF is contingent on other factors, both internal and external to state-owned entities, such as competencies, organisational structures, adequate investments and support from management and external stakeholders. A continuous series of strategic, tactical and operational decisions affect the use of the CGICTPF, more so than the mere act of formal adoption. An organisation may formally adopt the CGICTPF as mandated and evidenced by the relevant organisational charters and policies, but the use or implementation of the framework may be woefully poor, as the Auditor-General has consistently found (AGSA, 2019b; 2020; 2021). The failure of either the adoption or continued use of the CGICTPF of both results in the failure of the entire IT governance practice and controls. In the auditing profession this is explained through the concepts of control design versus control operating effectiveness (Graham, 2014). The effectiveness of the CGICTPF in an organisation must be measured by the extent of its use, and not merely by the decision to adopt the framework.

Much of the literature on IT governance does not address the subject of adoption and use in state-owned entities as is intended in this study. Rather, the extant literature focuses on other areas of IT governance, as shown in Table 4–2 below:

Table 4–2: IT governance focus areas in the IS literature

<b>IT GOVERNANCE FOCUS AREAS IN THE IS LITERATURE</b>			
<b>#</b>	<b>Area</b>	<b>Sector</b>	<b>Reference</b>
1	Success factors	Public/private	(Nfuka and Rusu, 2010; Alreemy et al., 2016)
2	Mechanisms	Private	(Van Grembergen, De Haes and Guldentops, 2004; Weill and Ross, 2004; Wu, Straub and Liang, 2015; Higgs et al., 2016; Levstek, Hovelja and Pucihar, 2018)
3	Practices	Public	(Wiedenhof, Luciano and Magnagnagno, 2017)
4	Levels	Public	(Coertze and Von Solms, 2014; Johl, Von Solms and Flowerday, 2014)
5	Awareness	Private	(Lin et al., 2010)
6	IT spending and efficiency	Public	(Pang, 2014)
7	Disclosures	Private	(Joshi, Bollen and Hassink, 2013)
8	Barriers	Private	(Othman and Chan, 2013)

In addition, some of the studies have explored IT governance solely from the perspective of the private sector (Nfuka and Rusu, 2010; Tonelli et al., 2015; Dawson et al., 2016). Other IS researchers have used a combination of theories in their studies so as to improve their understanding of the adoption and implementation decisions made by organisations (Weigel et al., 2014; Gangwar, Date and Ramaswamy, 2015; Vatanasakdakul, Aoun and Chen, 2017; Ali, Soar and Shrestha, 2018). However, several IS researchers have considered the subject of IT governance adoption and implementation by extending the work conducted by other IS researchers on IT innovation and adoption to IT governance research (Kanellis and Papadopoulos, 2009; Othman and Chan, 2013; Marrone et al., 2014; Vatanasakdakul, Aoun and Chen, 2017). The key theoretical lenses applied in such studies are displayed in Table 4–3 below:

Table 4–3: Theoretical lenses in previous IS studies

<b>The INDIVIDUAL as a unit of analysis</b>		<b>The ORGANISATION as a unit of analysis</b>	
<i>Theory</i>	<i>References</i>	<i>Theory</i>	<i>References</i>
<b>TAM</b> (technology acceptance model)	(Davis, 2015; Hornbæk and Hertzum, 2017)	<b>TOE</b> (technology–organisation–environment framework)	(DePietro, Wiarda and Fleischer, 1990; Gangwar, Date and Ramaswamy, 2015)

The <b>INDIVIDUAL</b> as a unit of analysis		The <b>ORGANISATION</b> as a unit of analysis	
<i>Theory</i>	<i>References</i>	<i>Theory</i>	<i>References</i>
<b>UTAUT</b> (unified theory of acceptance and use of technology)	(Venkatesh et al., 2003; Venkatesh, Thong and Xu, 2016)	<b>DOI</b> (diffusion of innovation)	(Rogers, 2003; Weigel et al., 2014)
<b>TBP</b> (theory of Planned Behaviour)	(Ajzen, 1991; 2015)	<b>Institutional theory</b>	(Scott, 2014)
<b>TRA</b> (theory of reasoned action)	(Fishbein and Ajzen, 1975; 2010)	<b>Absorptive capacity</b>	(Roberts et al., 2012)
<b>Agency theory</b>	(Eisenhardt, 1989; Dawson et al., 2016)	<b>The DeLone and McLean IS success model</b>	(DeLone and McLean, 2003; Nguyen, Nguyen and Cao, 2015)
		<b>Contingency theory</b>	(Turedi and Zhu, 2019)
		<b>Choice theory</b>	(Turedi and Zhu, 2019)

#### 4.4 The technology acceptance model (TAM)

The TAM is by far the most dominant model in IS research in relation to technology acceptance and use (Lee, Kozar and Larsen, 2003; Bagozzi, 2007; Venkatesh, Davis and Morris, 2007; Marangunic and Granic, 2015; Hwang, Al-Arabi and Shin, 2016; Hornbæk and Hertzum, 2017; Rad, Nilashi and Dahlan, 2018). The TAM was initially considered as a theoretical lens for this study; however, it was not preferred owing to its limitations which are elaborated below. Rad, Nilashi and Dahlan (2018) also caution that the dominance of the TAM in the IS adoption literature should not necessarily be construed as the maturing of the model, but rather as an indicator that researchers need to consider exploring other and emerging theories for IS adoption to circumvent the limitations of the TAM (Rad, Nilashi and Dahlan, 2018).

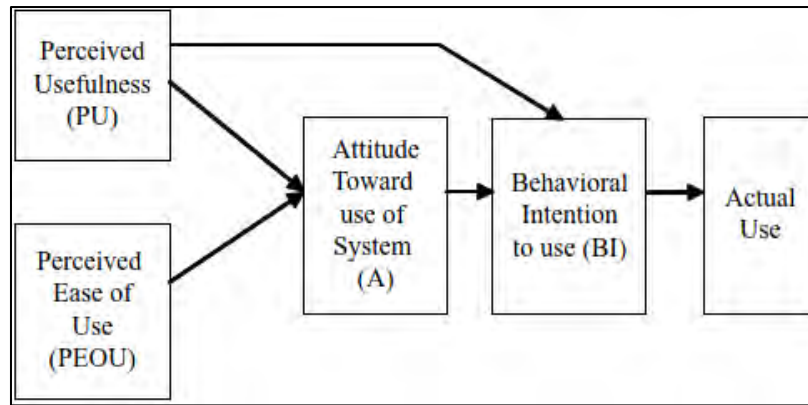


Figure 4–1: The original technology acceptance model (TAM) (Davis, Bagozzi and Warshaw, 1989)

The TAM was proposed by Davis (1989) in 1985 and empirically validated Davis, Bagozzi and Warshaw (1989). The TAM is derived from parts of the TRA and TBP, and has evolved over the years into various extensions such as TAM2, UTAUT, TAM3 (Davis, 1989; Venkatesh, Davis and Morris, 2007). As depicted in Figure 4–1, the two key independent variables of the TAM are perceived usefulness (PU) (i.e. “the degree to which an individual believes that using a particular system would enhance his or her job performance”) and perceived ease of use (PEOU) (i.e. “the degree to which an individual believes that using a particular system would be free of physical and mental effort”) (Davis, 1989, p.320). With actual technology usage being the determinant of system success and therefore the dependent variable (Davis, 1989; DeLone and McLean, 2016), the premise of individual technology acceptance models rests on three basic concepts: attitude towards using technology, intention to use and the actual use of technology (Davis, Bagozzi and Warshaw, 1989; Venkatesh, Davis and Morris, 2007). Legris, Ingham and Collette (2003) noted that even though the TAM is useful, it has limitations which can be remedied by integrating it into a broader model to account for variables that are related to crucial organisational and social change processes.

#### 4.4.1 TAM limitations and constraints

##### 4.4.1.1 *Mandated CGICTPF adoption*

As discussed in section 3.4, the adoption of the CGICTPF within the public sector is mandatory. Hwang, Al-Arabi and Shin (2016) argue that the explanatory and prediction power of the TAM, much like most acceptance models, has not been successful in organisations where adoption is mandatory. This weakness presents adverse implications for the TAM as a theoretical lens for this study in the following ways:

- *Unit of analysis*

The unit of analysis for this study is the *organisation* in the form of state-owned entities (i.e. the RAF and FSCA). The DPSA (2012) CGICTPF directive relates to government-wide adoption, and mandates a different process for *organisational* CGICTPF adoption and use. Organisational adoption is formalised in Phase 1 of the CGICTPF through idiosyncratic organisational IT governance charter, policy and related procedures. Therefore, the appropriate thematic approach to apply is *adoption and use*, instead of *acceptance and use*. As discussed previously, the former is applicable where the organisation is the unit of analysis. The utility of focusing at the organisational level of analysis is that “it subsumes all levels below, thus allowing for consideration (when appropriate) of subordinate levels” such as the individual (Fleischer and Roitman, 1990, p.200). The TAM is divergent in this regard as it was specifically conceptualised to explain and predict the attitude and behaviours of the individual as a unit of analysis (Bagozzi, 2007; Hwang, Al-Arabi and Shin, 2016). Consequently, with the CGICTPF being mandated at the organisational level, it is more beneficial to focus on organisational factors and related capabilities in relation to its adoption and use, rather than individual attitudes concerning its acceptance and use (Hwang, Al-Arabi and Shin, 2016).

In addition, when applied to a government agency in the US, the results showed that the independent constructs of the TAM (i.e. PU and PEOU) could not necessarily “mediate all influences from external environmental factors on system usage” (Chuttur, 2009, p.16). By design, the TAM does not account for external or organisational factors that might exert influence on how an organisation performs. The decision to adopt and use the CGICTPF at an organisational level in state-owned entities takes organisational factors into account and supersedes those of the individual. Individuals within the state-owned entities sign performance contracts with the organisations (their employer) with which they must comply, and often the contracts include aspects of IT governance that pertain to their specific roles. In a mandated environment, the individual aspects need to be complemented by the need for organisational compliance, which, as has been noted, can be a competitive differentiator in the public sector (Bagozzi, 2007).

- *Behavioural intention*

The TAM was adapted from the TRA and emphasises behavioural intention as a function of an individual’s attitude towards the use of a technology (Hwang, Al-Arabi and Shin,

2016). Considering the organisation as a unit of analysis and the mandatory nature of the CGICTPF, intention to use the framework may not be an accurate measure of the user's intentions since the individual use of the framework is not voluntary (Hwang, Al-Arabi and Shin, 2016). Therefore, intention to use the framework provided little utility in the context of this study. In addition, the reliance on behavioural intention in an environment that is not voluntary is a weakness of the TAM that extends to its evolved versions such as the TAM2, UTAUT, TAM3 (Bagozzi, 2007; Hwang, Al-Arabi and Shin, 2016). This is why they were also not considered as a theoretical foundation for this study.

#### 4.4.1.2 *Parsimony*

The above are sufficient cause to look beyond the TAM as a theoretical lens for this study. However, other limitations of the TAM are also material. Some IS researchers have criticised the TAM for its simplicity and parsimony (Venkatesh, Davis and Morris, 2007). While parsimony is desirable in a theory such as the TAM, it has also been its weakness in that it constrains its ability to explain and predict adoption decisions “across a wide range of technologies, adoption situations, and differences in decision making and decision makers” (Bagozzi, 2007, p.244; Hwang, Al-Arabi and Shin, 2016). Owing to its simplicity the TAM is noted to have mainly attracted quick and easy research interests and diverted attention from core issues pertaining to technology acceptance as a concept (Chuttur, 2009; Hwang, Al-Arabi and Shin, 2016). This diversion is responsible for the efforts to evolve the TAM that were not based on solid and widely accepted theoretical foundations, and resulted in further theoretical confusion and chaos (Benbasat and Barki, 2007; Hwang, Al-Arabi and Shin, 2016). Considering that the evolved versions of the TAM (i.e. TAM2, UTAUT, TAM3) closely resemble the TRA and TPB from which the original TAM was derived, some IS researchers have suggested that it is time for the IS research community to contemplate a renewed focus on the TRA or TPB in order to “provide the theoretical green light for going beyond TAM and allow for novelty and discovery” (Bradley, 2012, p.215).

## 4.5 Theoretical foundation

The unit of analysis for this study is public *organisations* in the form of two state-owned entities (i.e. the RAF and FSCA). In order to better account for both organisational and individual influences on the adoption and use of IT governance, the use of two theories as a foundation was preferred (Brown and Grant, 2005). In addition, this approach accommodates

the scope of this study and helps the researcher to circumvent the caution by Ågerfalk (2014) that using a particular/single theory can restrict the way in which the research is conducted and the scope of its potential results. Accordingly, the TOE framework and the DeLone and McLean IS success model were deemed suitable.

Rad, Nilash and Dahlan (2018) conducted a comprehensive review of the IS adoption literature for the period 2006 to 2015. They classified their analysis and results into four categories: (1) IT context used widely in IT adoption; (2) theories used widely in IT adoption; (3) influential variables that influence IT adoption; and (4) level of research in IT adoption (Rad, Nilashi and Dahlan, 2018). Their analysis has been useful in retaining the two theories that form the theoretical foundation of this study within the themes of *adoption* and *use* which are deemed appropriate as discussed in section 4.3. Rad, Nilashi and Dahlan (2018) observed that with regard to adoption and use, the theories that have been applied in the IS literature include the *TOE framework* and the *DeLone and McLean IS success model*:

- Adoption: TAM, DOI, task-technology fit (TTF) theory, UTAUT, trust model, TRA, perceived value model, uses and gratifications (U&G) theory, *TOE framework*, TPB, TOE, TAM2, Big Five theory, trust model, social capital theory, social identity theory, IOR
- Continuance of use: TAM, *DeLone and McLean IS success model*, ECT, TAM2, DOI, UTAUT, flow theory, *TOE framework*

#### **4.5.1 The technology, organisation and environment (TOE) framework**

The TOE is suited for this study because it is widely used in the IS literature, was conceptualised in an organisational analysis in the public sector and covers a broad spectrum of characteristics that advance the depth of analysis (Gangwar, Date and Ramaswamy, 2015; Rad, Nilashi and Dahlan, 2018). The TOE is an organisation-level theory that consists of three elements of the organisation that facilitate the adoption and use of technological innovations: technological context, organisational context and environmental context, depicted in Figure 4-2 below:

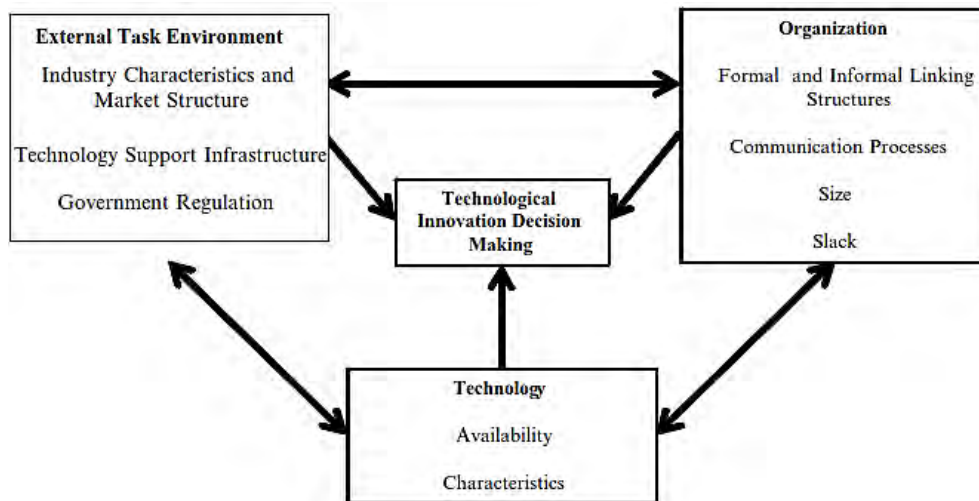


Figure 4-2: The technology–organisation–environment framework (DePietro, Wiarda and Fleischer, 1990)

The *technology context* refers to the internal and external technologies that are relevant to the organisation, including the practices applied and the equipment used in the organisation (DePietro, Wiarda and Fleischer, 1990). A review of adoption and use theories shows that they were intended to explore the adoption of new technologies, not frameworks or processes (Venkatesh, Davis and Morris, 2007; Ahmad et al., 2013). Nevertheless, technology is about more than just hardware; it is also about the functions that the hardware serves and their interactions with social actors in the organisation (DePietro, Wiarda and Fleischer, 1990; Eveland and Tornatzky, 1990). Therefore, in this context the IT governance process can also be conceived of as a technology. This ideation of technology is crucial for justifying the appropriateness of the TOE for an inquiry into the CGICTPF, which is process-based as opposed to hardware or system-based. It is important to present the convention that clearly establishes the applicability of the TOE framework to a process-based inquiry in order to enhance the rigour of the study.

The *organisational context* refers to formal and informal structures, processes and mechanisms within the organisation that facilitate the adoption and use of the CGICTPF (DePietro, Wiarda and Fleischer, 1990). Bradley (2012) argues this view by stating that organic and decentralised organisational structures contribute to adoption processes, and this can be attributed to mechanisms such as product champions, gatekeepers, well-defined functions within teams and employee relationships to other value chain partners within the organisation. Top management support and a well-communicated organisational strategy from an adequately skilled board of directors and executive team enhance the capacity of the

organisation to adopt and successfully implement the CGICTPF (Bradley, 2012; DPSA, 2012).

The *environmental context* refers to the industry structure, technology service providers and the impact exerted by the regulatory environment in which an organisation operates (DePietro, Wiarda and Fleischer, 1990; Bradley, 2012). In the context of this study the industry structure covers the extent to which the external stakeholders of the state-owned entities are supportive of organisational efforts to adopt and continuously use the CGICTPF. The influence of consultancy services is also examined.

While the TOE framework is broad and generally applicable to a number of technologies, industries and geographical contexts, Gangwar, Date and Ramaswamy (2015) reasoned that the key limitation of the TOE framework is that it is too generic and its constructs can be vague. Considering that the TOE framework is aligned to, rather than competing with, other adoption and use theories (Bradley, 2012), its limitations can be remedied in research by integrating it with other theoretical models (Gangwar, Date and Ramaswamy, 2015). To meet that imposition, the DeLone and McLean IS success model was preferred in this study.

#### **4.5.2 The DeLone and McLean IS success model (D&M model)**

The DeLone and McLean IS success model (D&M model) is widely cited and considered to be among “the most influential theories in contemporary IS research” (Nguyen, Nguyen and Cao, 2015). Its creation was driven by “a process understanding of IS” (DeLone and McLean, 2003, p.16). This makes it compatible with an inquiry into IT governance adoption and use. The D&M model is appropriate for this study because IT governance adoption and use is contingent on the “effective creation, distribution and use of information via technology” for IT-related decision-making (DeLone and McLean, 2016, p.4). In addition, the compatibility of the D&M model with IT governance research is strengthened because concepts from an industry operational IT governance framework concerned with IT service management (i.e. the Information Technology Infrastructure Library (ITIL)) are closely aligned to the service quality construct and measurements of the D&M model (DeLone and McLean, 2016).

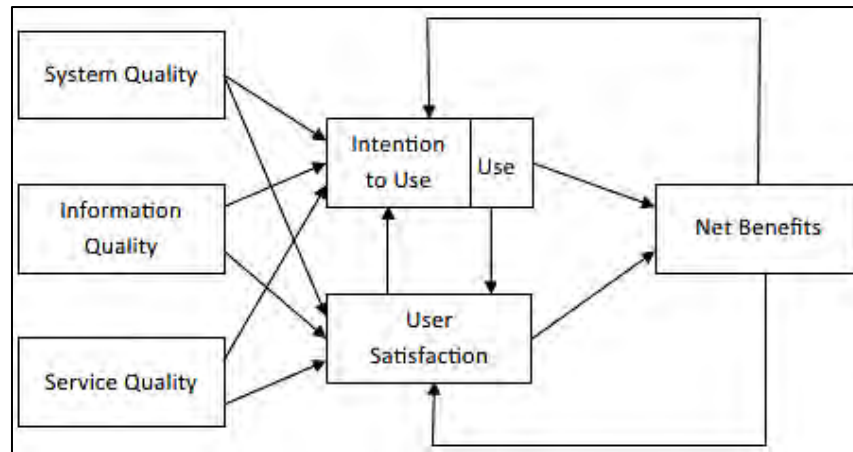


Figure 4–3: Updated D&M IS success model (DeLone and McLean, 2016)

The D&M model was published in 1992 as a comprehensive multidimensional model of IS success to address the hitherto ill-defined, complex, interdependent and multidimensional nature of IS success (Petter, DeLone and McLean, 2008; DeLone and McLean, 2016). In 2013, the authors of the D&M model published a ten-year review of the model and where necessary made updates to the original model as depicted in Figure 4–3. Similar to the original model, the updated D&M model also has six success dimensions, but these consist of additional and reconfigured dimensions which improve the original model (DeLone and McLean, 2016). DeLone and McLean advise that, as much as possible, the success dimensions and measures should be selected based on the objectives and context of the study in which it is applied (DeLone and McLean, 2016). This advice has been heeded in this study as explained below. Further, they recommend that these success dimensions and measures should be reduced in number significantly to improve the parsimony, validity and replicability of the study and, by implication, its results (DeLone and McLean, 2016). The dimensions and measures of the D&M model are adapted in this study as follows:

- *System quality* – refers to the desirable characteristics of the CGICTPF. In this study the relevant subdimensions considered are the usability and adaptability of the CGICTPF, both of which are organisational factors. It is not enough to assume that the design of the CGICTPF is fit for purpose merely because it was developed through a consultative process with the GITOC and endorsed by the South African government. Therefore, in this study the organisational measures for its usability and adaptability are expressed through some of the preliminary framework constructs under the organisational context, viz.: IT governance mechanisms, top management support, IT governance competencies among members of the board of directors, and the

organisation's IT dependency mode. The idea is that the analysis of the measures of these constructs will present a credible indicative view of the usability and adaptability of the CGICTPF, so long as the empirical evaluation affirms their significance in this study.

- *Information quality* – refers to the desirable characteristics of the CGICTPF outputs. In the preliminary framework for this study, this dimension is measured as a construct using accuracy, relevance, timeliness and completeness of management and board reports, performance reports, service level agreements (SLAs), operational level agreements (OLAs), business cases and IT strategic plans.
- *Service quality* – refers to the quality of the IT governance support that the state-owned entities receive. In the preliminary framework for this study, this dimension is measured in terms of the role of external stakeholders such as the GITOC, peer organisations in the public sector and the AGSA, as well as consultancy services support. Internal measures are accounted for in the system quality dimension as discussed above.
- *Use* – refers to the degree and manner in which the CGICTPF is adopted and implemented within state-owned entities. In preliminary framework for this study, this dimension is accounted for as a construct through the mandatory, effective and continued use of the CGICTPF. It is important to note that initial use and continued use are two related but different aspects of use. In relation to the CGICTPF *continued use* is preferred, and is demonstrated by adherence to all three phases of its implementation. The intention to use it is an individual measure was deemed unsuitable, considering the unit of analysis of this study – the organisation.
- *User satisfaction* – refers to management- and board-level satisfaction with reports. In this study it is accounted for using measures discussed under the preceding information quality and service quality dimensions.
- *Net benefits* – refers to the extent to which the CGICTPF is contributing to corporate governance such that it results in increased public value being generated by the state-owned entities. In this study this is also expressed through IT alignment and regulatory

compliance, which improve the efficiency and effectiveness of public organisations in the delivery of public services.

In their ten-year review, DeLone and McLean (2003, 2016) responded extensively to the criticisms of the original D&M model raised by researchers for the period 2003–2013 and modified the D&M model where they deemed it necessary, resulting in the updated D&M model as depicted in Figure 4–3. In the preliminary framework for this study, all D&M model constructs are directly and indirectly accounted for. This approach further enhances the validity of the TOE framework and the D&M model as theoretical lenses for IT governance research.

## **4.6 Conclusion**

This chapter discussed the important role that theory plays in research, and introduced the application of two foundational theories for IS adoption and use – the TOE framework and DeLone and McLean IS success model. This study relied on these two key theories as a theoretical basis for developing a compliance framework that was empirically investigated using a multi-case method. Therefore, the constructs of the proposed compliance framework were informed by the literature. The dearth of academic literature in relation to the adoption of the CGICTPF was also demonstrated by means of a literature search strategy.

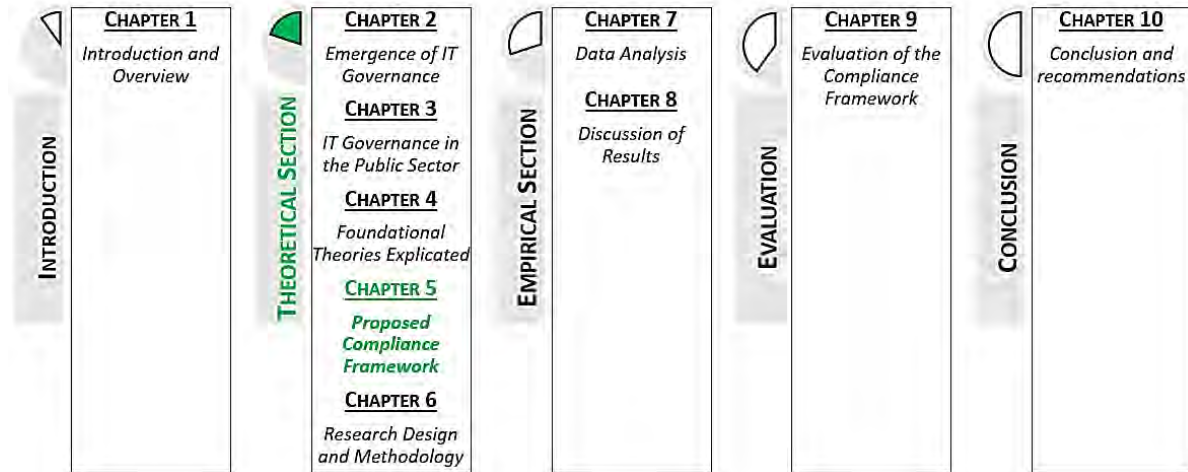
A discussion around the theoretical topography of IS adoption and use revealed the IT governance focus areas in the extant IS literature. This further crystalised the gap that this study seeks to close by investigating CGICTPF adoption and use. The TAM was also noted to be by far the most dominant model in IS research in relation to technology acceptance and use. Therefore, it became necessary to explain the weaknesses of the TAM which justified its exclusion as a foundational theory for this study.

The relevance of the two foundational theories was discussed within the context of the unit of analysis of this study, which is the organisation. Firstly, the TOE was noted as an organisation-level theory that consists of three elements of the organisation that facilitate the adoption and use of technological innovations: technological context, organisational context and environmental context. These three elements influenced the construction of the three domains of the proposed compliance framework. The D&M model was published in 1992 as a comprehensive multidimensional model of IS success and consists of six success

dimensions: system quality, information quality, service quality, use, user satisfaction and net benefits. All of these six dimensions inform and are accounted for in the constructs of the proposed compliance framework.

# 5

## Proposed Compliance Framework



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## 5.1 Introduction

Continuing from the previous chapter's application of theory to establish how literature informs theory development and the proposed compliance framework constructs, this chapter identifies the constructs and propositions of the conceptual preliminary compliance framework and articulates its utility.

The preliminary compliance framework and constructs were derived from the reviewed literature and foundational theories of this study: the technology–organisation–environment (TOE) framework and the DeLone and Mclean IS success model (D&M model). Later chapters of this study discuss the proposed compliance framework which was empirically evaluated and subjected to industry and academic expert reviews. The empirical evaluation and expert review processes culminated in a refined final compliance framework.

## 5.2 The preliminary compliance framework

The preliminary compliance framework was derived from the literature and premised on the two theories that formed the theoretical foundation of this study (as discussed in section 4.5). This study also builds on the work done by Vatanasakdakul et al. (2017) by applying the TOE and D&M model in an in-depth multi-case inquiry that was wholly focused on public sector organisations in the South African context. In essence, the preliminary compliance framework presented herein is a conceptual framework with a causal depiction of interrelationships between concepts, constructs and related propositions (Maxwell, 2013; Brown and Jacobsen, 2016). The preliminary compliance framework is the main contribution of this study, and it seeks to enhance corporate governance by improving IT governance adoption and use. A prefix (i.e. compliance) was added to the preliminary framework to read “a preliminary *compliance* framework”. This was necessitated by the notion that corporate governance is practised in an era of compliance and that the two concepts (i.e. corporate governance and compliance) cannot be extricated from each other (Griffith, 2016; MacNeil and Esser, 2022). The King IV Code operates on a principle of “comply *and* explain”, which compels organisations, including state-owned entities, to comply with principles of the Code *and* explain where they contravene them. Although this approach is not as punitive as the US Sarbanes–Oxley Act, it is a welcome advancement from the softer language of the King III Code of “comply *or* explain”.

Compliance is defined as a set of internal processes and mechanisms used by organisations to adapt their behaviour to applicable norms (i.e. legal, regulatory, industry and environmental) (Griffith, 2016; MacNeil and Esser, 2022). Compliance has become an important organisational process considering the increasingly regulated environment in which organisations in the public and private sectors operate. The compliance imperative is especially pronounced in the heavily regulated public sector. The nomothetic nature of the CGICTPF obligates compliance which is continuously monitored by internal audit, enterprise risk management, legal departments and the AGSA. State-owned entities have established a compliance function/capability to proactively and holistically monitor their compliance landscape and drive enforcement. The risk of non-compliance can be both reputational and financial damage; hence, compliance advisory, monitoring and enforcement is a key function of the Enterprise Risk Management (ERM) and Governance, Risk and Assurance (GRA) departments in both the RAF and the FSCA, respectively (Griffith, 2016; FSCA, 2020a; RAF, 2020). Compliance is not only about exogenous concerns such as regulatory requirements and industry practices and frameworks, but also endogenic concerns such as internal policies, processes and procedures through which the exogenous concerns find expression (Martinez, 2019).

The process relating to how organisations use technology to automate their compliance functions lies beyond the scope of this study (Gadinis and Miazad, 2019). It is sufficient to recognise that the board of directors is obligated to perform oversight on compliance initiatives of IT governance as part of its fiduciary duties (IoDSA, 2016; Armour et al., 2019). Every level within the organisation is obligated to perform IT governance practices that ensure that the organisation meets its compliance objectives (Orozco, 2020). The preliminary compliance framework in this study is intended to assist organisations to comply with CGICTPF imperatives if its constructs and their impact are carefully considered, as depicted in Figure 5–1 below. The propositions of the preliminary compliance framework take a deliberately positive outlook to focus on the IT governance practices that organisations can adopt in order to enhance IT governance adoption and use.

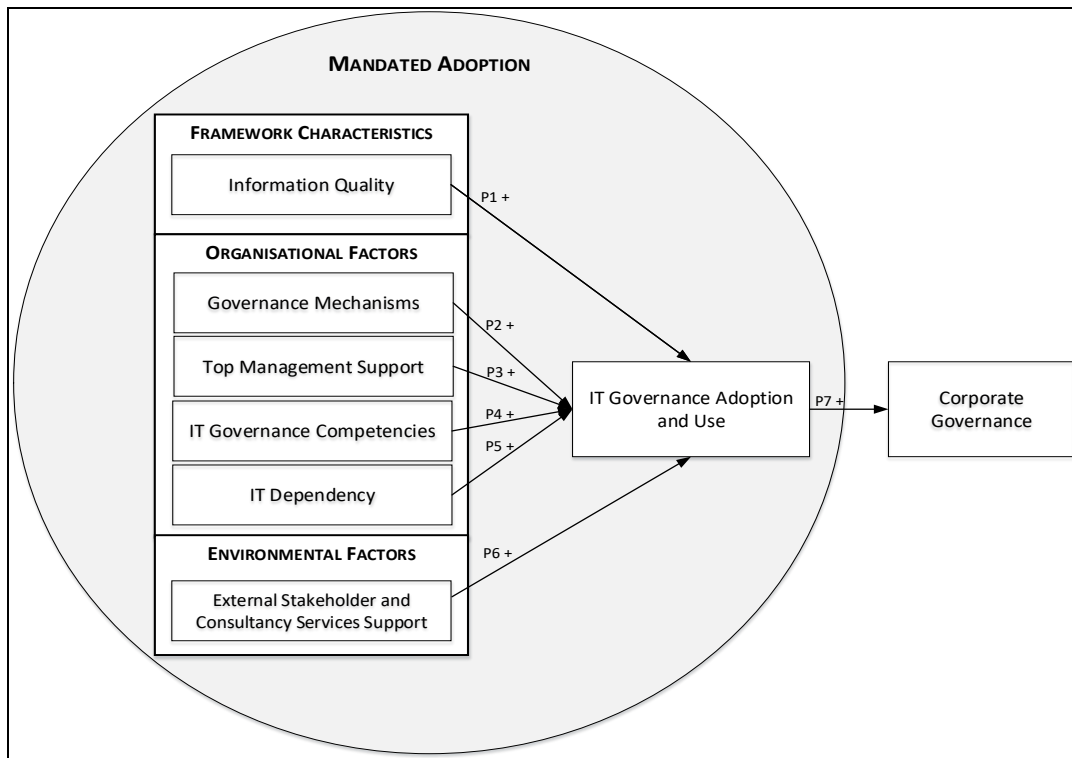


Figure 5-1: Preliminary compliance framework for IT governance adoption and use by state-owned entities in South Africa

The framework is comprised of eight constructs with seven related propositions, as presented in Figure 5-1. Now that the preliminary framework has been established, it is important to assess how the foundational theories influenced the development of the framework. Figure 5-2 below shows the influence of the TOE framework, and Figure 5-3 shows the influence of the D&M model:

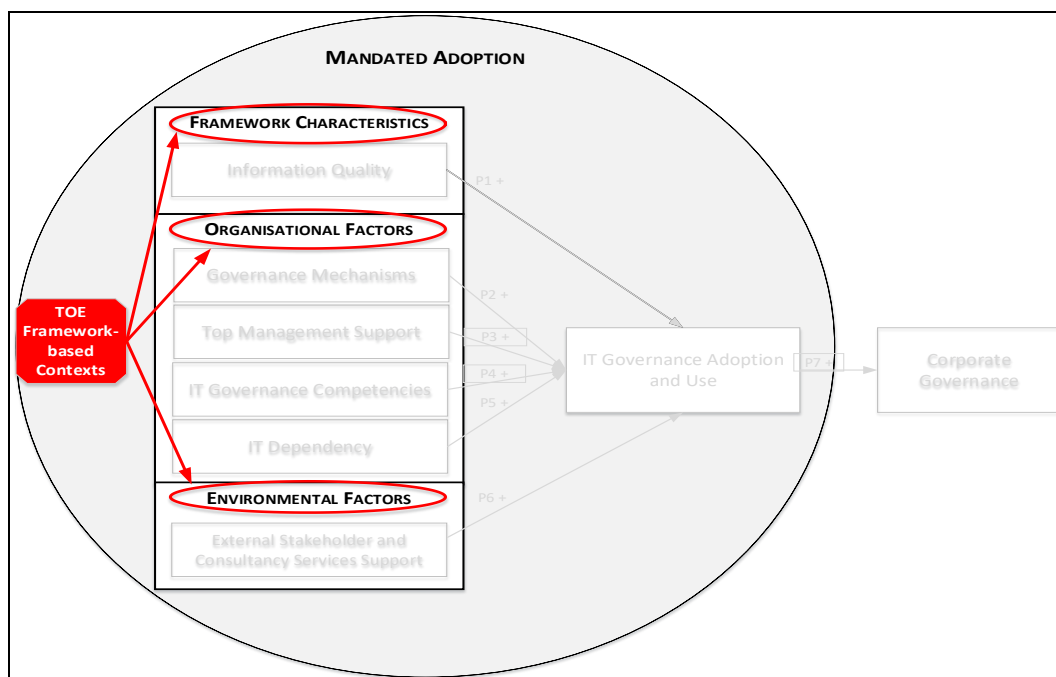


Figure 5–2: TOE framework influence on the preliminary compliance framework

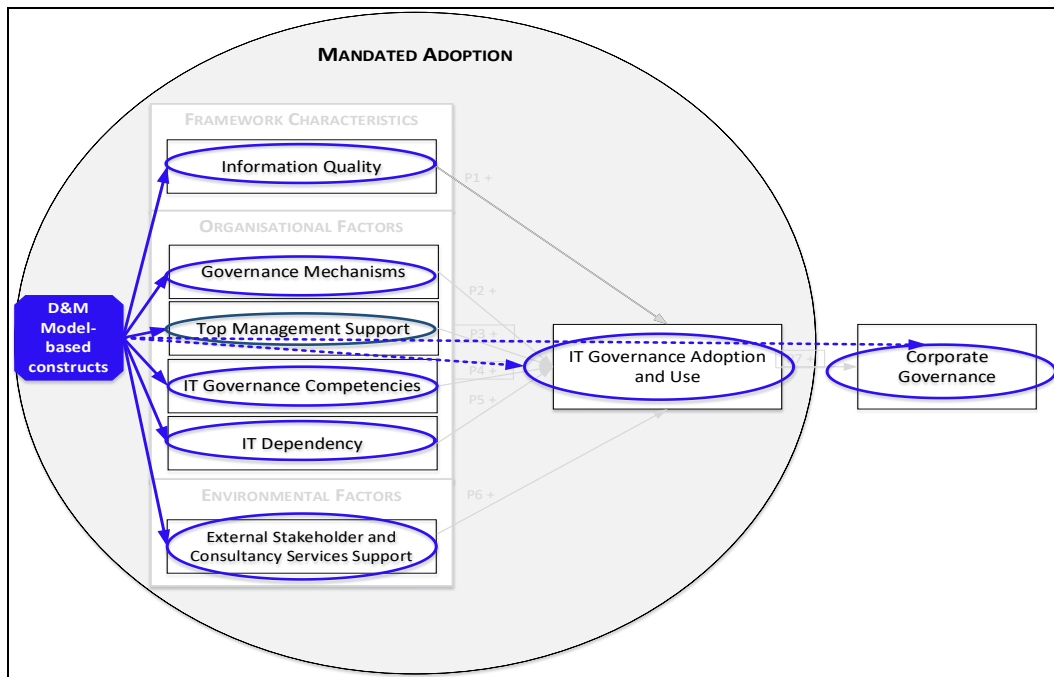


Figure 5–3: D&M model influence on the preliminary compliance framework

The logical framing of the compliance framework constructs and propositions is discussed below.

### 5.2.1 Information quality

Information quality as a concept is under-researched (Petter, DeLone and McLean, 2012), particularly in relation to the success of IT governance adoption and use. Its inclusion as a construct was highly motivated by the need to close this gap. In a study of commercial banks, AlShibly, Louzi and Al-Kaied (2014) found that organisations accrue strategic gains from information quality that is optimal. Using a comprehensive definition, information can be considered as data and facts, “events, things, processes, or ideas, including concepts, that within a certain context have a particular meaning” or are organised for a particular purpose (AlShibly, Louzi and Al-Kaied, 2014; Batini and Scannapieco, 2016, p.18). Quality, on the other hand, is the “degree to which a set of inherent characteristics of an object fulfils requirements” (International Standards Office, 2015b). Information is a critical organisational resource, and information quality makes it possible for decision-makers to make high-quality decisions using information that is accurate, current, relevant and complete (Batini and Scannapieco, 2016).

This study adopted four measures from two dimensions (i.e. intrinsic and contextual) of information quality, taking into account that the analysis of decision-making processes required a contextualised public sector approach (Batini and Scannapieco, 2016). The intrinsic dimension refers to “the extent to which data values are in conformance with the actual or true values” and the contextual dimension refers to the “extent to which information is applicable to the task of the information user and is presented in an intelligible and clear manner, recognizing that information quality depends on the context of use” (Batini and Scannapieco, 2016; ISACA, 2019, p.42). The *accuracy* (i.e. “the extent to which information is correct and reliable”) measure is adapted from the intrinsic dimension. The *currency* (i.e. “the extent to which information is sufficiently up to date for the task at hand”), *relevancy* (i.e. “the extent to which information is applicable and helpful for the task at hand”) and *completeness* (i.e. “the extent to which information is not missing and is of sufficient depth and breadth for the task at hand”) measures are adapted from the contextual dimension (ISACA, 2019, p.42) and are aligned to section 16 of the Protection of Personal Information Act (PoPIA) 4 of 2013.

The measures are applied to the key information products utilised by state-owned entities in relation to IT governance (i.e. IT strategic plan, management and board reports, IT performance reports, business cases, SLAs and OLAs). The objective of applying these measures was to test how the key stakeholders perceive the quality of information received from the aforementioned sources and how efficient and effective it makes their decision-making – whether strategic, tactical or operational decisions.

***Proposition 1 (P1):*** *The quality of management information is positively related to IT governance use.*

### **5.2.2 Governance mechanisms**

In their IT governance model, Weill and Ross (2004) proposed that successful IT governance implementation is contingent on three governance mechanisms: (1) decision-making *structures* such as committees, teams and specific roles that are responsible for making IT-related decision in the organisation; (2) alignment *processes* such as formalised IT investment proposals, enterprise architecture processes, and service-level agreements that provide input to the decision makers based on approved IT policies; and (3) *relational mechanisms* that involve the organisational communication channels to disseminate IT-related decisions and policies (van Grembergen, De Haes and Guldentops, 2004; Weill and Ross, 2004; De Haes

and Van Grembergen, 2009; 2015b) (refer to section 3.3.5). De Haes and Van Grembergen (2015a) further conducted an extensive inquiry into how organisations implement IT governance using the governance mechanisms proposed by Weill and Ross (2004). The result revealed that organisations primarily rely on a comprehensive list of 33 IT governance practices spread across the three governance mechanisms.<sup>6</sup>

This study adapted most of these IT governance practices as organisational measures of this specific governance mechanism construct. Considering the public sector context was key in identifying relevant measures,

***Proposition 2 (P2):*** *Formalised governance mechanisms in the organisation positively influence IT governance use.*

### **5.2.3 Top management support**

Top management support has been identified as a crucial factor in the successful adoption and use of IT systems (Alreemy et al., 2016). Within the broader IS field researchers have considered the concept of top management support in relation to technology adoption and acceptance using the TAM (Hwang, Al-Arabi and Shin, 2016), cloud adoption by an organisation (Gangwar, Date and Ramaswamy, 2015), IS implementation success (Shao, Feng and Hu, 2016; Hwang, 2019), using ICT to enhance organisational performance (García-Sánchez, García-Morales and Bolívar-Ramos, 2017) and IS project success (Ahmed, Noor and Ahmad, 2016). In the literature, the term “top management” is often used interchangeably with other terms such as senior management, upper management, and executive management (Basu, 2014; Ahmed, Noor and Ahmad, 2016).

Incorporating top management support as a construct for this study was motivated by the dearth of research around this concept as it applies to IT governance mechanisms (Gangwar, Date and Ramaswamy, 2015; Zhen, Xie and Dong, 2021). The success of IT governance adoption and use in state-owned entities depends on top management’s active involvement in the decision-making processes that influence IT-related investments and continuous compliance with IT governance practices (Turedi and Zhu, 2019). Therefore, top management

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<sup>6</sup> See Appendix J for the list of IT governance practices.

support denotes the actions of top officials in harnessing IT to produce public value and is identifiable in practices such as the willingness to understand and articulate the business-related benefits of IT solutions; making IT investment decisions; training employees (Gangwar, Date and Ramaswamy, 2015); understanding the critical role IT plays in their organisation; having sufficient IT knowledge; and actively participating in key IT-related activities in their organisations (Zhen, Xie and Dong, 2021). However, as it relates to IT governance mechanisms specifically, top management support is identifiable as (Zhen, Xie and Dong, 2021) the CEO spearheading the setting up of the relevant organisational structures necessary to involve business and IT management in sharing the responsibility of making IT-related decisions, including the implementation of the CGICTPF; the CIO reporting directly to the CEO so as to be able to articulate IT-related matters in a language that business management understands (which facilitates greater alignment between business and IT as business is more inclined to buy in to IT-related investments); collaboration between internal departments and structures to improve business and IT alignment at the process level and engender the transfer of knowledge among employees.

***Proposition 3 (P3):** Top management support is positively related to IT governance use.*

#### **5.2.4 IT governance competencies**

IT governance is the responsibility of the board of directors (ISACA, 2012; Caluwe et al., 2021), who delegate IT governance functions to executive management in state-owned entities. As discussed in section 3.4, IT governance forms part of corporate governance and the boards of directors of state-owned entities carry a fiduciary obligation to ensure the good governance of information and technology, and the ethical responsibility to be competent in their oversight role. However, Valentine and Stewart (2015) noted that fewer than 20 per cent of senior executives in their study conceded to having members of the board who were competent in IT. In the latest issue of the Institute of Directors in South Africa Director's Sentiment Index, "lack of understanding King IV" was rated as one of the top three governance challenges facing directors in the public sector (IoDSA, 2021). This malady manifests itself in the poor implementation of IT governance controls as noted by the AGSA (2021).

In a comprehensive study involving 400 directors, senior business and IT executives, and industry practitioners, Valentine and Stewart (2015) identified three IT governance

competencies which were also deemed critical and pertinent to boards of directors of South African state-owned entities, viz.: *Competency 1* relates to “skills, knowledge and experience to govern technology for strategic advantage and firm performance”; *Competency 2* relates to “making technology decisions and governing risk”; and *Competency 3* refers to “using technology to achieve returns and demonstrate value”. To exploit IT competencies effectively and efficiently, the board must implement and participate meaningfully in board-level IT governance mechanisms (Caluwe et al., 2021). All the identified IT governance competencies enhance the adoption and use of the CGICTPF, as well as forming part of the scope of this study and serving as measures for this construct.

***Proposition 4 (P4):*** *Board-level IT governance competencies are positively related to IT governance adoption and use.*

### **5.2.5 IT dependency mode**

McFarlan and Nolan (2005) proposed that organisations use IT in either a defensive or offensive approach, as represented in the Strategic Impact Grid<sup>7</sup> model. The defensive approach is about operational reliability where organisations use IT mostly for back-office processes and have a low propensity for strategic differentiation (Turel, Liu and Bart, 2017). Using this approach organisations can withstand long periods of system downtime and can revert to manual procedures for most of their transactions (Turel, Liu and Bart, 2017). The offensive approach, on the other hand, is concerned with entities’ competitiveness and strategic responsibilities. Organisations embracing this approach consider technology to play a key role in creating and dispensing public value. The offensive approach is associated with the exploitation of IT within the organisation to improve performance and gain competitive advantage (Peppard and Ward, 2016). State-owned entities operate within the realm of the offensive approach as they require systems to be responsive and system uptime to be high in order to provide quality services to the public.

There are four modes that describe organisational IT dependency, which are spread across the two approaches: support mode, factory mode (both under the defensive approach); turnaround mode and strategic mode (both under the offensive approach). Organisations in

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<sup>7</sup> See Appendix K for a diagram of the Strategic Impact Grid with related mode conditions as proposed by McFarlan and Nolan (2005).

*support mode* are not strategically dependent on IT for business operations and can quickly revert to manual procedures, while those in *factory mode* are much more dependent on IT for business operations but are unambitious when it comes to its strategic use and do not proactively seek to gain competitive advantage from IT use (McFarlan and Nolan, 2005; Héroux and Fortin, 2014). Organisations in *turnaround mode* are typically involved in a strategic transformative process through significant system(s) implementation and expect the new system(s) to change their business operations in ways that will cut costs and increase competitive gains (McFarlan and Nolan, 2005; Héroux and Fortin, 2014). The *strategic mode* is desirable for state-owned entities as it requires dependable systems, as well as pursuing emerging technologies to hold or advance their competitive positions (McFarlan and Nolan, 2005; Héroux and Fortin, 2014).

Board members and management of state-owned entities need to recognise their organisation's IT dependency mode in order to be able to implement the appropriate IT governance structures, processes and relational mechanisms. The measure for this IT dependency construct is adapted from McFarlan and Nolan (2005) and Héroux and Fortin (2014), and is further interrelated with the IT governance mechanisms.

***Proposition 5 (P5):*** *The organisation's strategic mode of IT dependence is positively related to IT governance use.*

### **5.2.6 External stakeholder and consultancy services support**

External stakeholders are conceived of as “social groups in the environment that have interests with the organization and can influence the way enterprises invest and use information technologies” (Susnienė and Sargūnas, 2011; Harguem, Karuranga and Mellouli, 2014, p.10). Using stakeholder theory, a list of external stakeholders was collated based on previous IS literature. This list comprised IT suppliers, IT consultants, compliance, external audit and security groups, business customers, business suppliers, investors, shareholders, competitors, trade associations and local communities (Harguem, Karuranga and Mellouli, 2014). Harguem, Karuranga and Mellouli (2014) further adapted this list for empirical evaluation in relation to IT governance decisions and practices within organisations. It should be noted that this list does not necessarily account for public sector organisations' external stakeholders. As an example, the list does not account for the symbiotic relationship between state-owned entities. Therefore, one of the measures of this construct gave respondents an opportunity to

identify the stakeholders that were pertinent to them, the nature of their association and the support they proffer.

The CGICTPF is a product of a consultative process that included senior DPSA officials and the Government Information Technology Officers Council (GITOC). At the very least the DPSA and GITOC remain key external stakeholders of state-owned entities in relation to operationalising the CGICTPF. The involvement of these stakeholders should be one of the main drivers for the successful implementation of the CGICTPF (Alreemy et al., 2016). It was expected that the GITOC and DPSA officials would have formal programmes to promote, support and guide the implementation of the continuous use of the CGICTPF in state-owned entities.

According to the South African Department of National Treasury, consultancy services refer to technical and specialist advice or assistance with the design and implementation of IT programmes or projects. The motivation for the initial use of consultancy services in state-owned entities was to create another avenue for capacity building through the process of skills transfer to permanent employees (Matsiliza, 2013; AGSA, 2021). The skills transfer process is dependent on the absorptive capacity of employees to exploit new external knowledge for the benefit of the organisation (García-Sánchez, García-Morales and Bolívar-Ramos, 2017). However, this process, like many in the public sector, has not been well managed and the use of consultants remains high and pervasive in the public sector across all spheres of government (Theletsane, 2015). The AGSA (2021) has consistently reported an over-reliance (sometimes termed “high dependency”) on consultants as a priority problem owing to the high fiscal expenditure and low returns associated with it. This reliance on consultancy services is largely a function of a lack of skills in the public sector, including IT-related skills (Theletsane, 2015; AGSA, 2021). IT project management has been characterised as significantly poor, partly due to inadequate IT governance and a high reliance on external consultants (AGSA, 2021; de Maere et al., 2021). Therefore, it was necessary to use measures that ascertain the effect of reliance on consultancy services, quality of support from consultants, and the relationship between consultancy services and IT governance within state-owned entities.

***Proposition 6 (P6): Support from external stakeholders and consultancy services is positively related to IT governance use.***

### **5.2.7 IT governance adoption and use**

The use of the CGICTPF as an IT governance framework precedes corporate governance and has the inherent characteristic of enhancing corporate governance (DPSA, 2012; IoDSA, 2016). The phased implementation of the CGICTPF commenced in 2012, and state-owned entities were expected to be in Phase 3 from 1 March 2014. This phase is characterised by continuous improvement on the adoption and use of framework imperatives as imposed by Phases 1 and 2. The object of this study was to determine the factors that influence the continued adoption and use of the CGICTPF.

***Proposition 7 (P7):** IT governance adoption and continuous use contribute positively to corporate governance.*

### **5.2.8 Corporate governance**

State-owned entities follow the state-owned entity supplement of the King IV code of corporate governance, which is a tailored representation of King IV principles that are relevant to state-owned entities. However, Principle 12 which addresses IT governance is applicable to the state-owned entities without qualification. Corporate governance is the dependent construct.

The utility of this compliance framework lies in its ability to theorise the factors that influence the success of the adoption and use of IT governance in state-owned entities. This is important because it brings academics and practitioners a step closer to prioritising those factors that must be considered to ensure that IT governance controls are enhanced. It complements the AGSA reports, not by regurgitating their content, but by using that content as a catalyst for a broader and deeper debate about what entities must do to address compliance deficiencies in state-owned entities. The AGSA reports are useful for providing patterns of inadequacies and quantifying the problem of poor IT governance controls. This preliminary compliance framework elucidates organisational factors that are crucial to aid the implementation of IT governance controls – thereby complying with the CGICTPF.

## **5.3 Conclusion**

In this chapter the preliminary compliance framework constructs and propositions were identified and discussed in depth. The compliance framework is the main contribution of this

study to enhance corporate governance in state-owned entities. The framework is prefaced with public compliance since corporate governance, of which IT governance is a critical component, is practised in an era of compliance and the two concepts (i.e. corporate governance and compliance) are intertwined.

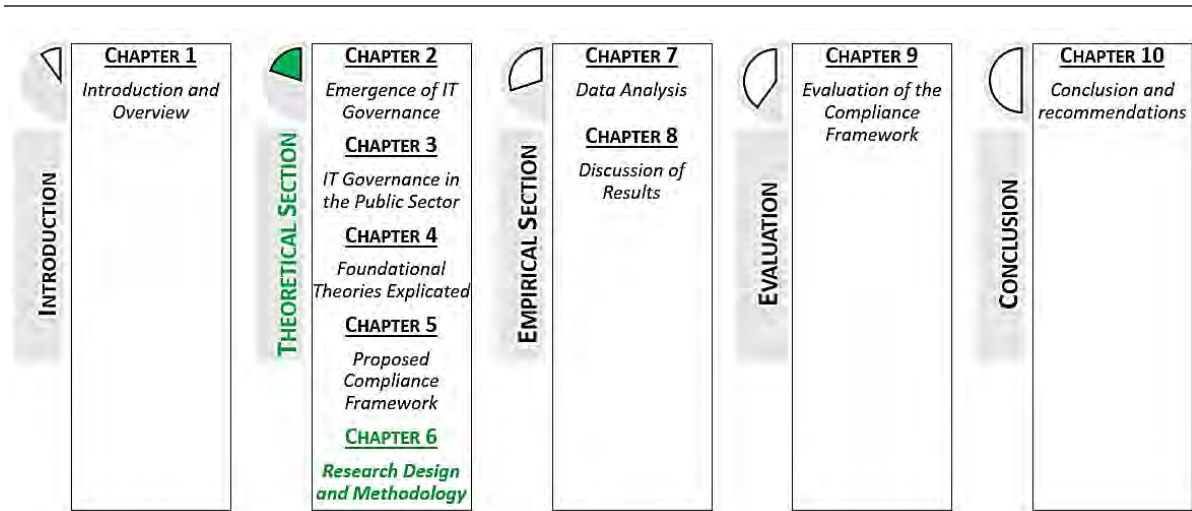
The main component of this chapter was the discussion relating to the compliance framework which is comprised of eight constructs (i.e. information quality, governance mechanisms, top management support, IT governance competencies, IT dependency, and external stakeholders and consultancy services support) with seven related propositions (i.e. P1 to P7):

- P1: The quality of management information is positively related to IT governance use.
- P2: Formalised governance mechanisms in the organisation positively influence IT governance use.
- P3: Top management support is positively related to IT governance use.
- P4: Board-level IT governance competencies are positively related to IT governance adoption and use.
- P5: The organisation's strategic mode of IT dependence is positively related to IT governance use.
- P6: Support from external stakeholders and consultancy services is positively related to IT governance use.
- P7: IT governance adoption and continuous use contribute positively to corporate governance.

Finally, an advisory note was added concerning the intention of the preliminary compliance framework to assist organisations to comply with CGICTPF imperatives when its constructs are carefully considered. Therefore, the propositions of the preliminary compliance framework take a deliberate positive outlook to focus on the IT governance practices that organisations can adopt in order to enhance CGICTPF adoption and use.

# 6

## Research Design and Methodology



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## **6.1 Introduction**

This chapter presents the research design and methodology on which the researcher relied for a structured way of conducting this study. The research design aspects of this study cover the research paradigm, research reasoning approach, methodological approach and strategy. The research design is premised on Saunders, Lewis and Thornhill's (2016) research onion: the research paradigm is pragmatism, the research reasoning approach is abductive reasoning, the methodological approach is mixed methods and the methodological strategy is that of a multi-case inquiry.

The data collection method is elucidated and involves semi-structured interviews, a questionnaire, organisational documents and expert reviews. The sampling method is explained and justified based on the case organisations. A further discussion ensues in relation to the research sites – the case organisations from where data was collected using the specified preferred methods.

The validity of the research design demonstrates the rigour applied in conducting this study. Ethical considerations for this study were crucial to ensure the application of adequate and ethical interactions with the human subjects involved in the data collection process.

## **6.2 Research design**

The research design for this study was modelled on the research onion proposed by Saunders, Lewis and Thornhill (2016). The research design discussion that follows in this chapter is predicated on layers such as the research philosophy, reasoning approach for theory development, research strategy, research method, data collection and analysis methods, as depicted in Figure 6–1.

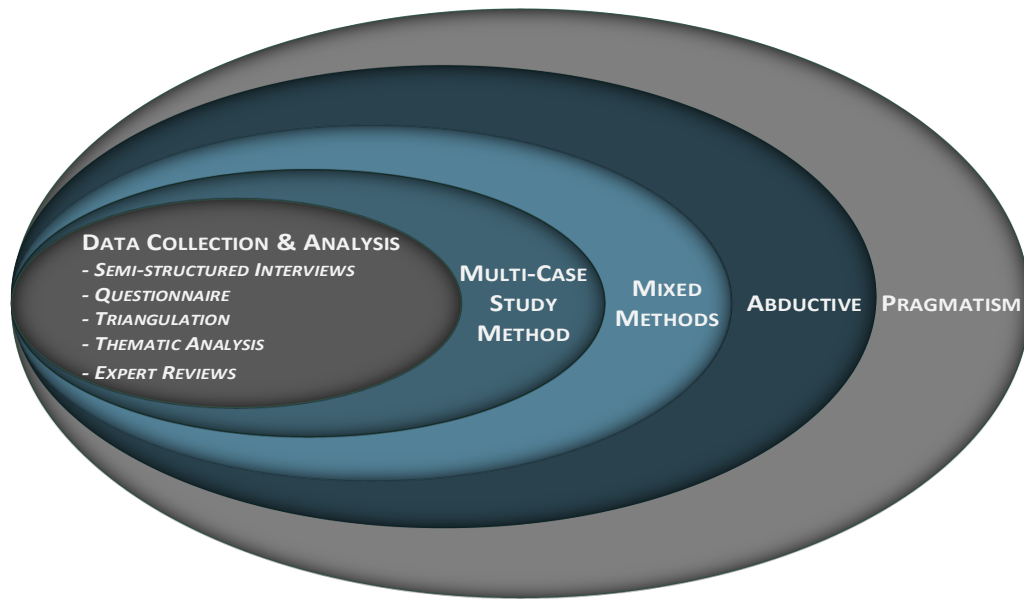


Figure 6–1: Research onion layers for this study (adapted from Saunders, Lewis and Thornhill, 2016)

### 6.3 Research paradigm

This study draws its philosophical disposition from pragmatism. Pragmatism differs from positivism and interpretivism in the following ways:

Pragmatism is argued to originate from American authors Pierce, James, Dewey and Mead, and contemporaries Cherryholmes, Murphy and Morgan (Goldkuhl, 2012; Creswell and Clark, 2017). However, it has connections to European thinkers and has similarities to East-Asian thinkers, and can be correlated to other overlooked contributory sources such as the Native American philosophical ideas and attitudes (Pratt, 2002; Goldkuhl, 2012) and African thinking and leadership (Mangu, 2019).

Pragmatism is a philosophy for practical research that is concerned with “action and change and the interplay between knowledge and action” (Goldkuhl, 2012, p.136). Pragmatism is grounded on “the research question and advocates using a range of methods that best meet its needs and research purpose” (Hesse-Biber, 2015, p.xxxvi). In pragmatism, meaning and truth are derived from the practical consequences and actual effects of actions (Venkatesh, Brown and Bala, 2013). Essentially, it is about more than just observing and interpreting phenomena; it is about research relevance for practice by providing practical solutions to real-world problems (Feilzer, 2010; Goldkuhl, 2012; Saunders, Lewis and Thornhill, 2016; Creswell and Creswell, 2018).

There are three variations of pragmatism which, when considered in their totality, account for pragmatism as it has been applied in IS research, as depicted in Figure 6–2.

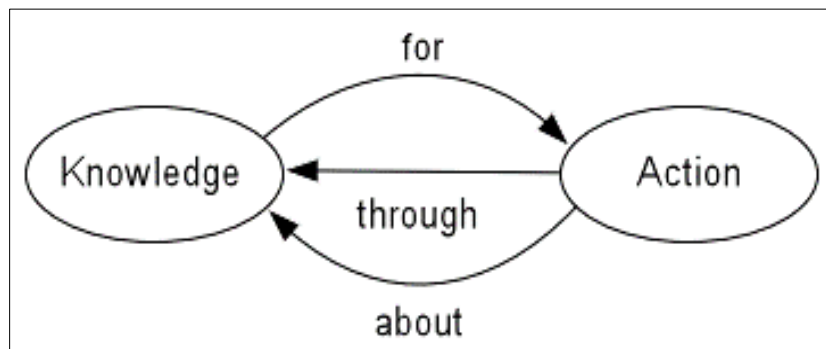


Figure 6–2: The knowledge–action relationship in pragmatism (adapted from Goldkuhl, 2008)

The three variations are described as follows (Goldkuhl, 2008, p.4):

(a) *functional pragmatism:*

- “knowledge for action”
- “knowledge is created and used for action”
- “the purpose of scientific knowledge is that it should make a practical difference”.

(b) *referential pragmatism:*

- “knowledge about action”
- “knowledge should be about actions”
- “the development of many theories on actions, activities and practices”.

(c) *methodological pragmatism:*

- “knowledge through action”
- “action as the source of knowledge”
- “to reach knowledge, actions need to be arranged”.

Functional pragmatism is the variation that is contemplated in this study, the essence of this study is to solve the real-world problem – which is also a research problem – of poor IT governance controls and compliance with the CGICTPF by state-owned entities in South Africa (which precipitates a low return on the significant IT investments made) (AGSA, 2019b; 2020; 2021). The compliance framework artefact is the main contribution of this study and is designed to provide policymakers, practitioners and academics with a tool to articulate the key factors (and their material impact) that need to be considered to enhance IT governance controls in the public sector in South Africa.

Further, Saunders, Lewis and Thornhill’s (2016) narration of the research assumptions (i.e. ontological, epistemological and axiological) under pragmatism are demonstrably the most relevant to the essence of this study compared to other philosophies, as shown in Table 6–1:

Table 6–1: Pragmatism philosophy and assumptions (adapted from Saunders, Lewis and Thornhill, 2016; Creswell and Creswell, 2018)

<b>PRAGMATISM PHILOSOPHY AND RELATED ASSUMPTIONS</b>			
<b><i>Ontology</i></b> <i>(nature of reality or being)</i>	<b><i>Epistemology</i></b> <i>(what constitutes acceptable knowledge and who can know)</i>	<b><i>Axiology</i></b> <i>(what is the role of values)</i>	<b><i>Typical methods</i></b>
<ul style="list-style-type: none"> <li>○ Complex, rich, external</li> <li>○ “Reality” is the practical consequences of ideas</li> <li>○ Flux of processes, experiences and practices</li> <li>○ Singular and multiple realities: researchers test hypothesis and provide multiple perspectives</li> </ul>	<ul style="list-style-type: none"> <li>○ Practical meaning of knowledge in specific contexts</li> <li>○ “True” theories and knowledge are those that enable successful action</li> <li>○ Focus on problems, practices and relevance</li> <li>○ Problem-solving and informed future practice as contribution</li> <li>○ Practicality: researchers collect data by considering “what works” to address research question</li> </ul>	<ul style="list-style-type: none"> <li>○ Value-driven research</li> <li>○ Research initiated and sustained by researcher’s doubts and beliefs</li> <li>○ Researcher reflexive</li> <li>○ Multiple stances: researchers include both biased and unbiased perspectives</li> </ul>	<ul style="list-style-type: none"> <li>○ Following research problem and research question</li> <li>○ Range of methods: mixed, multiple, qualitative, quantitative, action research</li> <li>○ Emphasis on practical solutions and outcomes</li> </ul>

These assumptions underscore the objective of this study; that is, to enhance corporate governance in state-owned entities to improve their ability to create and dispense public value.

In the execution of this research, a pragmatic approach was adopted in engaging each of the two case organisations. These case organisations are different with different mandates,

strategies, structures, staff motivation levels and geographical footprints. Therefore, it became necessary to adapt engagement processes, timelines and expectations to accommodate these differences, so long as those decisions enriched this study. Sometimes the researcher relied on prior public sector experience to negotiate the twists (i.e. key staff suspensions) and delays during the research process.

**6.4 Research reasoning approach for theory development**

In accordance with pragmatism, the preferred logical approach for this study is *abductive reasoning* rather than inductive and deductive reasoning, as depicted in Figure 6–3 below. Inductive reasoning is about collecting data and developing theory from the analysis of that data (Dubois and Gadde, 2002; Saunders, Lewis and Thornhill, 2016). Deductive reasoning is premised on the use of a theory to design a research strategy for testing the hypothesis of that theory (Dubois and Gadde, 2002; Saunders, Lewis and Thornhill, 2016).

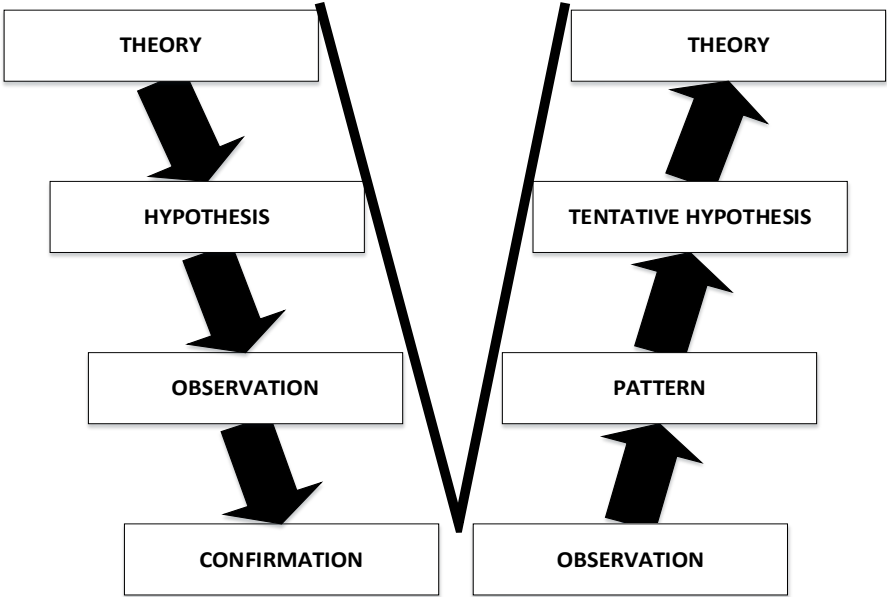


Figure 6–3: Deductive and inductive reasoning approaches (adapted from Trochim, 2001)

The abductive reasoning approach is explicated in Table 6–2 below, and contrasted with deductive and inductive reasoning approaches in relation logic, generalisation, use of data and theory.

Table 6–2: Differences between deductive, inductive and abductive research approaches adapted from (Dudovskiy, 2018)

<b>DIFFERENCES BETWEEN DEDUCTIVE, INDUCTIVE AND ABDUCTIVE RESEARCH APPROACHES</b>				
#	<i>Aspect</i>	<i>Deduction</i>	<i>Induction</i>	<i>Abduction</i>
1	<b>Logic</b>	In a deductive inference, when the premises are true the conclusion must also be true.	In an inductive inference, known premises are used to generate untested conclusions.	In an abductive inference, known premises are used to generate testable conclusions.
2	<b>Generalisation</b>	Generalise from the general to the specific.	Generalise from the specific to the general.	Generalise from the interactions between the specific and the general.
3	<b>Use of data</b>	Data collection is used to evaluate propositions or hypotheses related to an existing theory.	Data collection is used to explore a phenomenon, identify themes and patterns and create a conceptual framework	Data collection is used to explore a phenomenon, identify themes and patterns, locate these in a conceptual framework and test this through subsequent data collection.
4	<b>Theory</b>	Theory falsification or verification.	Theory generation and building.	Theory generation or modification; incorporating existing theory where appropriate to build new theory or modify existing theory.

The abductive reasoning approach assimilates the deductive and inductive approaches, and is useful where a traversal between the two is required to best answer the research question (Saunders, Lewis and Thornhill, 2016). Fundamentally, this approach has also been useful in assisting the researcher to work back and forth between qualitative and quantitative methods to collect and analyse the data. The abductive approach was applied in the following manner: data collected during the literature review informed the development of the preliminary compliance framework – an inductive process. The preliminary compliance framework influenced the research design and instruments used to empirically evaluate the framework through interviews, a survey and expert reviews – a deductive process. The insights gained from this data collection process prompted modifications to the preliminary compliance framework, essentially yielding a finalised framework which was a product of abduction.

## 6.5 Methodological approach

Of the three methodological approaches (i.e. qualitative,<sup>8</sup> quantitative<sup>9</sup> and mixed methods), mixed methods was preferred for this study. The mixed methods approach entails the use of “quantitative and qualitative research methods, either concurrently (i.e. independent of each other) or sequentially (e.g. findings from one approach inform the other), to understand a phenomenon of interest.” (Venkatesh, Brown and Bala, 2013, p.23; Creswell and Creswell, 2018), as depicted in Figure 6–4. Mixed methods are suited to a study seeking to understand and explain complex organisational and environmental phenomena, as is contemplated in this study (Venkatesh, Brown and Bala, 2013).

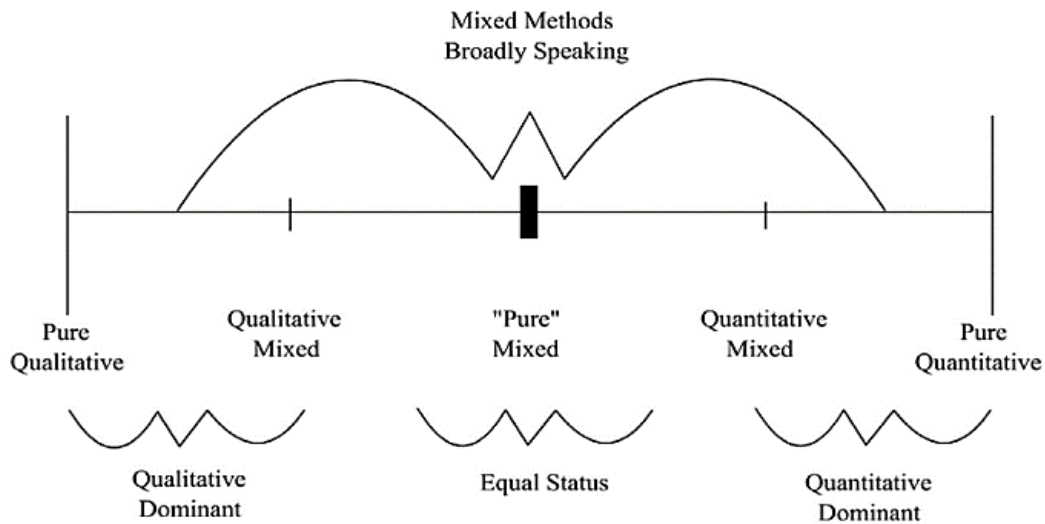


Figure 6–4: Mixed methods research subtypes continuum (adapted from Johnson and Onwuegbuzie, 2007; Frels Rebecca K. and Newman, 2015)

The convergent (also referred to as concurrent or parallel) design of the mixed method approach was applied to gain complementary and divergent sentiments about the CGICTPF, and to provide a complete understanding of the research problem (Creswell and Clark, 2017). Even so, this study tended towards the Qualitative Dominant branch of the continuum in Figure 6–4, often denoted as QUAL+quan, as the quantitative data is used for descriptive

<sup>8</sup> Qualitative research is “an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures, data typically collected in the participant’s setting, data analysis inductively building from particular to general themes, and the researcher making interpretations of the meaning of the data.” (Creswell and Creswell, 2018, p.3).

<sup>9</sup> Quantitative research method is “an approach for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures” (Creswell and Creswell, 2018, p.3).

statistics and triangulated with qualitative data. This approach was dictated by the research questions and the broader research context of public administration (Venkatesh, Brown and Bala, 2013). Further, it was important to adopt this approach so as to ensure the generalisability of the results by covering the phenomenon of public sector IT governance in the form of the CGICTPF holistically and in depth. To this end, semi-structured interviews were conducted with participants and were based on questions that were derived from the preliminary compliance framework and propositions. In addition, expert reviews were designed in a similar manner to elicit the opinion of industry and academic experts on the merits of the preliminary compliance framework. This accounted for the qualitative approach. The survey questionnaire administered comprised questions based on the preliminary compliance framework; thus this questionnaire accounted for the quantitative aspect of the mixed method approach. A detailed discussion of the data collection methods and analysis used in this study is presented in sections 6.8 and 6.10, respectively.

Mixed methods research is suited to pragmatism because in both pragmatism and mixed methods research the focus is on the practical consequences of the research in solving real-world problems, and on the supremacy of the research question in dictating the research design and use of methods for data collection and analysis (Venkatesh, Brown and Bala, 2013; Creswell and Clark, 2017; Creswell and Creswell, 2018).

## **6.6 Methodological strategy**

This study is based on a multi-case method of inquiry. Of all the social science research methods at a researcher's disposal (i.e. experiment, survey, archival analysis, history and case study) (Yin, 2018), the case study method was preferred. The following discussion justifies the preference for this method. A case study method is defined as an in-depth inquiry about a contemporary phenomenon (i.e. CGICTPF) within its real-world context (i.e. state-owned entities), where the boundary between the phenomenon and its context may not be clearly evident (McNabb, 2015; Yin, 2018). The CGICTPF is a uniquely public sector framework and it was important to conduct an inquiry into its effectiveness in that context, but also to associate the meaning of the inquiry findings with the broader IT governance literature. The case study method is based on a reliance "on multiple sources of evidence, with data needing to converge in a triangulation fashion" (Yin, 2018, p.17).

Therefore, a case study method is amenable to the use of mixed methods research. Even so, the selection of the case study method for this study was directed by the conditions proposed by Yin (2018), as depicted in Table 6–3:

Table 6–3: Research methods and conditions (adapted from Yin, 2018)

<b>RESEARCH METHODS AND CONDITIONS</b>				
#	<i>Method</i>	<i>(a) Form of research question</i>	<i>(b) Requires control over behavioural events?</i>	<i>(c) Focuses on contemporary events?</i>
1	Experiment	How, why?	Yes	Yes
2	Survey	Who, what, where, how many, how much?	No	Yes
3	Archival analysis	Who, what, where, how many, how much?	No	Yes/No
4	History	How, why?	No	No
5	Case study	How, why?	No	Yes

The three conditions guided the selection of the case study method in the following manner:

- (a) *The form of the research question*: the main research question for this study is “How should IT governance adoption and use be enhanced in state-owned entities in South Africa”. Therefore, it was suited to the case study method which caters for “how” and “why” research questions.
- (b) *Control a researcher has over the actual behavioural events*: during the research process, the researcher had no ability to influence or manipulate respondent behaviour and events around IT governance processes. Furthermore, being external to both case organisations, no control was exerted by the researcher on how the CGICTPF was being implemented in either of the case organisations. For data collection reliance was placed on the interviews, survey, literature and expert reviews. Therefore, the condition that a researcher should not have control over actual behavioural events was met.
- (c) *Focus on contemporary events*: IT governance is a contemporary phenomenon in the public sector, and the historical focus of IT governance implementation in this study covers the period since the inception of the CGICTPF in 2012 to date. Therefore, this condition was also met.

Case study research assumes an instructional nature when it comes to public administration research (McNabb, 2015). As is the case in this study, the experiences of

administrators in the case organisations are analysed and the findings will help other administrators in public sector organisations to improve their adoption and use of the CGICTPF (McNabb, 2015). The case organisations in scope for this study are two government agencies, with each individual case being considered holistically. The choice of a multi-case design allowed the researcher to compare and contrast findings, and draw deep and broad insights that could be generalised across other state-owned entities. The cases that were studied are state-owned entities which fall within the Schedule 3 Part A classification of the Public Finance Management Act (National Treasury, 2018), namely, the Road Accident Fund (RAF) and the Financial Sector Conduct Authority (FSCA). This classification covers state-owned entities (i.e. agencies) as it underscores the differences between the public and private sector contexts as envisaged in this study (i.e. non-profit making public sector organisations as described in Table 1–1). The case selection also considered the entities’ socioeconomic impact and capital intensity. Therefore, the selected cases provided for an in-depth analysis of the boundary between IT governance and the public sector context (Yin, 2018).

## **6.7 Research sites**

The criteria for case selection are stipulated in section 6.5 and 6.6, and requests for gatekeeper permission to conduct research were extended to several organisations that fall within those criteria. Positive responses were received from the RAF and the FSCA and subsequently the two state-owned entities were designated as research sites and cases for this study:

### **6.7.1 Case 1: The Road Accident Fund (RAF)**

The RAF is a creation of an act of parliament, the Road Accident Fund Act, 1996 (Act No. 56 of 1996) as amended (“RAF Act”), and is classified under Schedule 3, Part A of the PFMA. It commenced operations on 1 May 1997. Prior to this it was governed by the following legislation: the Motor Vehicle Insurance Act, 1942 (Act No. 29 of 1942); the Compulsory Motor Vehicle Insurance Act, 1972 (Act No. 56 of 1972); the Motor Vehicle Accident Act, 1986 (Act No. 84 of 1986); and the Multilateral Motor Vehicle Accidents Fund Act, 1989 (Act No. 93 of 1989).

The RAF exists to assist road accident victims financially and medically, and to indemnify wrongdoers thereby preventing their financial ruin (RAF, 2020). The assistance for road accident victims follows a defined business process that is predicated on receiving, processing

and paying claims effectively, as depicted in Figure 6–5. The RAF national footprint is comprised of 97 hospital service centres (HCSs), five customer service centres (CSCs), five walk-in service centres (WICs) and five regional offices across the country (RAF, 2020). In the 2019/20 FY the RAF registered 303 695 new claims and finalised 258 382, with total claims paid amounting to R43,2 billion (RAF, 2020). Other significant achievements registered by the RAF in the 2020/21 FY include (Allie-Paine, 2022)

- more than R7 billion reduction in administrative costs
- first surplus, to the value of R3,2 billion, a reduction from a R5,2 billion deficit in the preceding year
- investment income increase (year-on-year) from R62 million to R157 million (i.e. 152%)
- finance cost reduction by (year-on-year) from R263 million to R90 million (i.e. 62%)
- writs of execution reduced by more than 50%
- short-term liability reduced by R2,2 billion, from R17 billion to R14,8 billion;
- current assets increase of more than R4 billion, and
- a clean audit.

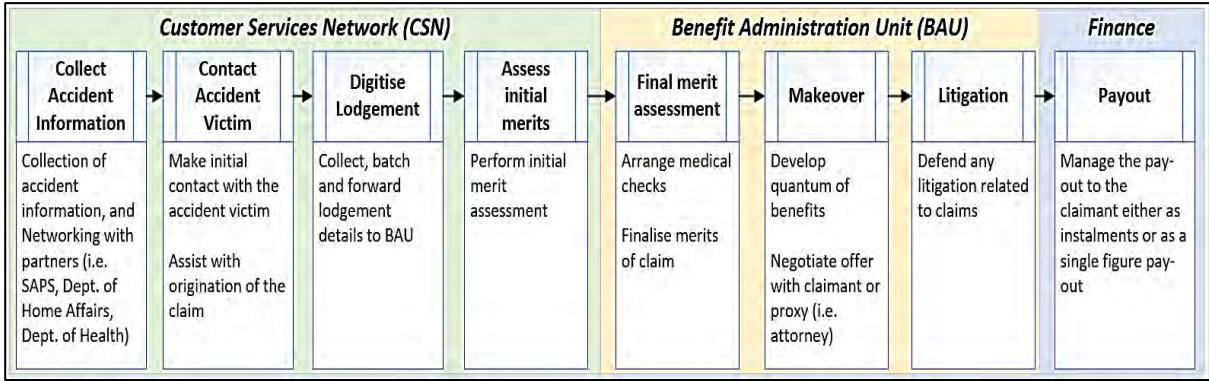


Figure 6–5: RAF high-level business process (adapted from RAF, 2020)

The RAF funding model is based solely on revenue stemming from the fuel levy, as depicted in Figure 6–6. The variables that determine the quantity of the levy are the volume of petrol and diesel sold, and the rate of the levy – which is set by the National Treasury (i.e. it was 198 cents per litre of fuel sold for the 2019/20 FY). The collection and administration of the fuel levy is done by the South African Revenue Service (SARS) as the levy forms part of the general fuel tax regulated by government.

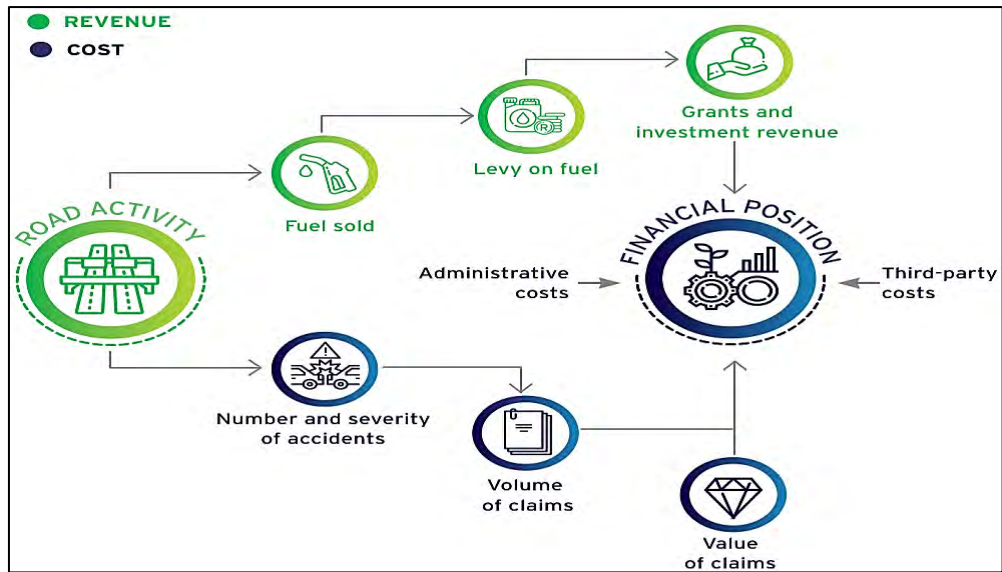


Figure 6-6: RAF funding model high-level view (RAF, 2020)

The corporate governance and oversight of the RAF is vested in parliament (i.e. Portfolio Committee on Transport and the Standing Committee on Public Accounts), the executive authority (i.e. Minister of Transport) and the board of directors of the RAF (RAF, 2020), as depicted in Figure 6-7. The relational configuration between the executive authority, the board and executive management board is depicted in the organisational structure in Figure 6-9. Further, the board operates board-level committees as shown in Figure 6-8. The board appoints and delegates functions to the executive management – the relationship between the board and executive management is depicted in Figure 6-9. These structures and their inter-relationships are important for understanding how decisions must be made and who must make decisions in relation to organisational strategy and investments, including IT-related decisions. The board committee responsible for IT-related strategic decisions and investments is the Operations, Information and Technology Committee (OPSIT). IT is considered one of seven strategic risks in the RAF and is monitored by the Risk Management Committee (RMC) on a quarterly basis.



Figure 6-7: RAF executive and accounting authority structure (RAF, 2020)



Figure 6–8: RAF board members and committees (RAF, 2020)

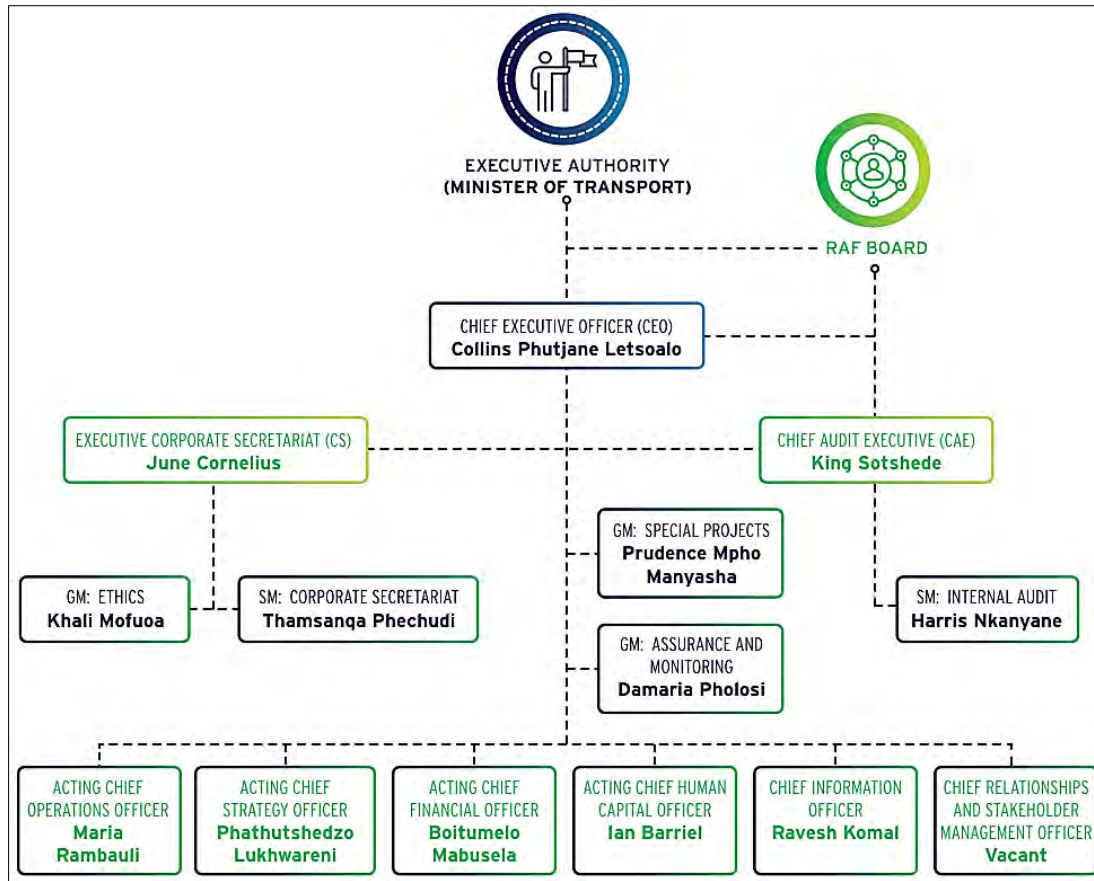


Figure 6–9: RAF organisational structure (RAF, 2020)

The current RAF operating model rests on a fault basis, which directs that those responsible for an accident are not entitled to claim or receive compensation. A new operating model (i.e. Road Accident Benefit Scheme (RABS)) is being proposed which rests on a no-fault basis where even those who are responsible for causing an accident are entitled to benefits like all other accident victims. The current and proposed operating models are heavily reliant on IT infrastructure and systems which are optimised to efficiently facilitate effective business processes. Therefore, the IT environment remains “an essential component in implementing the RAF’s business strategy and executing its mandate” (RAF, 2020, p.70). The Integrated Claims Management System (ICMS) project aims to fulfil the objective of modernising the RAF core business systems and move away completely from a paper-based to an efficient, fully digitised claim processing environment. The summary of the mandate of the IT function in the RAF is to “enable the automation of business processes, ensure data integrity and protection, and ensure maturity of IT governance in the organisation” (RAF, 2020, p.70), thus showing how integral IT is to the RAF strategy and how seriously IT governance is considered. In 2016, the RAF was recognised by the DPSA for its excellent

implementation of the CGICTPF and was invited to present and share its experiences at the flagship GovTech conference held in 2016.

### **6.7.2 Case 2: The Financial Services Conduct Authority (FSCA)**

The FSCA is a creation of the Financial Sector Regulation Act, Act 9 of 2017 (FSR Act), and is classified under Schedule 3, Part A of the PFMA. It derives its legislative mandate from the FSR Act, reports to the Minister of Finance and, like the RAF, is accountable to parliament. Its predecessor, the Financial Services Board (FSB), was established in 1991 to regulate the non-banking financial industry. However, as more regulations (i.e. Financial Intelligence Centre Act of 2001 and Financial Advisory and Intermediary Services Act (FAIS) of 2004) extended the mandate of the FSB, policymakers deemed it necessary to reconfigure the system of financial regulation by “establishing the Prudential Authority and the Financial Sector Conduct Authority” (National Treasury, 2017). The FSCA was launched in April 2018 as “one ‘peak’ of South Africa’s Twin Peaks model of financial regulation, tasked with regulating the conduct of all financial institutions, not just the non-banking ones. The other peak is the Prudential Authority (PA) which focuses on promoting and enhancing the safety and soundness of financial institutions” (FSCA, 2020a, p.10).

The FSCA exists to “protect financial customers by promoting their fair treatment by financial institutions; enhance and support the efficiency and integrity of financial markets; provide financial education and promote financial literacy; and assist in maintaining financial stability” (FSCA, 2020a, p.10). The mandate of the FSCA covers all financial institutions that provide a financial product and/or a financial service as defined in the FSR Act (FSCA, 2020b) and depicted in Figure 6–10 below. In 2020, the financial service industry contributed R626 billion to the South African GDP (Galal, 2021). The FSCA funding model is based on levies obtained from the regulated financial institutions. In 2020, the levy income alone was R827 million; collectively, including revenue from investment income, penalty income, fee income and recoveries, the FSCA recorded revenue of R926 million (FSCA, 2020a). This was against operating costs of R891 million. This is not surprising considering the extensive scope covered by the financial institutions that are regulated by the FSCA.

The FSCA business model is based on regulating and supervising all financial institutions that provide a financial product and/or service, as depicted in Figure 6–10. The FSCA also oversees the market infrastructure (MI) (i.e. exchanges, central counterparties, central

securities depositories, clearing houses and trade repositories), and the MI regulates and supervises its members in accordance with the rules approved by the FSCA (FSCA, 2020c). The FSCA also regulates credit rating agencies. Therefore, as a data-intensive environment the supervised institutions submit periodic reports to the FSCA to demonstrate compliance.

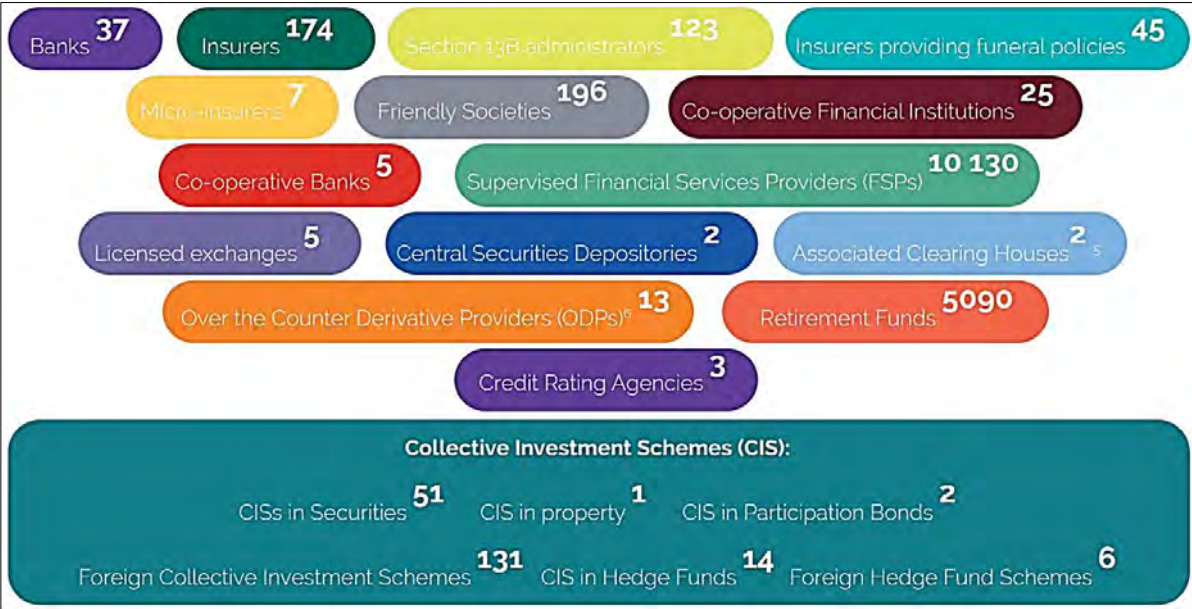


Figure 6–10: Financial institutions covered by the FSCA (adapted from FSCA, 2020b)

The Executive Committee (EXCO) is a key organ in the structural design of the FSCA. It comprises the Commissioner and three Deputy Commissioners appointed by the Minister of Finance. It is responsible for generally overseeing the strategic and operational matters of the FSCA to ensure that it is efficient and effective (FSCA, 2020b). Although the Commissioner is the accounting authority in terms of the PFMA, the functions and decision powers of the EXCO, as stipulated in sections 66 and 67 of FSR Act, are comparable to those of a governing body as advised in King IV (IoDSA, 2016; National Treasury, 2017). The Act further enjoins the Executive Committee to establish subcommittees to assist the work of the Executive Committee as may be deemed necessary (IoDSA, 2016; National Treasury, 2017) and depicted in Figure 6–11. The EXCO is supported by the FSCA management (i.e. eight divisional executives, chief information officer [CIO] and the chief financial officer [CFO]) (as depicted in Appendix G) who engage with EXCO through the EXCO subcommittees, “as well as external committees made up of independent members, which advise the EXCO on their respective areas of expertise” (FSCA, 2020b, p.17).

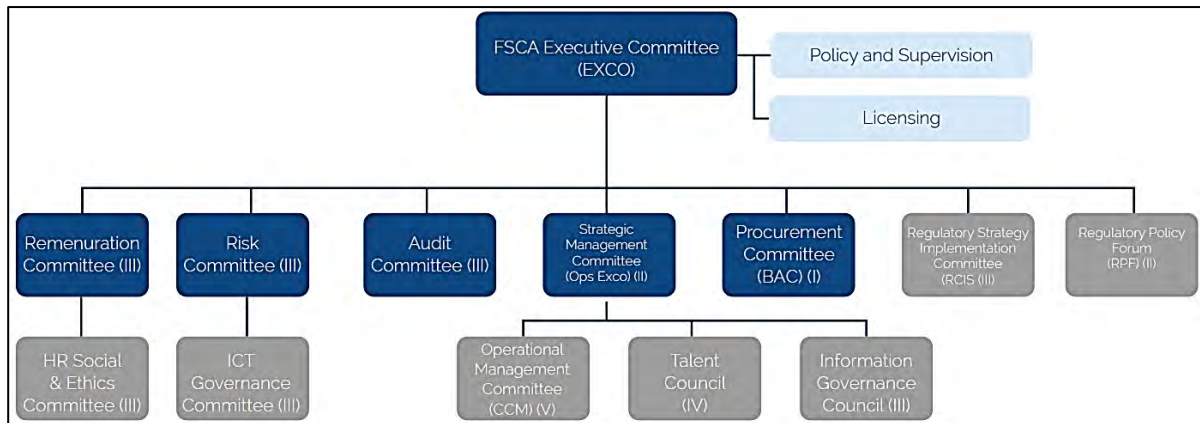


Figure 6–11: FSCA executive committee and subcommittees (FSCA, 2020a)

As may be noted in Figure 6–11, the presence of the dedicated IT governance and information governance subcommittees signals the seriousness with which information and technology are deemed crucial to the success of the FSCA business strategy. These subcommittees help guide the decision-making by the EXCO regarding IT-related investments and risks. It also worth noting that cyber risk is a strategic consideration for the FSCA, and is monitored and reported on a quarterly basis (FSCA, 2020a). The role of the CIO is central to that process and he or she is responsible for the following functions: ICT Governance, Risk and Compliance; ICT Applications and Operations; the Project Management Office; Enterprise Information Governance; Data Analytics; and ICT Security. The FSCA has embarked on a process to improve IT capabilities in order “to actualise the Data Driven Digital (DDD) strategy, such as those for data/information management and analytics, vendor management, IT demand management, and IT innovation – the purpose of which is to transform the FSCA into a digitised regulator” (FSCA, 2020a, p.15). The main features of the DDD include business intelligence and data analytics, the use of cloud services and disruptive technologies (i.e. RegTech and SupTech), customer self-service and channels for customer engagement, and cybersecurity and resilience (FSCA, 2020b).

## 6.8 Data collection method

Interviews with respondents were rescheduled following a Covid-19 induced disruption, and were conducted between November 2020 and August 2021. The availability of respondents remained a constant issue and adjustments had to be made for online engagement with all the respondents. However, the research instruments and overall data collection process remained the same, with the only change being that interviews were conducted virtually. The data collection process is shown in Figure 6–12.

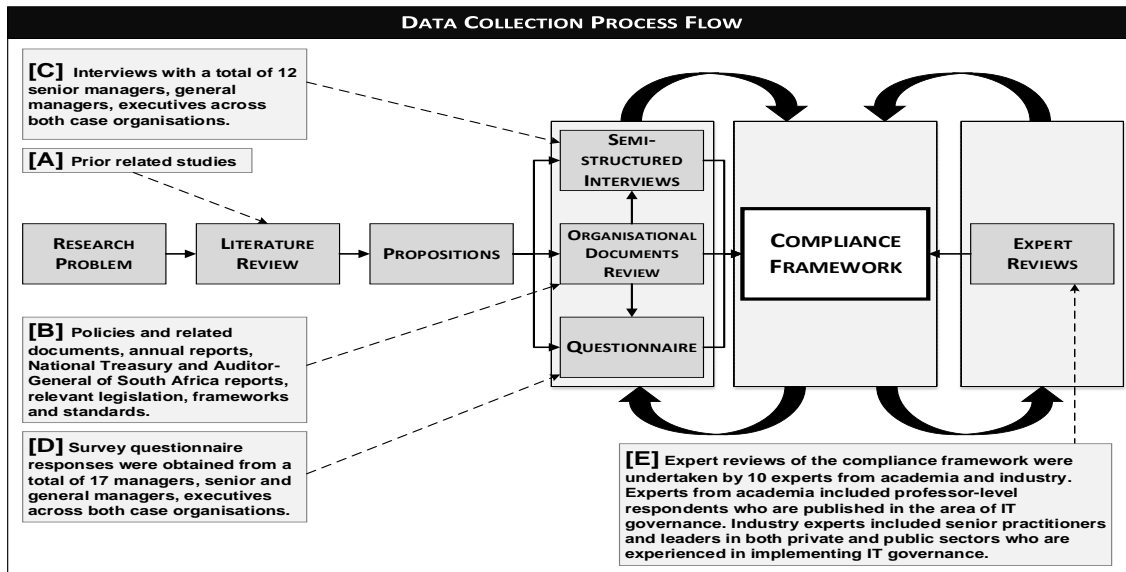


Figure 6–12: High-level data collection process

The data collection process was guided by the research problem and question, and entailed a review of extant literature (i.e. [A] (Webster and Watson, 2002; Boell and Cecez-Kecmanovic, 2014; Tate et al., 2015)). A proposed compliance framework and related propositions were developed from the literature review and empirically evaluated through semi-structured interviews, a survey questionnaire and a review of organisational documents (i.e. [B], [C] and [D] (Oates, 2006; Yin, 2018)). An iterative process ensued to modify the proposed compliance framework according to the feedback received from the interviews, the questionnaire, the organisational documents and the expert reviews (i.e. [E] (Allam, Flowerday and Flowerday, 2014)). The choice of sample sizes in the data collection process is discussed in detail in section 6.8.5.

### 6.8.1 Semi-structured interviews

Semi-structured interviews are one of the key sources of evidence in case study research alongside documentation, archival records, direct observations, participant observation and physical artefacts (Yin, 2018). At the direction of the CIO, all interviews with all respondents at the FSCA were arranged through the office of the CIO by the CIO’s personal assistant (PA). Similarly, at the RAF all engagements in relation to interviews and survey questionnaires were arranged through the CIO’s office by the CIO’s PA, in collaboration with the PAs of the general manager and the IT managers. All interviews were conducted virtually using Zoom, Microsoft Teams and Google Meet tools.

The interviews were based on a research instrument with 10 questions (see Appendix A), and were categorised into four sections (i.e. demographic information, CGICTPF implementation, IT governance framework characteristics, and general information). The semi-structured nature of the interviews allowed the researcher to ask specific questions that guided the discussion, and then explore with the participants' in-depth explanations of their responses (Yin, 2018; Casteel and Bridier, 2021).

### **6.8.2 Survey**

The survey questionnaire was administered online using SurveyMonkey. It consisted of 85 questions based on a five-point Likert scale (i.e. 1 – Strongly disagree; 2 – Disagree; 3 – Undecided; 4 – Agree; 5 – Strongly Agree), as shown in Appendix B. The questions were aligned to the semi-structured interview questions, and were based on the proposed compliance framework. The survey questionnaire was adapted from Othman (2016) and Vatanasakdakul et al. (2017) and was designed to complement the semi-structured interviews and provide an additional point of data triangulation to the expert reviews, literature review and documentation review.

### **6.8.3 Review of organisational documents**

Documentation review is considered a source of evidence in case study research (Yin, 2018). The documents that were reviewed as part of this study included organisational CGICTPF-related policies (where it was possible to obtain them), annual reports, Auditor-General of South Africa reports, relevant legislation, frameworks and standards. Data gathered from these documents was instrumental in affirming the data attained from other sources through triangulation.

### **6.8.4 Expert reviews**

Weber (2012) argues that a model or framework can be evaluated as theory from two perspectives: parts and whole. He further proposes that parts of a theory include constructs, associations, states and events (where applicable), and the whole perspective covers its importance, novelty, parsimony, level and falsifiability (Weber, 2012; Allam, Flowerday and Flowerday, 2014). The expert reviews were based on Weber's (2012) framework for theory evaluation, and were obtained from 10 experts (i.e. 6 experts from academia and 4 experts from industry). All the experts from academia were at the level of professor, have a track

record of publishing in IT governance, and two (of the 6) were international academics. The industry experts comprised senior practitioners in the area of IT governance, had over 20 years of experience, had implemented (or been exposed to) IT governance at a strategic level, both in the public and private sectors.

The expert review questionnaire was based on 10 open-ended questions designed to solicit the experts’ opinions on the proposed compliance framework (see Appendix C). The evaluation was administered via Google Forms online and a Microsoft Word document form, which was included in case the Google Form presented unforeseen technical problems. The analysis of the expert review data was done following a thematic analysis method as discussed in section 6.10 below, the CAQDAS tool was not necessary for the analysis of expert review data. The list of experts was selected on the basis of purposive heterogeneous sampling (Saunders, Lewis and Thornhill, 2016). Feedback from the expert reviews was used to improve the proposed compliance framework and thereafter it was presented as the final compliance framework.

**6.8.5 Sample and sampling method**

Research participants were retained from the RAF and the FSCA, and ranged from executive management, divisional executives, IT general managers (GM), department heads, IT senior managers (SM), IT managers, and functional heads, as shown in Table 6–4. The participants were selected on the basis of purposive heterogeneous sampling (Saunders, Lewis and Thornhill, 2016). This sampling method allowed the researcher to focus on the management levels that are most likely to be involved in and affected the most by IT governance decisions and practices, and who thus were able to provide insightful knowledge about IT governance implementation. Furthermore, this form of sampling ensures that diverse views from different levels of management are obtained and the depth of analysis is realised.

Table 6–4: Sample overview

<b>SAMPLE OVERVIEW</b>						
<i>Case Organisation</i>	<i>Top Management</i>	<i>Senior Management</i>	<i>IT Managers</i>	<i>Target Population</i>	<i>Sample – Interviews</i>	<i>Sample – Survey</i>
<b>RAF</b>	CEO	Executives/ GM/SM	Managers	<b>39</b>	7 (18%)	11 (28%)
	-	23	16			
<b>FSCA</b>	CEO/ Divisional executives	Departmental heads/	-	<b>18</b>	5 (28%)	6 (33%)

<b>SAMPLE OVERVIEW</b>						
<i>Case Organisation</i>	<i>Top Management</i>	<i>Senior Management</i>	<i>IT Managers</i>	<i>Target Population</i>	<i>Sample – Interviews</i>	<i>Sample – Survey</i>
		Functional leads				
	11	7	-			
<b>Total</b>	<b>11</b>	<b>30</b>	<b>16</b>	<b>57</b>	<b>12 (21%)</b>	<b>17 (30%)</b>

The target population for this study was all the top management, senior management and IT managers in both case organisations, as depicted in Table 6–4. The categorisation of the different layers of management follows that which is prescribed in the 2020 annual reports of both case organisations. The total target population from the RAF was 39, comprised of 23 members of senior management (i.e. executive management, IT general managers and IT senior managers) and 16 IT managers. The FSCA total target population was 18, comprised of 11 members of top management (i.e. CEO and divisional executives) and seven members of senior management (i.e. departmental heads and functional leads). In the RAF, semi-structured interviews were conducted with a sample of seven respondents (i.e. 18% of the target population) and the number of survey responses received was 11 (i.e. 28% of the target population). In the FSCA, semi-structured interviews were conducted with a sample of five respondents (i.e. 28% of the target population) and six survey responses were received (i.e. 33% of the target population)

In single case study research it is believed that 15 to 30 interviews are sufficient to reach data saturation – the point at which “new information gained from additional sessions decreases as more sessions are held” (Teddlie and Tashakkori, 2009, p.183; Marshall et al., 2013). However, Casteel and Bridier (2021) argue that because case study research embraces various other sources of evidence in addition to interviews (i.e. documentation review and surveys), the number of interviews can be lower than suggested by Marshall et al. (2013). Consequently, Casteel and Bridier (2021) propose that 12 to 15 interviews are adequate to reach data saturation for case studies, particularly in multi-case study research such as the present study. This is consistent with Marshall et al.’s (2013) own finding that data saturation occurred by 12 interviews. Therefore, the sample sizes of the present study (as presented in Table 6–4) are deemed appropriate as they are congruent with recommended sample sizes as applied in previous IS research. In addition, the sample percentage figures presented in Table

6–4 provide a clear view of the high representation of the sample for both the interviews (i.e. 21%) and the survey (i.e. 30%).

## **6.9 Validity and reliability of research design**

Yin (2018) proposes four tests that can be applied to case study research to assess its quality: construct validity, internal validity, external validity and reliability. Construct validity is associated with using multiple sources of evidence and having key stakeholders such as experts to review the preliminary compliance framework of this study (Yin, 2018). Internal validity is not in scope for this study as it relates to explanatory case studies, which this study is not; this study assumes an exploratory design. External validity is concerned with the generalisability of the findings of the study beyond the selected case organisations (Creswell and Creswell, 2018; Yin, 2018). The form of the main research in this study provides a rich groundwork to generalise its outcome through the use of theoretical propositions and replication logic (Yin, 2018). Reliability is concerned with whether another researcher, using the same research methods, could generate the same results as this study given similar working circumstances (Dudovskiy, 2018; Yin, 2018). The procedures undertaken in conducting this research are documented in this work, and the extensive use of software tools to assist the data collection and analysis of data provides an additional chain of evidence that can be replicated (Yin, 2018).

## **6.10 Data analysis**

This study followed a thematic data analysis approach as proposed by Braun and Clarke (2012). Thematic analysis is defined as a “method for systematically identifying, organizing, and offering insight into patterns of meaning (themes) across a data set” (Braun and Clarke, 2012, p.57). Emergent themes contributed to the improvement of the proposed compliance framework. The actual thematic analysis was carried out using Braun and Clarke’s (2012) six-phase approach to thematic analysis, as depicted in Figure 6–13 and explicated below:

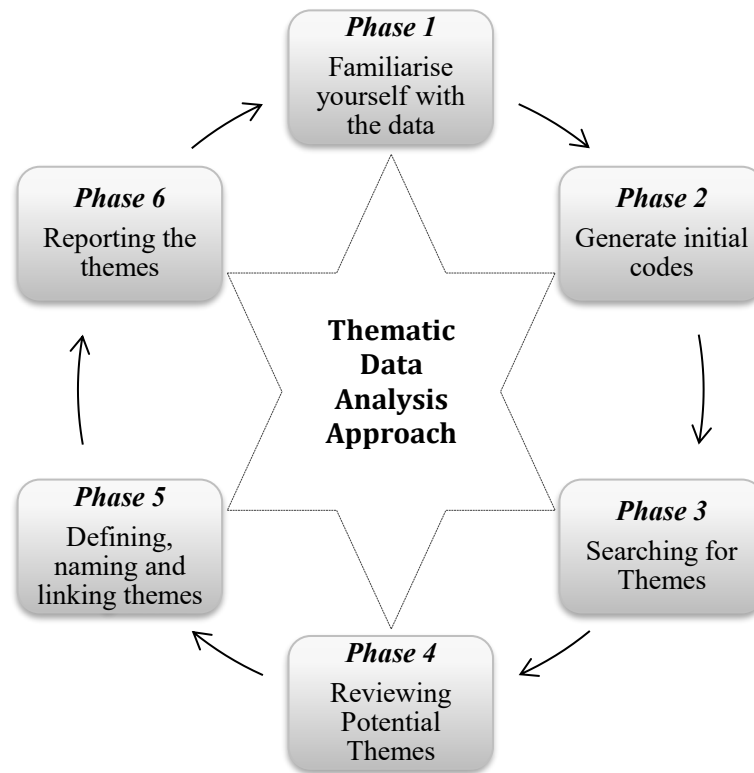


Figure 6–13: Thematic data analysis approach (adapted from Braun and Clarke, 2012)

- *Phase 1: Familiarise yourself with the data* – In this phase this researcher reviewed the transcripts of interviews and collated them in Atlas.ti version 9 – licensed computer-assisted qualitative data analysis (CAQDAS) software designed to support the coding and analysis of qualitative data, including case study data (Yin, 2018). This phase was used by the researcher to identify items of interest and look for meanings, recurring themes and patterns in the data (Saunders, Lewis and Thornhill, 2016). The reference manager software used was the Mendeley Desktop version 1.19.
- *Phase 2: Generate initial codes* – Codes are the building blocks of analysis (Braun and Clarke, 2012). The use of this method allowed this researcher the flexibility to use the research questions and existing literature to develop initial codes and systematically apply those to the data (Saunders, Lewis and Thornhill, 2016).
- *Phase 3: Searching for themes* – In this step, this researcher built on the work done in Phase 2, and began a process of analysing the codes and generating themes of shared patterns and meaning among the codes.

- *Phase 4: Reviewing potential themes* – This phase involved refining the codes to ensure that codes with shared meaning were integrated into a single coherent code that clearly articulated their nuanced and complex relationship. In this phase this researcher also started to test the themes against the research propositions to ensure that there was a form of alignment between the two.
- *Phase 5 and 6: Defining, naming and reporting themes* – This phase entailed labelling and presenting the themes to convey a story of the data as is done in Chapter 7.

The process described above relates to data collected through interviews where open-ended questions were used. Survey questionnaire data was based on a five-point Likert scale and was quantified as descriptive statistics in the form of bar graphs.

The essence of conducting case study and mixed methods research is to ensure the triangulation of data (Creswell and Clark, 2017). Triangulation is also used as a validity strategy for qualitative data and enhances the interpretability of the data (Creswell and Clark, 2017). Triangulation in this study is based on data from interviews, survey questionnaire and expert reviews, as depicted in Figure 6–14 below:

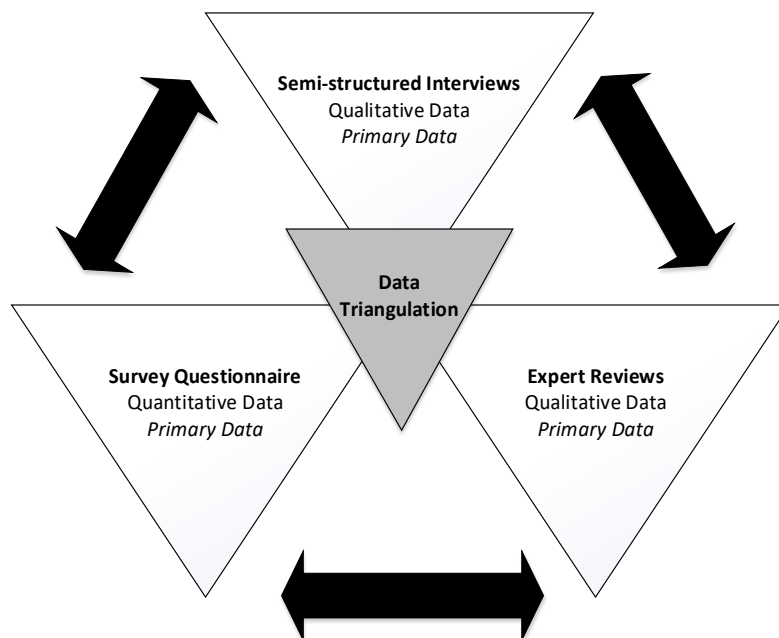


Figure 6–14: Triangulation method (adapted from Teddlie and Tashakkori, 2009)

## 6.11 Ethical considerations

The nature of this research is such that its outcomes could be put to a use that is not intended in this study, owing to the politically charged environment within which the state-owned entities operate. Therefore, it was critical for the researcher to keep the data secure and accessible only to authorised individuals, as well as to ensure that it will only be made public under the terms agreed with the participants (Oates, 2006). The researcher obtained a Rhodes University ethical clearance certificate for human subjects before undertaking the data collection process (Rhodes University Human Ethics Committee [RU-HEC] approval numbers [i.e. original approval and extension approvals: 2020-0810-3207 and 2022-0810-6863]).

The following aspects were managed as part of the ethical considerations for this study, in keeping with the University's policy on human ethics and ethical case study research (Yin, 2018):

- ***Informed consent***

Gatekeeper approvals were requested before approaching the participants directly. Participants were requested to indicate their participation through a formal and signed informed consent letter.<sup>10</sup> The letter contained clauses that address the aspect of informed consent:

- The purpose of the research project
- Ethical clearance for the research project
- The risks associated with participating in the project, which were deemed to be low, and what steps were taken to prevent the risks
- Contact details of the researcher and supervisor for any further questions the participants may have had.

- ***Voluntary participation***

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<sup>10</sup> See Appendix D

To address the aspect of voluntary participation, the participant informed consent letter included the following clauses:

- “I will participate in the project by completing a questionnaire and/or taking part in an interview session.”
  - “My participation is entirely voluntary and should I at any stage wish to withdraw from participating further, I may do so without any negative consequences.”
  - “I will not be compensated for participating in the research, but my out-of-pocket expenses will be reimbursed.”
- ***Use of acceptable, non-discriminatory and non-offensive language***

All communication with respondents was done in a respectful manner, observing the use of acceptable, non-discriminatory and non-offensive language.

- ***Privacy and anonymity of respondents***

Respondents were assured that their names would not be published and the data would be secured with only the researcher having access to it. The online questionnaire data was securely confined to a database where access was restricted to the researcher, and other data was stored in the Rhodes University-provided repository where access is restricted using password protection. In addition, when preliminary research findings were published this was done under the terms agreed with the participants, and complete participant anonymity was maintained. This will also apply to further publications of the research findings.

## **6.12 Conclusion**

In this chapter the research design of this study was discussed using the research onion layers as a canvass. The following key points were made in relation to the research onion layers: paradigm (i.e. pragmatism); reasoning approach (i.e. abductive reasoning); methodological approach (i.e. mixed methods approach); and methodological strategy (i.e. multi-case study method).

Data collection involved semi-structured interviews based on 10 questions drawn from the literature and aligned to the proposed framework constructs, a survey questionnaire with 85 questions based on a Likert scale of 1 to 5, a review of organisational documents as well as

expert reviews to evaluate the preliminary compliance framework. Data analysis was undertaken using a CAQDAS tool called Atlas.ti based on a six-step thematic analysis approach.

An overview of the two case organisations was further provided, highlighting key aspects such as organisational strategy and the socioeconomic impact of the organisations' mandate, IT strategy, organisational governance structures, key stakeholders and targeted citizens.

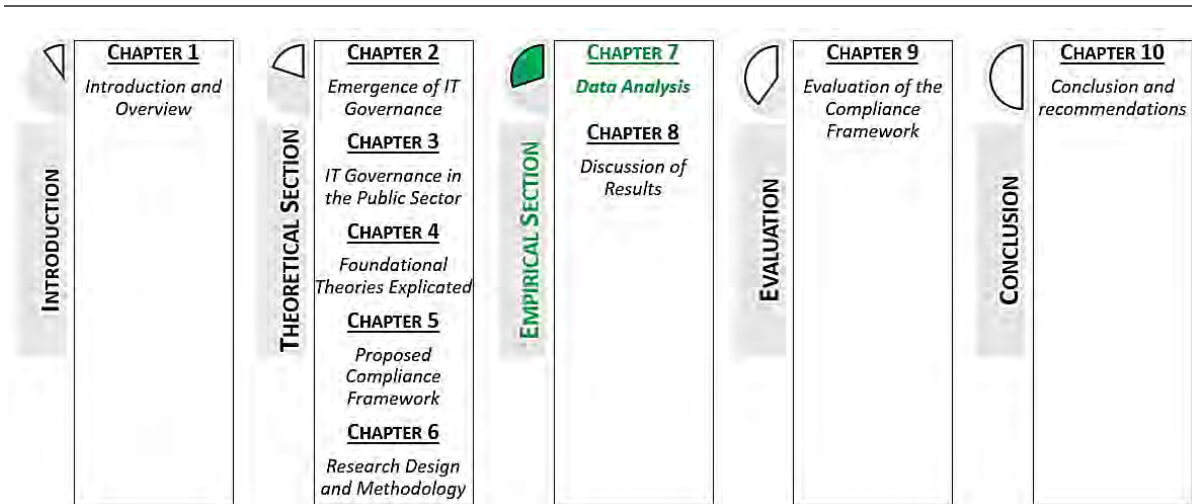
A detailed discussion ensued to justify the appropriateness of the selected research design and sampling methods and the samples that were applied. Finally, an overview of ethical considerations was provided, based on Rhodes University ethical clearance guidelines.

# **EMPIRICAL SECTION**

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# 7

## Data Analysis



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## 7.1 Introduction

Data collection for this study commenced in March 2020. The initial meetings took place in-person at both research sites, during the week of 16–20 March 2020 in Centurion and Menlo Park, Tshwane. During this time Covid-19 pandemic cases and related deaths were gradually increasing in South Africa. A state of disaster was declared on 15 March 2020 and a 21-day lockdown began on 27 March 2020. The lockdown restrictions meant that no travel was possible, and social distancing and other Covid-19 protocols had to be strictly observed. This had an adverse impact on the data collection process and timelines, including the indefinite postponement of meetings as respondents had to adjust to working from home and attend to their health and safety needs due to the pandemic. Beyond the physical health risks, the pandemic further presented psychological challenges to the respondents and this researcher alike as the lockdowns were continuously extended (De Caux, 2021). The responsiveness levels of respondents reached the lowest level during 2020.

A combined total of 12 interviews were conducted from both cases ranging from 45 to 60 minutes, with only one interview lasting 99 minutes. This chapter presents a visualisation of the interview results using the Atlas.ti networks functionality. Networks serve the purpose of presenting intricate information as easily accessible visuals. Visualisation is thus utilised to support the analysis of data by discovering connections between the concepts, effectively communicating the results of this study and theory building based on the data collected. Codes are based on quotations and possess two characteristics: groundedness (i.e. indication of how many quotations are linked to a code) and density (i.e. indication of a number of code-to-code connections).

Networks are essentially configured using nodes and links. Nodes refer to data objects such as codes and code groups. Links are labels that explicate the symmetric and asymmetric associations between nodes (e.g. “Information Quality” [code] → *improves* (link) → “benefit: accurate monitoring and reporting” [code]).

The crucial feature of the networks presented here is that they are based on code co-occurrence frequencies. The analysis of code co-occurrence frequencies in qualitative data essentially demonstrates a correlation between the codes and thus improves the validity and reliability of the networks in drawing inferences from the data.

The data analysis in this chapter is also arranged according to the three research sub-questions (i.e. RSQ1, 2 and 3). In order to meet the objective of triangulating the data from the interviews, the survey and later the expert reviews, this chapter presents qualitative interview data and descriptive statistical data from the survey under corresponding themes. The survey data is presented in the form of bar graphs that depict respondents' responses in percentages using the Likert scale. However, it should be noted that there is a rounding issue with the SurveyMonkey tool such that for some graphs the percentages add up to 101, instead of 100.<sup>11</sup> This rounding issue has no significant bearing on the results as the one percentage point does not materially affect any of the responses owing to the large percentage differences between responses.

## **7.2 Respondents' demographic information**

### **7.2.1 Respondent roles**

The following are the summative roles that were represented in the interview process for this study from both case organisations:

- Chief Information Officer (CIO)
- Chief Audit Executive (CAE)
- General Manager: ICT Operations (GM: ICT OPS)
- Head of IT Governance, Risk and Compliance (HoD: IT GRC)
- Acting Senior Manager: ICT Security and Governance (ASM: ICT S&G)
- Enterprise Information Governance Officer (EIGO)
- Head: Data Analytics (HoD: DATA)
- Head of ICT Applications, Operations and Infrastructure (HoD: ICT Apps, Ops & Infra)
- Senior Manager: ICT Project Management Office (SM: ICT PMO)
- Senior Manager: Application Development and Business Intelligence (SM: AD & BI)
- Senior Manager: ICT Infrastructure Development and Business Continuity Management (SM: ICT ID & BCM)

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<sup>11</sup> <https://help.surveymonkey.com/en/analyze/percents-not-totaling/>

- Senior Manager: ICT Operations (SM: ICT OPS)

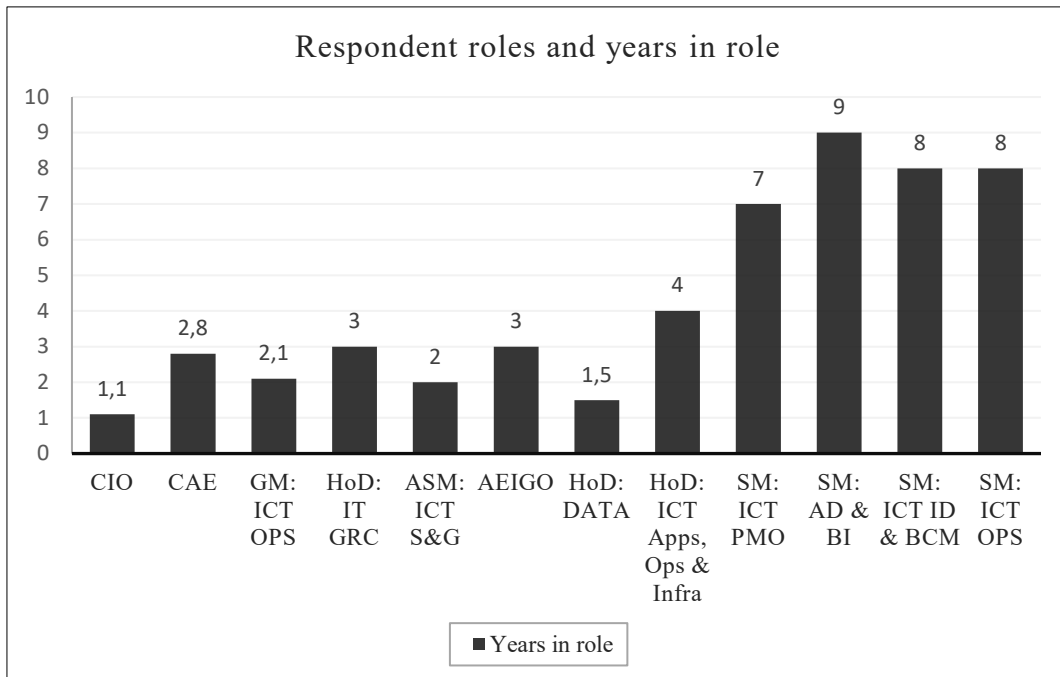


Figure 7–1: Respondent roles and years of service

As shown in Figure 7–1, the range of length of service for each of the individuals who held these roles was between one and nine years. In addition to the roles that were directly interviewed, other roles that were mentioned during the interview process as pertinent to the IT governance function within the state-owned entities included COO, CFO, and Senior Manager for Applications.

## 7.2.2 Background and experience related to IT governance

All respondents were experienced in IT governance, with their experience varying from mostly actual involvement in high-level decision-making in relation to IT governance implementation, to exposure in driving implementation at departmental level. Respondents' knowledge of IT governance was strong; this was based on years of exposure built up over their careers in senior roles within the case organisations as well as various prior positions held before joining the case organisations.

## 7.2.3 Survey respondents' demographic information

The survey questionnaire was completed by interview respondents and IT managers. No additional demographic information was collected from survey respondents.

### 7.3 CGICTPF implementation phase

Ten of the 12 respondents (83%), evenly spread among the two case organisations, confirmed that their organisations were in Phase 3 of the CGICTPF implementation, the rest were unsure. Phase 3 entailed an iterative process of continuous improvement of the CGICTPF implementation from April 2015 onwards.

### 7.4 Compliance framework constructs

The constructs of the preliminary compliance framework are discussed in detail in section 5.2, but are presented in Figure 7–2 below for ease of reference.

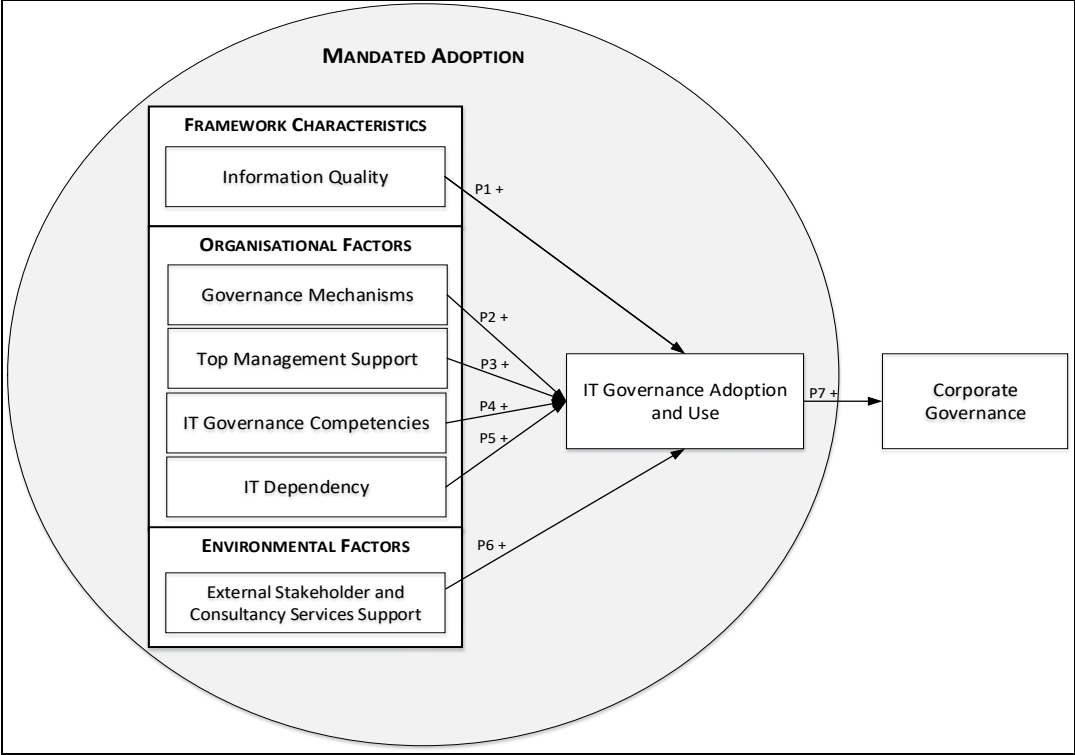


Figure 7–2: Preliminary compliance framework for IT governance adoption and use by state-owned entities in South Africa

The constructs of the preliminary framework and their relationship to the research questions of this study are depicted in Table 7–1 below. This is important to note so as to provide context for the analysis of the preliminary framework constructs that follows below.

Table 7–1: Mapping of preliminary framework constructs to research questions

<b>MAPPING OF PRELIMINARY FRAMEWORK CONSTRUCTS TO RESEARCH QUESTIONS</b>			
<b>#</b>	<b>Title</b>	<b>Research Question</b>	<b>Construct</b>
1	<b>Main Research Question</b>	<i>How should IT governance adoption and use be enhanced in state-owned entities in South Africa?</i>	
2	Research Sub-Question (RSQ) 1	What are the factors that influence IT governance adoption and use in state-owned entities?	1. Information quality
			2. Governance mechanisms
			3. Top management support
3	Research Sub-Question (RSQ) 2	How do public sector characteristics affect IT governance adoption and use?	4. IT governance competencies
			5. IT dependency
			6. External stakeholder and Consultancy services support
4	Research Sub-Question (RSQ) 3	How does IT governance adoption and use influence corporate governance in state-owned entities?	7. IT governance adoption and use

In relation to their analysis, the compliance framework constructs were configured from interview data following the extensive coding of interview transcripts using Atlas.ti version 9 Smart Groups functionality. The key feature of Smart Groups in Atlas.ti is that they function as repositories of a query that updates its references in real-time, instead of using hardwired connections among group members. The first step to creating Smart Groups for the constructs was to thematically group all the codes that were developed (e.g. IT alignment related codes were thematically grouped into the “business and IT alignment” group). The second step was to query the data by applying a Boolean operator to join related normal groups – thus thematically creating a smart group based on the applied query:

- The configuration of the 1\_INFORMATION\_QUALITY construct smart group is based on a query applied to three thematically associated normal groups (viz. “Business Data Analytics”, “Information Quality” and “Board and management reports”) using the “OR” operator, as shown in Figure 7–3 below:

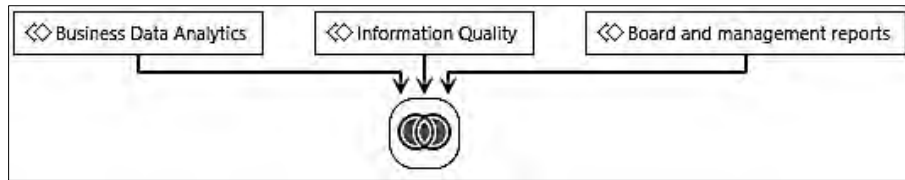


Figure 7-3: 1\_INFORMATION\_QUALITY construct smart group

- The configuration of the 2:1\_MECHANISM\_STRUCTURE construct smart group is based on a query applied to two thematically associated normal groups (viz. “IT governance structures” and “IT roles and related years”) using the “OR” operator, as shown in Figure 7-4 below:

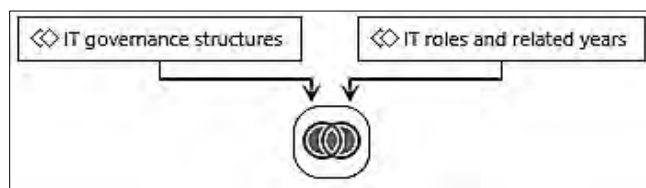


Figure 7-4: 2:1\_MECHANISM\_STRUCTURE constructs smart group

- The configuration of the 2:2\_MECHANISM\_PROCESS construct smart group is based on a query applied to two thematically associated normal groups (viz. “Processes” and “Compliance”) using the “OR” operator, as shown in Figure 7-5 below:

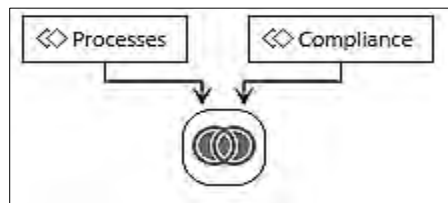


Figure 7-5: 2:2\_MECHANISM\_PROCESS construct smart group

- The configuration of the 2:2\_MECHANISM\_RELATIONAL construct smart group is based on a query applied to two thematically associated normal groups (viz. “Communication and Training” and “Regulation, policies, processes and frameworks”) using the “OR” operator, as shown in Figure 7-6 below:

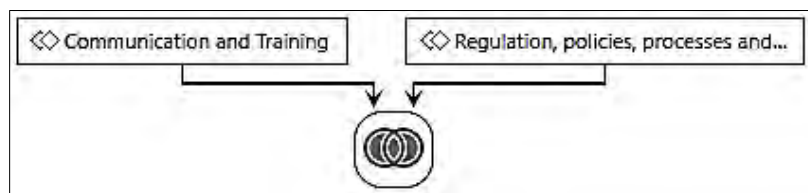


Figure 7-6: 2:2\_MECHANISM\_RELATIONAL construct smart group

- The configuration of the 3\_TOP\_MAN\_SUPPORT construct smart group is based on a query applied to the normal group (viz. “Top Management Support”); no Boolean operator was necessary as only one group makes up this construct smart group, as shown in Figure 7–7 below:



Figure 7–7: 3\_TOP\_MAN\_SUPPORT construct smart group

- The configuration of the 4\_ITG\_COMPETENCIES construct smart group is based on a query applied to the normal group (viz. “Board of Directors”); no Boolean operator was necessary as only one group makes up this construct smart group, as shown in Figure 7–8 below:

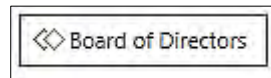


Figure 7–8: 4\_ITG\_COMPETENCIES construct smart group

- The configuration of the 5\_IT\_DEPENDENCY construct smart group is based on a query applied to three thematically associated normal groups (viz. “Business and IT alignment”, “IT Strategy” and “Strategy-related Documents”) using the “OR” operator, as shown in Figure 7–9 below:

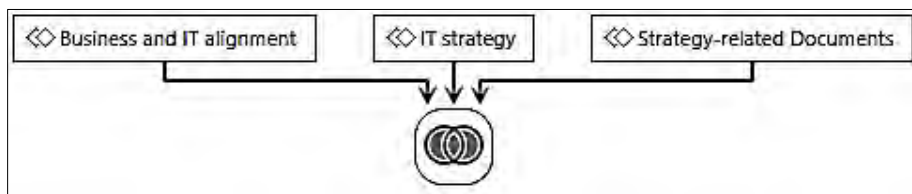


Figure 7–9: 5\_IT\_DEPENDENCY construct smart group

- The configuration of the 6\_CULTURE construct smart group is based on a query applied to two thematically associated normal groups (viz. “Culture” and “Public Sector Context”) using the “OR” operator, as shown in Figure 7–10 below:

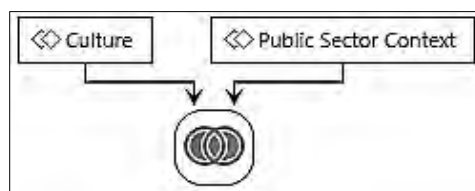


Figure 7–10: 6\_CULTURE construct smart group

- The configuration of the 7\_EXT\_STKHD\_and\_CONS construct smart group is based on a query applied to four thematically associated normal groups (viz. “Consultancy Services”, “Collaborating Organisations”, “Suppliers”, and “IT governance stakeholders”) using the “OR” operator, as shown in Figure 7–11 below:

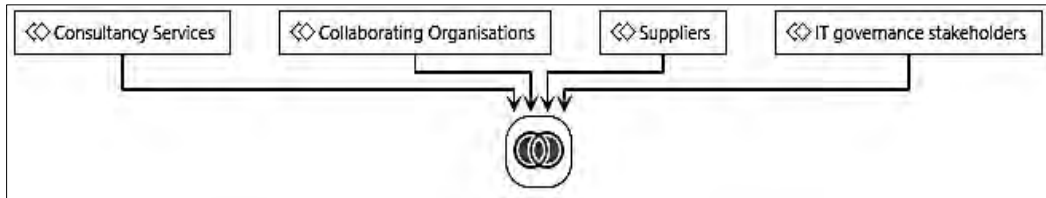


Figure 7–11: 7\_EXT\_STKHD\_and\_CONS construct smart group

- The following two constructs are normal groups of thematically arranged codes:
  - CORPORATE\_GOVERNANCE
  - ITG\_ADOPTION\_and\_USE

The Sankey diagram presented in Figure 7–12 below demonstrates the distribution of absolute code frequencies per construct smart group for Cases 1 and 2, respectively:

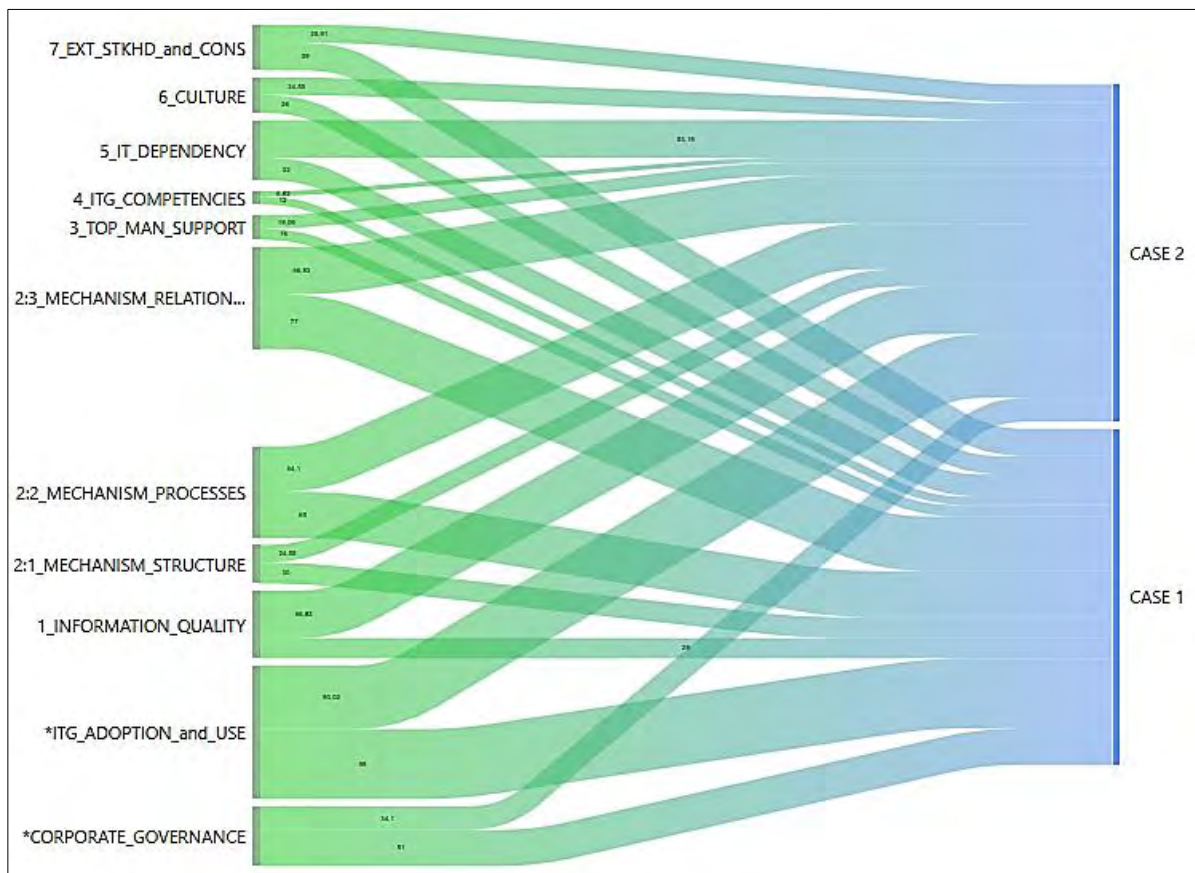


Figure 7–12: Compliance framework constructs code frequency by case organisation

While the smart groups are comprised of groups, the groups themselves are based on a thematic collection of codes which, in turn, are derived from quotations from interview transcripts with respondents from case organisations 1 and 2. *Absolute* normalised code frequency values underpin the Sanky diagram presented in Figure 7–12 above. The normalisation process entails adjusting the code frequencies where the total quotations for each case organisation are uneven (i.e. Case 1 = 206; Case 2 = 244 [see red circle markers in Figure 7–13 below]), so as to facilitate a more meaningful comparison of code frequencies between the two case organisations.

		□ CASE 1 □ 6 (206)	□ CASE 2 □ 5 (244)	Totals	
🔗 *CORPORATE_GOVERNANCE	◇ 7 (76)	51 10,49%	33,56 6,91%	84,56 8,70%	100,00%
🔗 *ITG_ADOPTION_and_USE	◇ 22 (165)	99 20,37%	88,61 18,23%	187,61 19,30%	100,00%
🔗 1_INFORMATION_QUALITY	◇ 29 (78)	29 5,97%	65,78 13,54%	94,78 9,75%	100,00%
🔗 2:1_MECHANISM_STRUCTURE	◇ 25 (74)	41 8,44%	44,3 9,12%	85,3 8,78%	100,00%
🔗 2:2_MECHANISM_PROCESSES	◇ 27 (112)	65 13,37%	63,1 12,98%	128,1 13,18%	100,00%
🔗 2:3_MECHANISM_RELATIONAL	◇ 25 (126)	77 15,84%	65,78 13,54%	142,78 14,69%	100,00%
🔗 3_TOP_MAN_SUPPORT	◇ 6 (30)	16 3,29%	18,8 3,87%	34,8 3,58%	100,00%
🔗 4_ITG_COMPETENCIES	◇ 4 (17)	12 2,47%	6,71 1,38%	18,71 1,93%	100,00%
🔗 5_ITG_DEPENDENCY	◇ 21 (71)	32 6,58%	52,36 10,77%	84,36 8,68%	100,00%
🔗 6_CULTURE	◇ 24 (44)	26 5,35%	24,17 4,97%	50,17 5,16%	100,00%
🔗 7_EXT_STKHD_and_CONS	◇ 31 (55)	38 7,82%	22,82 4,70%	60,82 6,26%	100,00%
<b>Totals</b>		486 100,00%	486 100,00%	972 100,00%	100,00%

Figure 7–13: Compliance framework constructs quotation frequency computation

Figure 7–13 above depicts both the *absolute* and *relative* code frequency computations for case organisations 1 and 2, respectively. In the first column the total number of group members and quotations that constitute the respective construct smart group are presented for ease of reference (e.g. the 1\_INFORMATION\_QUALITY construct smart group contains a total of 29 group members and 78 quotations [see black circle markers]). Taking the normalisation process into account, for the 1\_INFORMATION\_QUALITY construct smart group the *relative* code frequencies show that under Case 1 the column relative code frequency is 5,97% and the row relative code frequency is 30,60% [see yellow circle markers]. This similarly applies under Case 2 for a total of 100% for all row relative code frequencies and column relative code frequencies, respectively, as shown in Figure 7–13 above.

The construct with the *highest absolute* code frequency for Cases 1 and 2 is ITG\_ADOPTION\_and\_USE with 99 and 88,61, respectively. However, the constructs with the highest *relative* row and column frequencies for Case 1 are 4\_ITG\_COMPETENCIES (i.e. row = 64,13%) and ITG\_ADOPTION\_and\_USE (i.e. column = 20,37%), whereas for Case 2, the constructs with the highest *relative* row and column frequencies are 1\_INFORMATION\_QUALITY (i.e. row = 69,40%) and ITG\_ADOPTION\_and\_USE (i.e. column = 18,23%)

The construct with the *lowest absolute* code frequency for Cases 1 and 2 is ITG\_COMPETENCIES with 12 and 6,71, respectively. However, the constructs with the *lowest relative* row and column frequencies for Case 1 are 1\_INFORMATION\_QUALITY (i.e. row = 30,60%) and 4\_ITG\_COMPETENCIES (i.e. column = 2,47%), respectively, whereas for Case 2, the constructs with the *lowest relative* row and column frequencies are 4\_ITG\_COMPETENCIES (i.e. row = 35,87%) and 4\_ITG\_COMPETENCIES (i.e. column = 2,47%).

In addition, an emergent construct smart group (viz. 6\_CULTURE) was identified during the thematic analysis process.

## **7.5 RSQ1: What are the factors that influence IT governance adoption and use in state-owned entities?**

A number of factors were identified and were themed according to the framework constructs. Some factors were designated and labelled as benefits since they also derive from the implementation of other related IT governance factors. It must be noted that as part of the analysis of each of the themes, benefits and challenges pertaining to a theme are also presented – and those benefits that are also factors are also presented for accuracy and completeness of analysis. This level of abstraction enriches the analysis beyond the mere identification of factors by identifying the benefits of and challenges to IT governance adoption and use pertaining to a specific theme.

As explained, and this is important to note, the networks presented herein are based on code co-occurrence frequencies (i.e. a qualitative data equivalent of correlations in quantitative data analysis) and the use of links to associate codes based on raw data

relationships. This provides a much more reliable method for deriving meaning from the qualitative data.

Code co-occurrences for the factors presented in the networks below were moderated by excluding, as much as possible, the codes that relate to challenges, the public sector, culture and those that were co-occurring but had no immediate relationship with the factor code. This exclusion process was necessary so as to streamline the networks and avoid duplication, since those excluded codes are presented in their own right in the other sections.

In relation to the presentation of benefits and challenges for SRQ1, SRQ2 and SRQ3, the values that are shown in brackets are coefficients (*see black circle markers on Figure 7–19 below*), which indicate the strength of the relationship between the listed benefit codes and the variable code. The range of the coefficient is between 0 and 1; with 0 meaning the codes do not co-occur and 1 meaning the codes co-occur wherever they are applied. Despite the yellow dot indicating a low co-occurrence on some values, it also shows that one of the co-occurring codes has been applied more than five times more than the other, and therefore the co-occurrence still warrants consideration for analysis.

An additional emergent factor was identified – culture – which is discussed in section 7.5.9 below.

### **7.5.1 Information quality**

The interview data shows, as presented in Figure 7–14 below, that information quality (i.e. IQ1) improves accurate monitoring and reporting (i.e. code IQ2), and accurate decision-making (i.e. IQ3). IQ1 is also associated with corporate governance (i.e. IQ9) and compliance with the CGICTPF (i.e. IQ4) through the implementation of relevant policies, processes and standard operating procedures (SOPs) (i.e. IQ10) which embed information quality in daily operations across the organisation. As noted, IQ1 has a significant impact on board, exco and management report quality (i.e. IQ5) on the basis of which board, executive management and operational management decisions are made. Therefore, the quality of the information contained in board and management reports improves the level of accuracy of IT-related decisions made by those same structures.

A clearly defined and well-implemented information management policy and structures (i.e. IQ11) is an integral part of what constitutes good quality of information. Another key

element that improves information quality is the use of data analytics (i.e. IQ12). This crucial aspect, data analytics, is further explained in section 7.5.1.1 below.

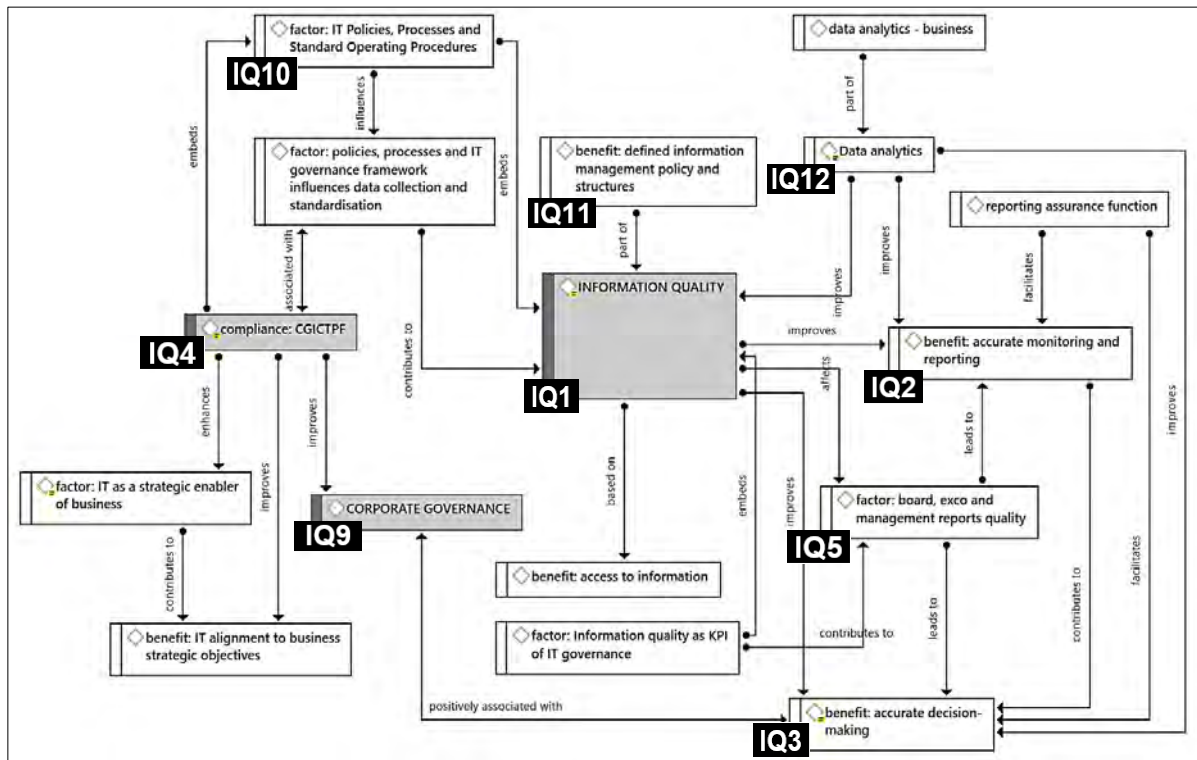


Figure 7–14: Information quality code co-occurrences

### 7.5.1.1 Board and management reports

Considering the centrality of code IQ5, which is affected by code IQ1, it is necessary to present a dedicated analysis of code IQ5, as depicted in Figure 7–15 below. Figure 7–15 also depicts the rest of the associations that correlate to code IQ1 from the code group “Board and management reports” (i.e. code group IQ6). This level of analysis of code group IQ6 was also necessitated by the need to represent all key co-occurrences with code IQ1 so as to obtain an appropriately scoped view of the interview data.

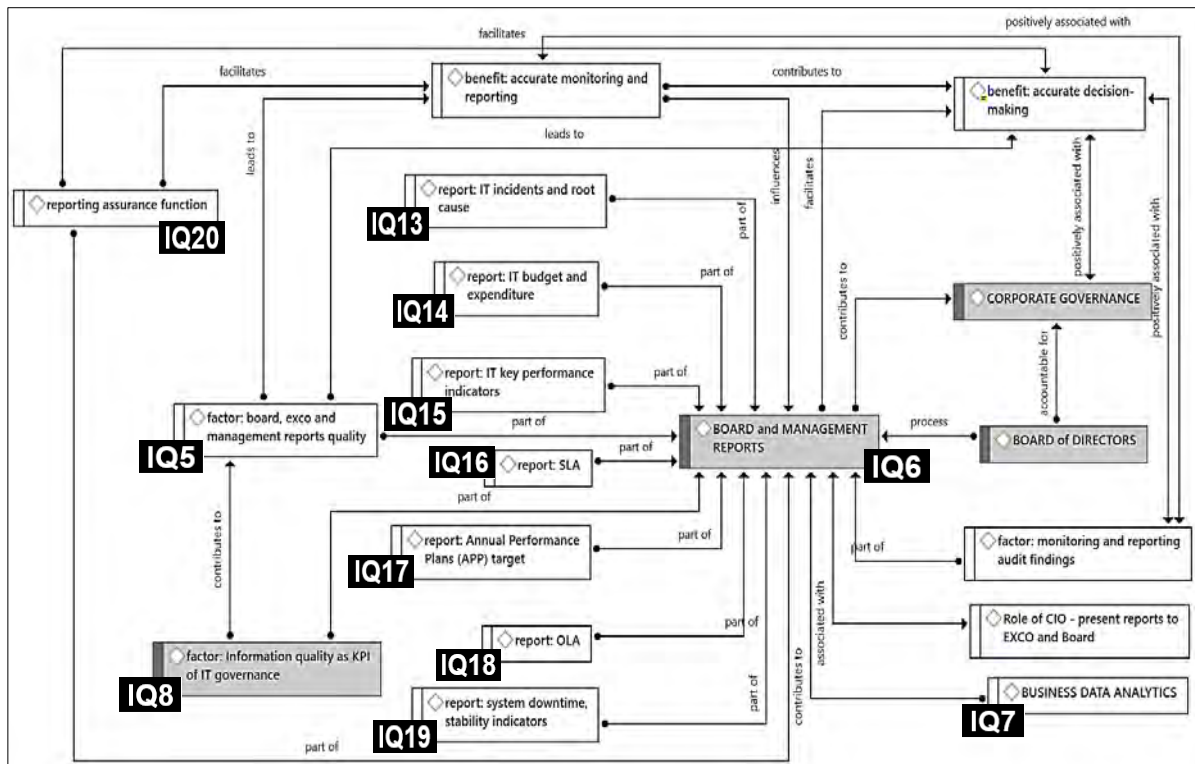


Figure 7-15: Board and management reports code group

Code group IQ6 shows all the management reports that were identified by respondents as crucial to decision-making by the board and executive and operational management. The reports include both IT and business data analytics reports. IT-specific reports are denoted by the codes IQ13 – IQ19 (i.e. IT incidents and root cause, IT budget and expenditure, IT key performance indicators, service level agreements (SLA), annual performance plan (APP) targets, operating level agreements (OLA), and system downtime and stability indicators). Some of these are operational reports, others are for the attention of the upper management layers and the board.

Business-specific reports include those that are derived from business intelligence and data analytics (i.e. code group IQ7). These typically contain business-related metrics, operational targets including investments, capital and operational expenditure and other key performance ratios. When information quality is designated as a key performance indicator (KPI) for IT governance (i.e. IQ8) it has the effect of contributing to the improved quality of board, executive and operational management reports (i.e. IQ5). This is due to the KPIs being included in the performance contracts of management and operational staff.

An interesting feature that was noted is that of the reporting assurance function (i.e. code IQ20) which consolidates all organisational reporting regarding all aspects of the APP targets (i.e. IQ17) that are tabled to the board and other key external stakeholders.

**7.5.1.2 Survey data: information quality**

- Code IQ14 shows that the IT budget forms part of the key reports for the attention of the board and executive and operational management. The survey data collected indicated that among the key reporting undertaken at the level of strategic importance, the IT budget and related investments are key metrics from both a business and an IT perspective. Figure 7–16 below shows that 71% of respondents agreed and 12% strongly agreed that IT budgets are used for controlling and reporting on IT activities and related investments. This affirms that the board and executive and operational management make use of the reports to monitor whether or not benefits accrue from IT-related investments.

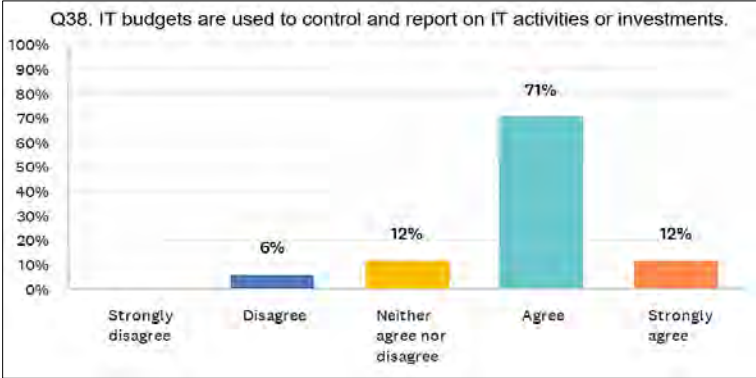


Figure 7–16: Survey responses IT budget reports

- Codes IQ13–IQ19 clearly show the extent of IT-related reports based on the interview data. The survey data also affirms that 53% of respondents agreed and 6% strongly agreed that there are measures in place to accurately monitor and report on IT performance, as depicted in Figure 7–17 below. However, 35% of respondents disagreed that there were measures to adequately monitor and report IT performance, while 6% neither agreed nor disagreed.

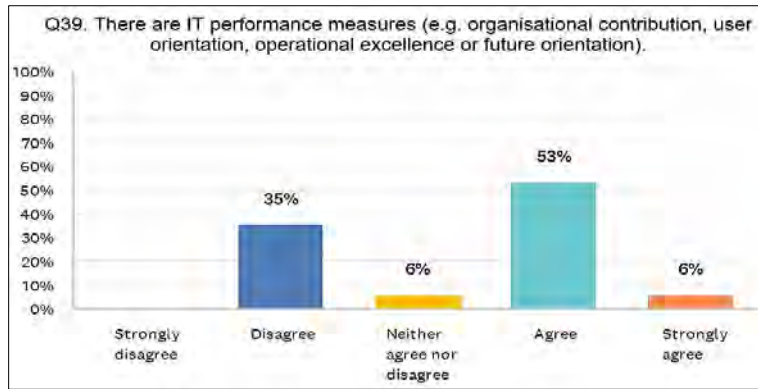


Figure 7–17: Survey responses for IT performance measures reports

- Whereas IT performance metrics from reports such as IQ13, 15, 18 and 19 contain data that can be used specifically to help monitor the value of operational services that IT provides to the business, the survey data shows that there is a lack of adequate chargeback mechanisms for the IT costs. As depicted in Figure 7–18 below, 41% of respondents disagreed and another 41% strongly disagreed with the notion that there are methodologies in their organisations to facilitate the charge back of IT costs to business; only 12% of respondents agreed.

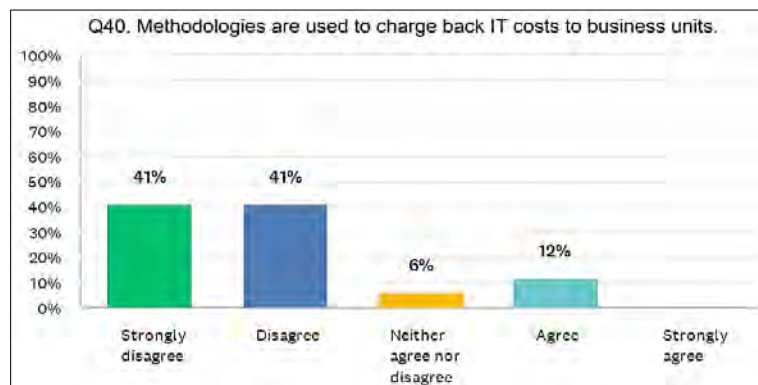


Figure 7–18: Survey responses for methodologies to charge back IT costs to business

### 7.5.1.3 Information quality: related benefits and challenges

Benefits associated with the information quality factor are derived from the data by observing which benefits co-occur with that factor. The benefits and challenges are depicted in Figure 7–19 and Figure 7–20 below, respectively. It should be noted that these benefits and challenges are a complete list that also includes those that appear in Figure 7–14 and Figure 7–15 above.

		● ◇ INFORMATION QUALITY
		① 16
● ◇ benefit: access to information	① 1	1 (0,06)
● ◇ benefit: accurate decision-making	① 14	10 (0,50)
● ◇ benefit: accurate monitoring and reporting	① 13	10 (0,53)
● ◇ benefit: defined information management policy and structures	① 1	1 (0,06)
● ◇ benefit: improved service delivery through optimal use of resources	① 12	1 (0,04)
● ◇ benefit: IT alignment to business strategic objectives	① 24	2 (0,05)
● ◇ benefit: IT investments and IT business value	① 12	1 (0,04)
● ◇ benefit: reduced audit findings	① 8	1 (0,04)

Figure 7–19: Co-occurring benefit codes associated with Information Quality

		● ◇ INFORMATION QUALITY
		① 16
● ◇ challenge: business information duplicates	① 2	2 (0,13)
● ◇ challenge: business process silos	① 2	1 (0,06)
● ◇ challenge: data intelligence not explored	① 10	6 (0,30)
● ◇ challenge: lack of integrated data collection and storage	① 7	6 (0,35)
● ◇ challenge: lack of understanding the benefit of IT governance	① 5	1 (0,05)
● ◇ challenge: no tool to measure usability of IT services	① 2	1 (0,06)

Figure 7–20: Co-occurring challenge codes associated with information quality

## 7.5.2 Governance mechanisms: structures

### 7.5.2.1 Board, EXCO, management and operational structures

The codes for governance structures were grouped on the basis of their level: board of directors (i.e. code group GM1), executive committee (i.e. code group GM2), senior management (i.e. code group GM3) and operational structures (i.e. code group GM4), as shown in Figure 7–21 below. The grouping of these structures follows the pattern of strategic (i.e. GM1 and GM2), tactical (i.e. GM2) and operational management (i.e. GM3 and GM4) and related decision-making, as discussed section 3.4.2. Code group GM1 delegates IT governance to code group GM2, but maintains accountability through oversight mechanisms exercised by GM35, GM36 and GM37 – all of which are subcommittees of the Board. GM35 oversees the strategic alignment of IT and operations at the level of the board; and approves and delegates the implementation of IT and business strategy to GM2 for Case 1. GM36 is the equivalent of GM35 at the Case 2 organisation. The GM37 structure is concerned with monitoring the strategic risks of the organisations and is accountable for the implementation of controls to mitigate the risks, including IT-related risks. Internal Audit and Enterprise Risk

Management functions have a reporting line to this subcommittee of the board and present quarterly reports to the committee.

Code group GM2 is delegated by code group GM1 to drive the implementation of the organisational strategy, and exercises the delegation through structures such as GM38, GM39, GM40 and GM41, which are subcommittees of EXCO (denoted by code GM42). Code GM38 denotes the IT Steering Committee at the level of EXCO. At the Case 1 organisation, GM38 processes IT-related investments and prioritisation decisions, and makes recommendations to GM42 in line with the organisational strategy. GM38 also approves the IT strategy and ensures IT alignment at the level of the EXCO. GM40 plays an equivalent role for the Case 2 organisation. Codes GM39 and GM41 are the expression of the strategic importance of information governance as they process decisions relating to how the use of information is optimised in the Case 2 organisation.

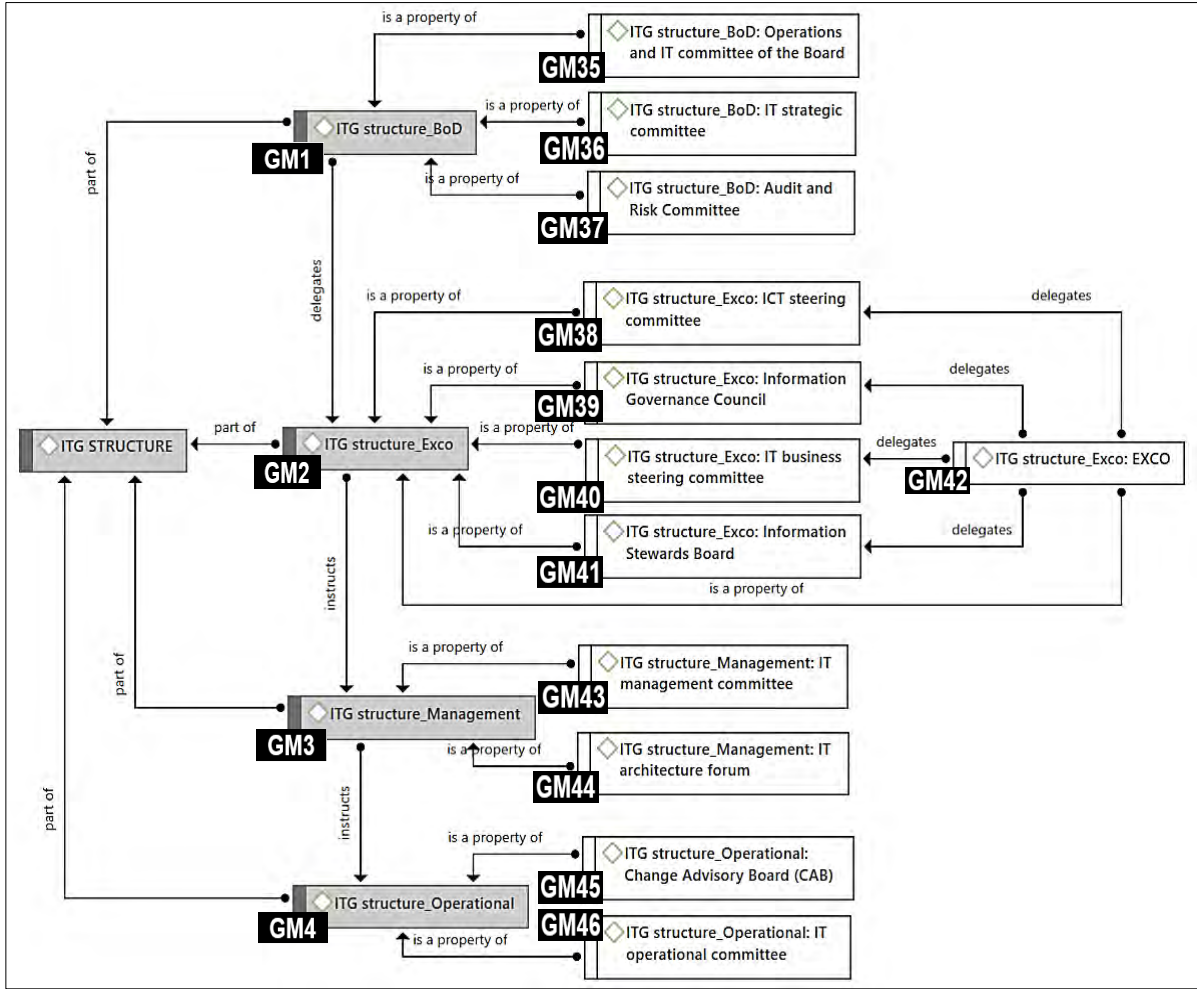


Figure 7–21: IT governance structures code group

Code group GM3 receives instructions from code group GM2. Some of the instructions are coded into job functions, performance contracts and policies, process and standard operating procedures (SOPs) which are based on the CGICTPF. The key governance structures that were noted at this level were that of the IT management committee (i.e. code GM43) and the IT architecture forum (i.e. code GM44). Code GM43 is comprised of the CIO and the functional heads, general managers and senior managers who report to the CIO and look after the various IT departments. The IT management committee meets on a weekly basis to process operational decisions. Code GM44 is crucial for the objective of strategic alignment at the operational level as it comprises business and IT specialists who process decisions in relation to how the business and IT components such as business architecture, data architecture, application architecture and technology architecture fit together.

GM4 receives instructions and guidance from GM3 to further operationalise governance processes at a more granular layer of day-to-day operations through the Change Advisory Board (i.e. code GM45) and the IT operational committee (i.e. code GM46). The code GM45 is an operational forum led by a senior IT service manager to process and schedule technical changes that are due for implementation; attendees include IT and business process owners who are affected by the proposed IT change.

#### ***7.5.2.2 Survey data: board, EXCO, management and operational structures***

- GM1 has subcommittees in the form of GM35, GM36 and GM37 according to the interview data. In relation to GM35 and GM36:
  - 1) Survey data supports the functional success of these structures as a high proportion of 67% of respondents agreed that IT is a regular agenda item for boards of directors' meetings and a reporting issue that is up for discussion in the same board meetings, while 17% disagreed and yet another 17% neither disagreed nor agreed, as shown in Figure 7–22 below.

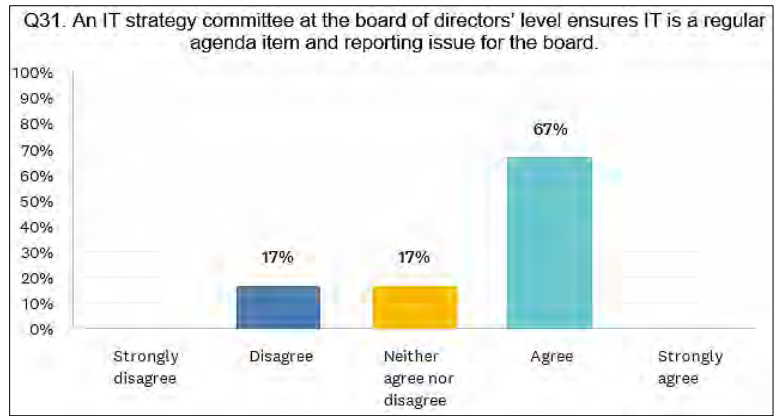


Figure 7–22: Survey responses for IT as a regular agenda item and reporting issue for the board

2) In addition, the survey data also shows support, albeit moderate, for the statement that the board of directors provides strategic direction and alignment of IT and business, as shown in Figure 7–23 below, with 50% and 6% of respondents agreeing and strongly agreeing with that statement, respectively. However, 11% of respondents disagreed, with 33% of respondents neither agreed nor disagreed.



Figure 7–23: Survey responses for the board of directors providing strategic direction and alignment of IT and business

3) Pursuant to the role of the board of directors of providing strategic direction and alignment of IT and business, the survey data does not support the notion that this strategic direction and IT alignment leadership extends to matters of IT-related sourcing and the use of IT resources, skills and infrastructure to meet the organisation’s strategic objectives. As shown in Figure 7–24 below, only 33% of respondents agreed with that statement while 38% of respondents disagreed and 28% of respondents neither agreed nor disagreed.

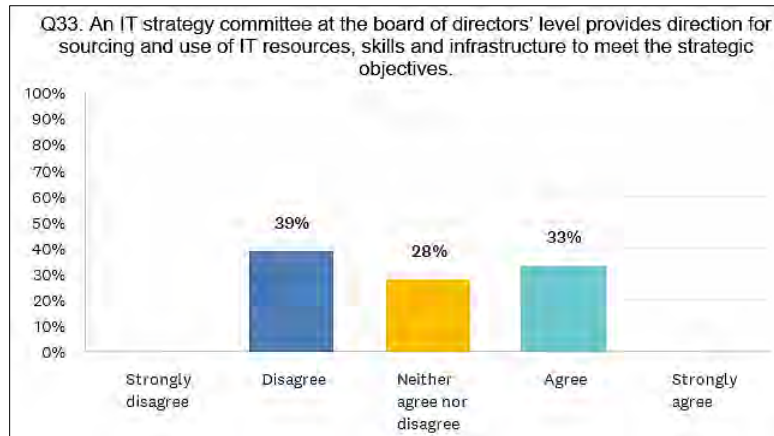


Figure 7–24: Survey responses for board of directors providing direction for the sourcing and use of IT resources, skills and infrastructure to meet the strategic objectives

- 4) When asked to express whether they concurred with the statement that the board of directors provides direction to management specifically in relation to IT strategy, only 33% of respondents agreed while 28% disagreed, as shown in Figure 7–25 below. A large number of respondents (39%) neither agreed nor disagreed.

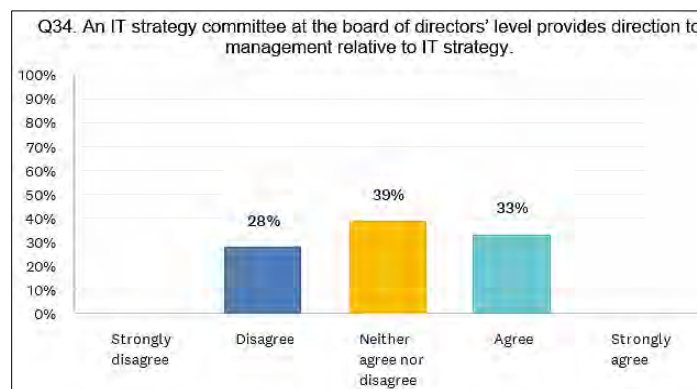


Figure 7–25: Survey responses for the board of directors providing direction to management regarding IT strategy

- In relation to GM37, the Audit and Risk Committee of the Board:
  - 1) Survey data nominally supports the notion that the board of directors oversees the IT assurance activities of the organisation, and that the Audit and Risk Committee is comprised of independent members who are from outside the organisation. As shown in Figure 7–26 below, 22% of respondents agreed while 11% strongly agreed. Interestingly, a significant 50% of respondents indicated that they neither agreed nor disagreed, while only 11% disagreed, with only 6% strongly disagreeing.



Figure 7–26: Survey responses for the board of directors overseeing IT assurance activities and being comprised of independent members

2) In addition, a similarly nominally subscribed response is noted in Figure 7–27 below for the statement probing respondents regarding the board of directors overseeing IT assurance activities and addressing IT governance requirements of the organisation. Thirty-three per cent of respondents agreed while 17% disagreed. An interesting observation is that 50% of respondents neither agreed nor disagreed with this statement.



Figure 7–27: Survey responses for the board of directors overseeing IT assurance activities and addressing IT governance requirements

- Survey data was also collected in relation to GM2, as the board of directors and executive management layers form the core focus of this study in relation to IT governance adoption and use. These layers provide strategic direction and instruction for the other layers of management. In relation to GM2’s ICT steering (GM38) and IT business committees (GM40) of EXCO – jointly functioning effectively as the IT Steering Committee referenced in the survey – the survey data significantly supports the successful execution of the IT governance related mandate of these structures:

1) In Figure 7–28 below, 56% of respondents agreed and 17% strongly agreed with the notion that the IT steering committee approves the IT strategy and IT policies of the

organisation, while 11% of respondents disagreed and 17% neither agreed nor disagreed.

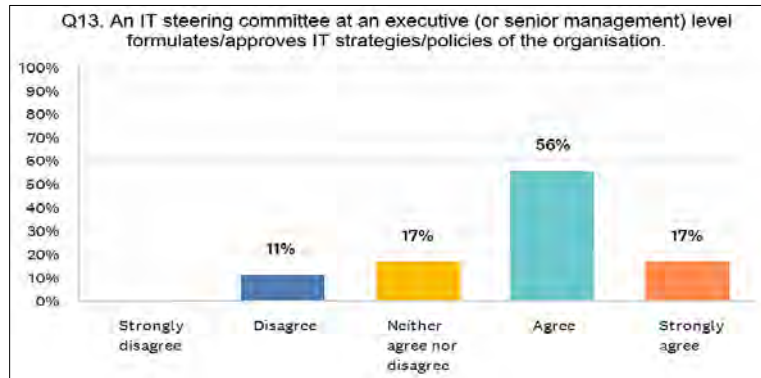


Figure 7–28: Survey responses on the IT steering committee approving the IT strategy and IT policies of the organisation

2) Survey data in relation to IT-related investments shows that 67% of the respondents agreed and 6% strongly agreed that the IT steering committee determines business priorities when making decisions about IT-related investments, as depicted in Figure 7–29 below, with 11% of the respondents disagreeing with that notion while 17% neither agreed nor disagreed. Yet, 61% of the respondents agreed and 11% strongly agreed that the IT steering committee makes these decisions about IT-related investments based on what the business needs, as depicted in Figure 7–30 below, with 17% of the respondents disagreeing and 11% neither agreeing nor disagreeing.

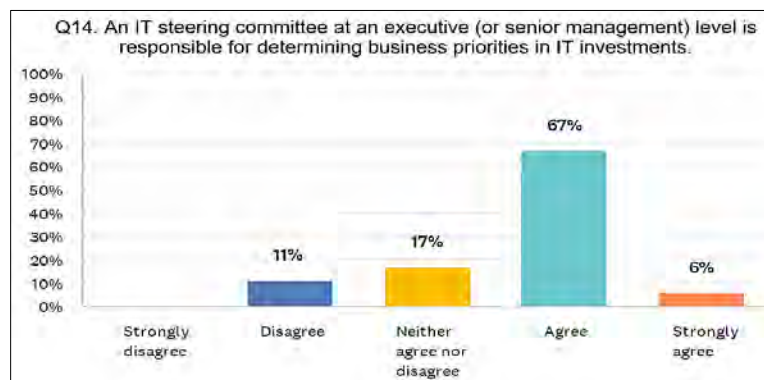


Figure 7–29: Survey responses about the IT steering committee determining business priorities when making IT investments

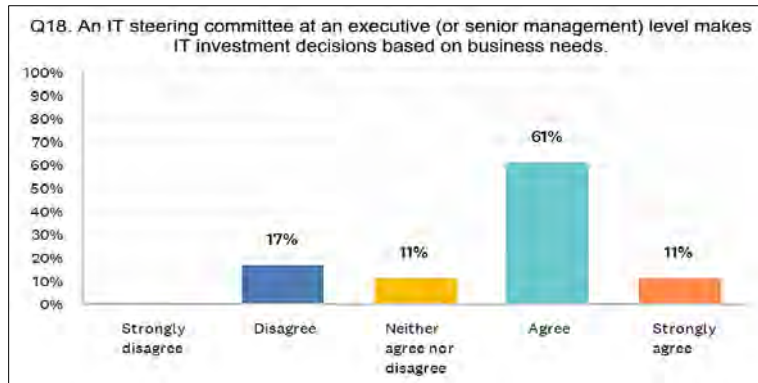


Figure 7–30: Survey response about the IT steering committee making IT investments based on business needs

3) The survey data also shows that the focus by the IT steering committee on providing strategic direction in relation to IT projects was considered favourably by respondents, with 6% of the respondents agreeing and 6% strongly agreeing with that notion, as shown in Figure 7–31 below. However, 17% of the respondents disagreed and 6% strongly disagreed, with 11% neither agreeing nor disagreeing.

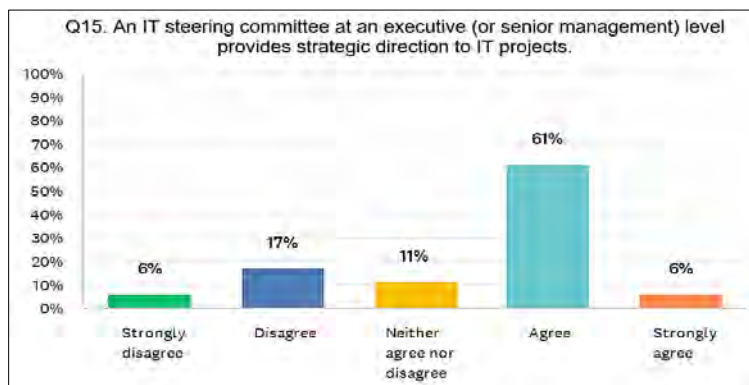


Figure 7–31: Survey responses about the IT steering committee providing strategic leadership to IT projects

4) Survey data affirms that benefits realisation from IT investments is considered a strategic imperative and that the IT steering committee provides leadership in making this IT governance process part of decision-making and operational procedures. As shown in Figure 7–32 below, 67% of the respondents agreed and 6% strongly agreed that the IT steering committee provides adequate leadership in terms of deriving benefits from IT-related investments. Only 11% of the respondents disagreed, while 17% neither agreed nor disagreed.

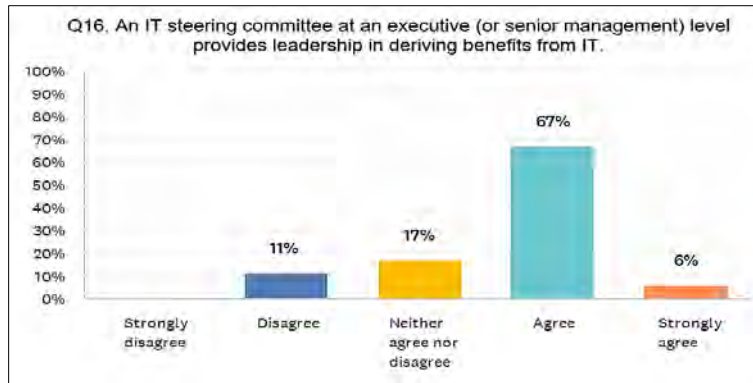


Figure 7–32: Survey responses about the IT steering committee leading benefits realisation from IT

5) Survey data shows a poor representation of IT-competent business personnel on the IT steering committee. As shown in Figure 7–33 below, 44% of the respondents disagreed that business representatives on the IT steering committee possess extensive IT knowledge; whereas only 28% agreed and 6% strongly agreed with that notion. Conversely, 50% of respondents agreed and 11% strongly agreed that IT representatives on the IT steering committee possess extensive business knowledge, as depicted in Figure 7–34 below, with 28% of the respondents disagreeing with that notion and 11% neither agreeing nor disagreeing.

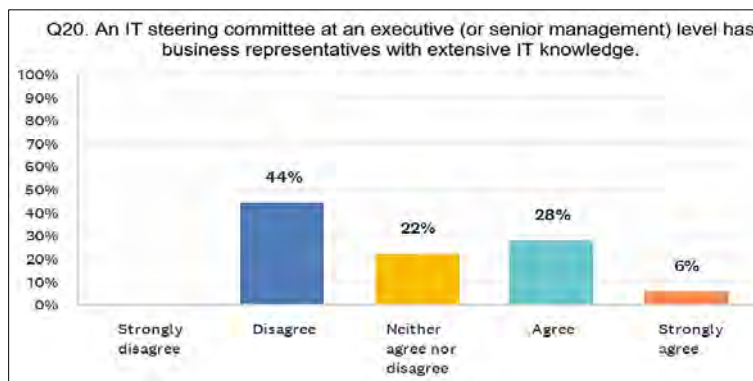


Figure 7–33: Survey responses about the IT steering committee business representatives having extensive IT knowledge

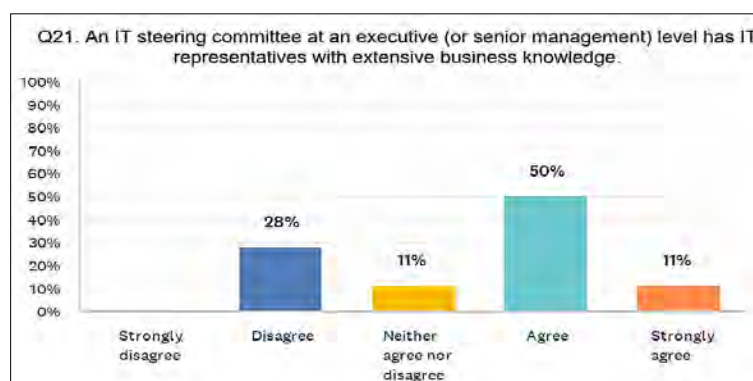


Figure 7–34: Survey responses about the IT steering committee IT representatives having extensive business knowledge

6) Finally, survey responses affirm the centrality of the IT steering committee in entrenching IT-related decision-making across the key levers of the organisation. As shown in Figure 7–35 below, 50% of the respondents agreed and 11% strongly agreed that the IT steering committee participates in the organisations’ IT decision-making processes, with 17% of the respondents disagreeing and 22% neither agreeing nor disagreeing.

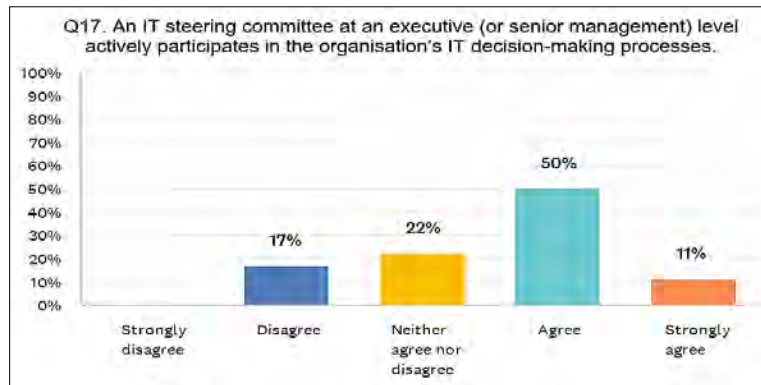


Figure 7–35: Survey responses about the IT steering committee actively participating in the organisation's IT decision-making processes

### 7.5.2.3 Board, EXCO, management and operational structures: benefits

This section presents the benefits associated with the identified governance structures, with the exclusion of the roles of the CIO and IT governance officer – both of which are presented in the next sections. Figure 7–36 below shows that there are four co-occurring benefit codes which signify the benefits that closely correlate to the governance structures. Considering that it serves the analysis to understand which benefits directly co-occur with which specific governance structures, a Sankey diagram is presented in Figure 7–37 below to provide such a view. The use of a Sankey diagram is preferred since it is better suited to visualising data than a table, considering that the governance structure codes are three or more in number.

● ◇ benefit: accurate decision-making	14
● ◇ benefit: IT alignment to business strategic objectives	24
● ◇ benefit: rationalise and include agenda items in business meetings	3
● ◇ benefit: self-assessments conducted routinely	4

Figure 7–36: Co-occurring benefit codes associated with the board, EXCO, management and operational structures

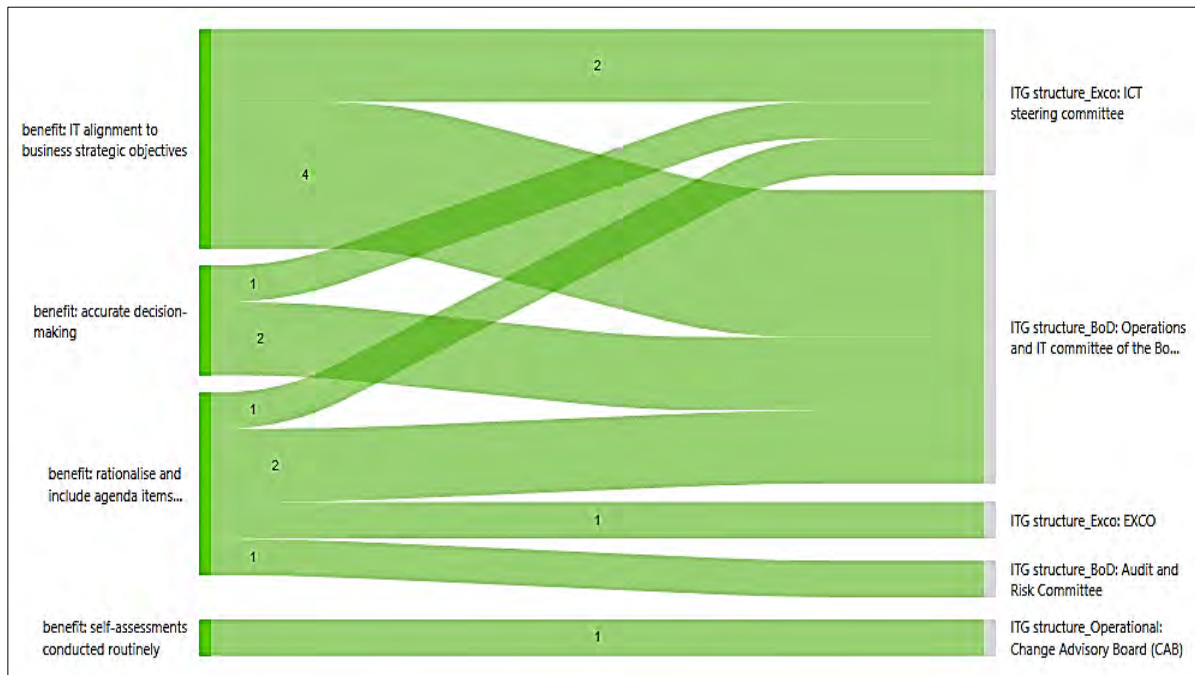


Figure 7–37: Sankey diagram of co-occurring benefit codes associated with IT governance structures

#### 7.5.2.4 *The role of the chief information officer (CIO)*

One of the structures that was emphasised as crucial for the successful implementation of the CGICTPF is the position of the CIO, and that its reporting line must head directly to the CEO as is the situation in both case organisations.

The codes for the various functions of the CIO are grouped under the code group “Role of the CIO” (i.e. GM6) in Figure 7–38 below. The interview respondents note that the crucial role of the CIO in the adoption and use of the CGICTPF includes essential facets such as

- being a communicator (i.e. GM7) and driving IT governance awareness based on IT governance policies, processes and SOPs throughout the organisation – this leads to the continuous use of the CGICTPF and enhances corporate governance;
- presenting reports to the EXCO and Board (i.e. GM8), including their subcommittees
- in association with that role the CIO is also experienced as the link between EXCO and the board in terms of articulating business-related IT matters (i.e. GM9)
- building strong relationships with internal and external stakeholders (i.e. GM47)

- facilitating peer reviews of the IT organisations by collaborating with organisations in the public sector (i.e. GM10)
- extending benchmarking exercises against peer organisations in the public sector both locally and internationally (i.e. GM11)
- enforcing IT governance training for all IT staff through the use human resource-related mechanisms (i.e. GM12)
- consulting with all relevant stakeholders on key business-related IT decisions (i.e. GM13). The CIO consults the IT governance officer as governance processes are pervasive throughout the organisation. The CIO further consults the internal auditors who are also key IT governance stakeholders.

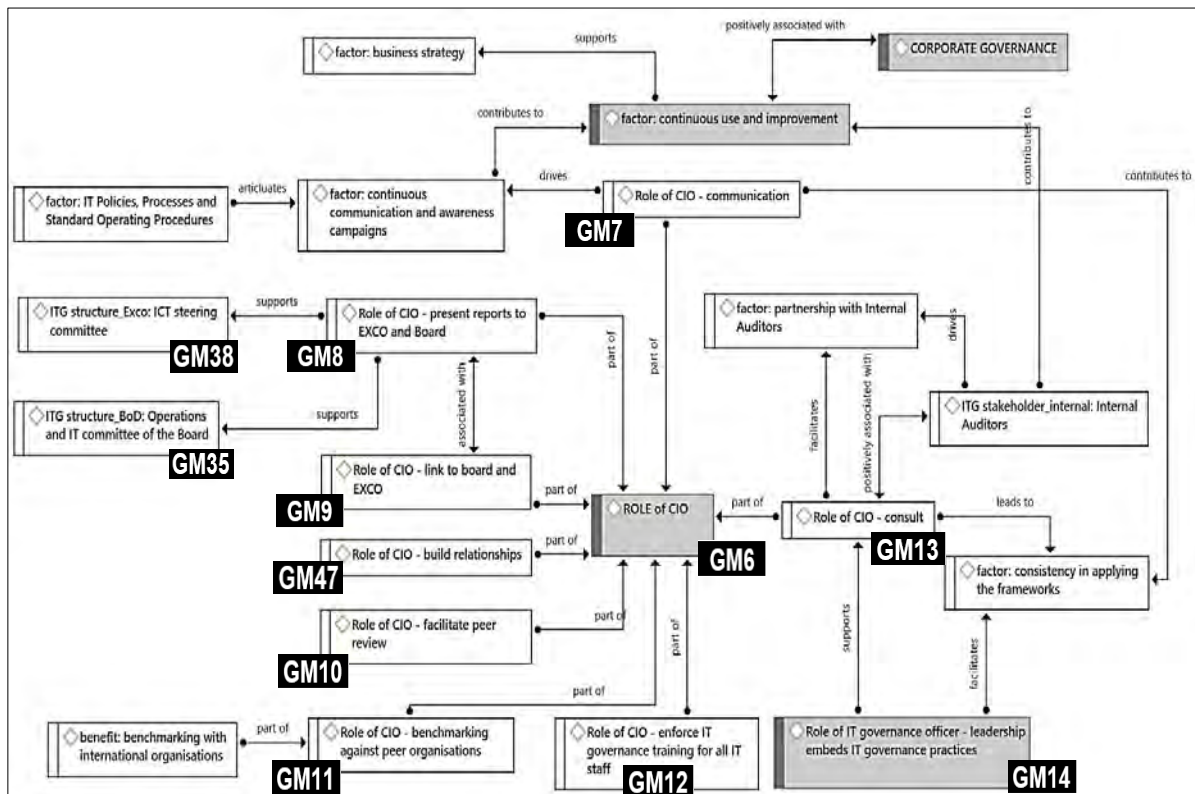


Figure 7–38: Role of the CIO code group

#### 7.5.2.5 Survey data: role of the CIO

- Survey data affirms the crucial role of the CIO and how they establish the IT function and articulate the role of IT in the organisation. As shown in Figure 7–39 below, a significant

76% of the respondents agreed with the notion that the CIO articulates a vision for the role of IT in their organisation; 24% of the respondents neither agreed nor disagreed.

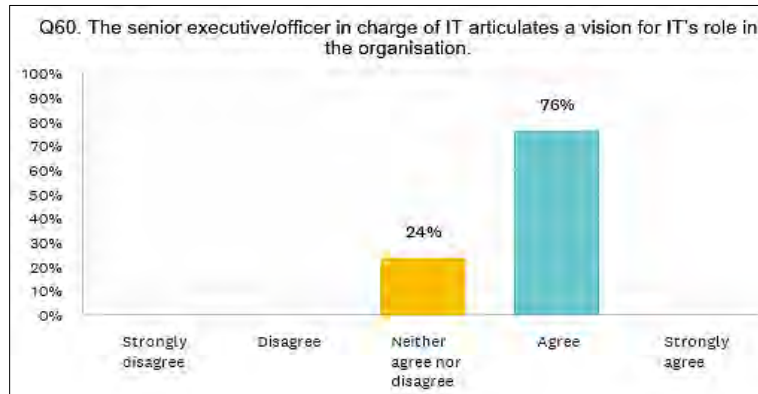


Figure 7–39: Survey responses about the CIO articulating a vision for the role of IT in the organisation

- In addition, survey data further affirms that the CIO drives the vision for IT and that this vision is clearly understood by all decision-makers across the various layers of the organisation. In Figure 7–40 below, again, a significant 76% of the respondents agreed with that notion while 18% neither agreed nor disagreed, with 6% of the respondents disagreeing.

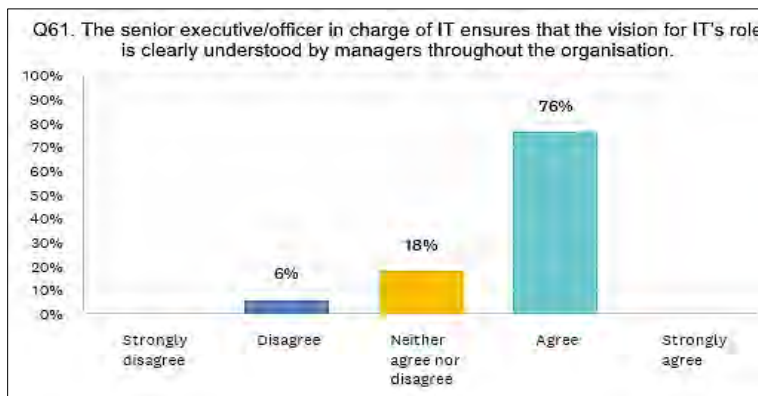


Figure 7–40: Survey responses about the CIO ensuring that the vision for the role of IT is clearly understood by managers throughout the organisation

#### 7.5.2.6 *The role of the IT governance officer*

The role of a dedicated IT governance officer (i.e. code GM14) was identified as crucial to the successful adoption and use of the CGICTPF as it is consulted by the CIO and supports the efforts of the CIO to embed the CGICTPF. As depicted in Figure 7–41 below, the code co-occurrences with the code GM14 explicate the relationships that pertain to this role. In the first instance, code GM14 supports code GM13 by providing leadership to embed IT



### 7.5.2.7 Survey data: role of the IT governance officer

- Pursuant to the leadership role of code GM14 in embedding IT governance practices, the survey data supports the notion that the IT governance officer (or equivalent) is responsible for developing and implementing an IT governance strategy. As shown in Figure 7–42 below, 50% of the respondents agreed and 28% strongly agreed with the notion of an IT governance officer developing and implementing IT governance strategy. In contrast, only 17% of the respondents disagreed, with only 6% neither agreeing nor disagreeing.

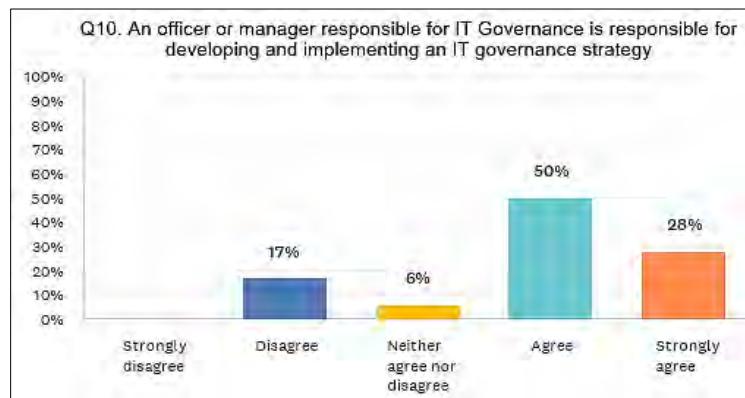


Figure 7–42: Survey responses about the IT governance officer developing and implementing an IT governance strategy

- Another crucial aspect of code GM14 is conducting self-assessments (i.e. GM15) and implementing IT risk management (i.e. GM16). The survey data affirms this aspect as 56% of the respondents agreed and 22% strongly agreed that an IT governance officer (or equivalent) is responsible for assessing IT risks within the organisation, as depicted in Figure 7–43 below; again, only 17% of the respondents disagreed, with only 6% neither agreeing nor disagreeing.

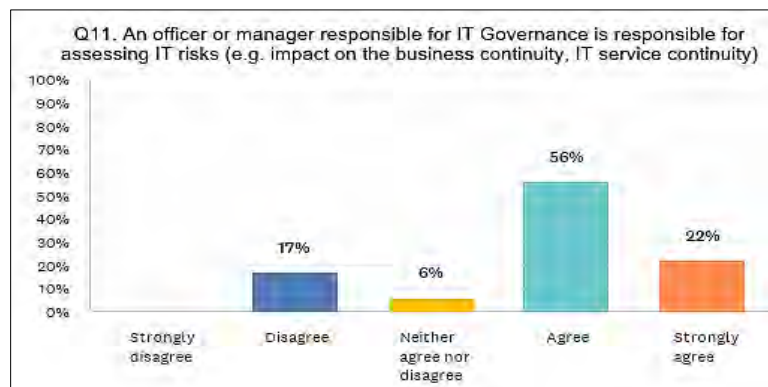


Figure 7–43: Survey responses about the IT governance officer assessing IT risks

- Code GM14 is intended to support the CIO in enforcing IT governance training and practices (i.e. GM12). The survey data shows that 50% of the respondents agreed that an IT governance officer has sufficient authority to enforce IT governance processes, while 17% disagreed and 33% neither agreed nor disagreed, as depicted in Figure 7–44 below.

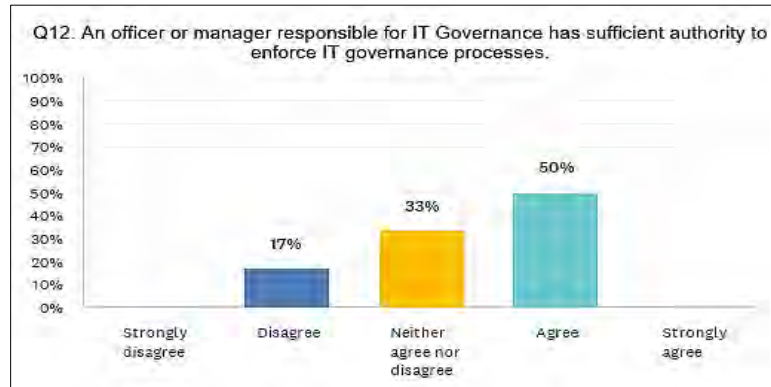


Figure 7–44: Survey responses about the IT governance officer's authority to enforce IT governance processes

#### 7.5.2.8 Roles of the CIO and IT governance officer: related benefits

The benefits presented here relate only to the roles of CIO and the IT governance officer, since benefits associated with the preceding IT governance structures were presented in section 7.2.6.3 above. Figure 7–45 below shows that there are eight co-occurring benefit codes which signify the benefits that closely correlate to the role of the CIO code group GM6 and the role of the IT governance officer code GM14.

●◇ benefit: accurate decision-making	14
●◇ benefit: benchmarking with international organisations	1
●◇ benefit: IT alignment to business strategic objectives	24
●◇ benefit: IT enables and embeds efficient business processing	4
●◇ benefit: rationalise and include agenda items in business meetings	3
●◇ benefit: self-assessments conducted routinely	4
●◇ benefit: speaking same language, understanding the why of IT governance	7
●◇ benefit_external: ITG regulates relationship with stakeholders by defining roles and responsibilities	6

Figure 7–45: Co-occurring benefit codes associated the roles of the CIO and the IT governance officer

Again, it serves the analysis to use a Sankey diagram, as presented in Figure 7–46 below, to provide an understanding of which benefits directly co-occur with which specific codes. The

use of a Sankey diagram is preferred since it is better suited to visualising data than a table, considering that the governance structure codes are three or more in number. Code GM12 is not shown in Figure 7–45 because it does not correlate with any specific benefit codes.

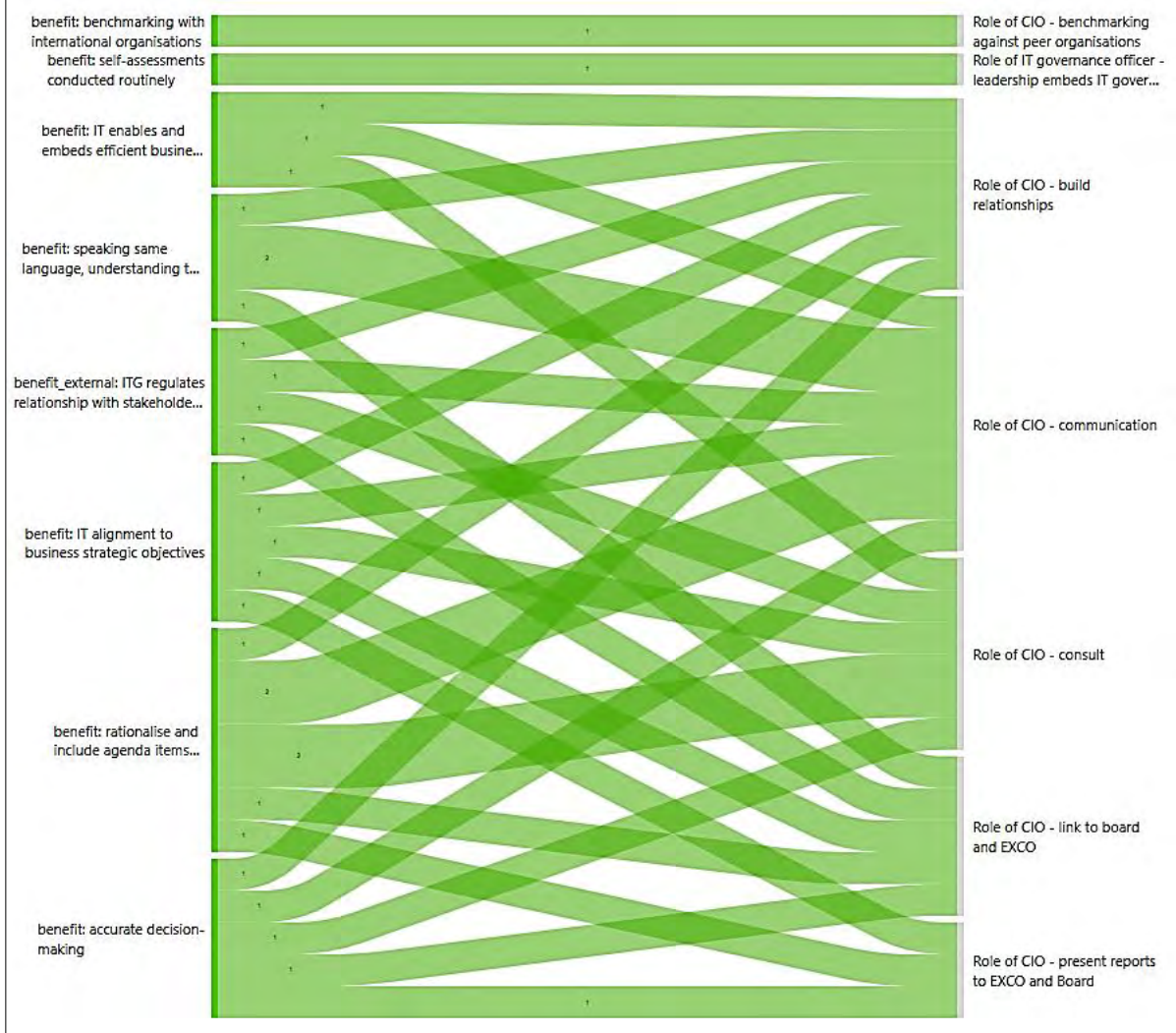


Figure 7–46: Sankey diagram of co-occurring benefit codes associated with the roles of the CIO and the IT governance officer

**7.5.2.9 Overall IT governance mechanism structures: challenges**

This section presents the overall challenges associated with all governance mechanism structures and roles as discussed above. Up to now only benefits have been presented, first for the governance structures and later for the roles of the CIO and IT governance officer. However, this section presents combined challenges. Figure 7–47 below shows that there are 14 co-occurring challenge codes which signify the challenges that correlate to all the governance mechanisms and roles of the CIO and IT governance officer combined.

● ◇ challenge: business process silos	④ 2
● ◇ challenge: ICT steering committee focuses on operational rather than strategic matters	④ 2
● ◇ challenge: inadequate business process ownership	④ 5
● ◇ challenge: ineffective IT governance structures	④ 2
● ◇ challenge: intergovernmental collaboration and data sharing not optimal	④ 4
● ◇ challenge: IT processes not followed internally	④ 3
● ◇ challenge: key vacancies not filled	④ 4
● ◇ challenge: lack of qualified and experienced staff for roles	④ 6
● ◇ challenge: lack of understanding the benefit of IT governance	④ 5
● ◇ challenge: minimal to no external stakeholder support from DPSA	④ 4
● ◇ challenge: poor business ownership of IT governance processes	④ 7
● ◇ challenge: poor staff attitude and morale	④ 7
● ◇ challenge: top management support not reaching all levels	④ 4
● ◇ challenge: top management support to middle management	④ 4

Figure 7–47: Overall IT governance mechanism structure-related challenges

As previously discussed, it serves the analysis to use a Sankey diagram, as presented in Figure 7–48 below, to provide an understanding of which challenges directly co-occur with which specific codes. The use of a Sankey diagram is again preferred over a table since it is better suited to visualising data, considering that the governance mechanism codes are three or more in number. If governance mechanism codes are not showing in Figure 7–48 below it means that they do not materially correlate with any specific challenge codes.

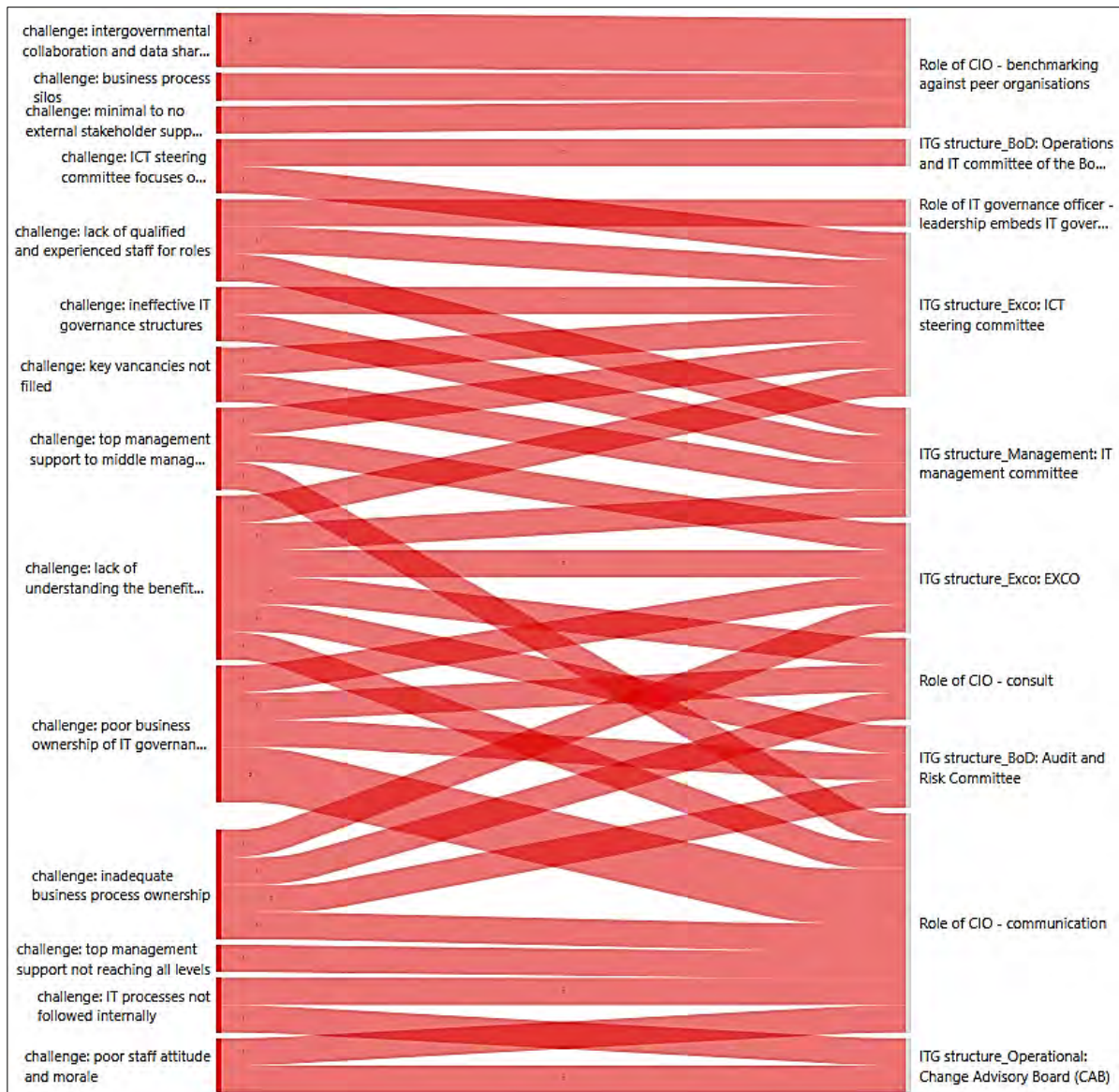


Figure 7–48: Sankey diagram of co-occurring challenge codes associated with all governance mechanism structures and roles of the CIO and IT governance officer

### 7.5.3 Governance mechanisms: processes

As discussed in section 5.2.2, process-related governance mechanisms cover alignment processes such as formalised IT investment proposals, enterprise architecture processes, and SLAs that provide input for the decision-makers based on approved IT policies. Therefore, this section is divided into two interconnected thematic sections, namely, IT policies, processes and procedures; and IT projects, business cases and enterprise architecture.

### 7.5.3.1 IT policies, processes and procedures

Organisational IT policies, processes and SOPs (i.e. GM26 in Figure 7–49 below) were identified by interview respondents as crucial to the successful adoption and use of the CGICTPF. Figure 7–49 depicts code co-occurrences with the code GM26 and provides a view of the relationships that pertain to this code. The relationship between IT policies and governance structures is denoted by the relationship between GM1, GM2, GM3, GM4 and GM26. Essentially, governance structures set, approve and operationalise policies.

GM26 is the expression of IT governance framework requirements for the organisation (i.e. GM49) as it is based on the prescripts of the governance frameworks. The frameworks themselves are the best interpretation of the regulations that are applicable to the organisation, including the Public Finance Management Act (PFMA). In turn, the consistent application of the IT governance frameworks, including compliance with the CGICTPF (i.e. GM29), has the effect of embedding and refining GM26, which enhances corporate governance. Clearly defined code GM26 also facilitates the continuous communication and awareness campaigns around IT governance practices (i.e. GM50). Change management and education programmes (i.e. GM51) and compulsory IT governance training and workshops (i.e. GM30) are based on clearly defined GM26.

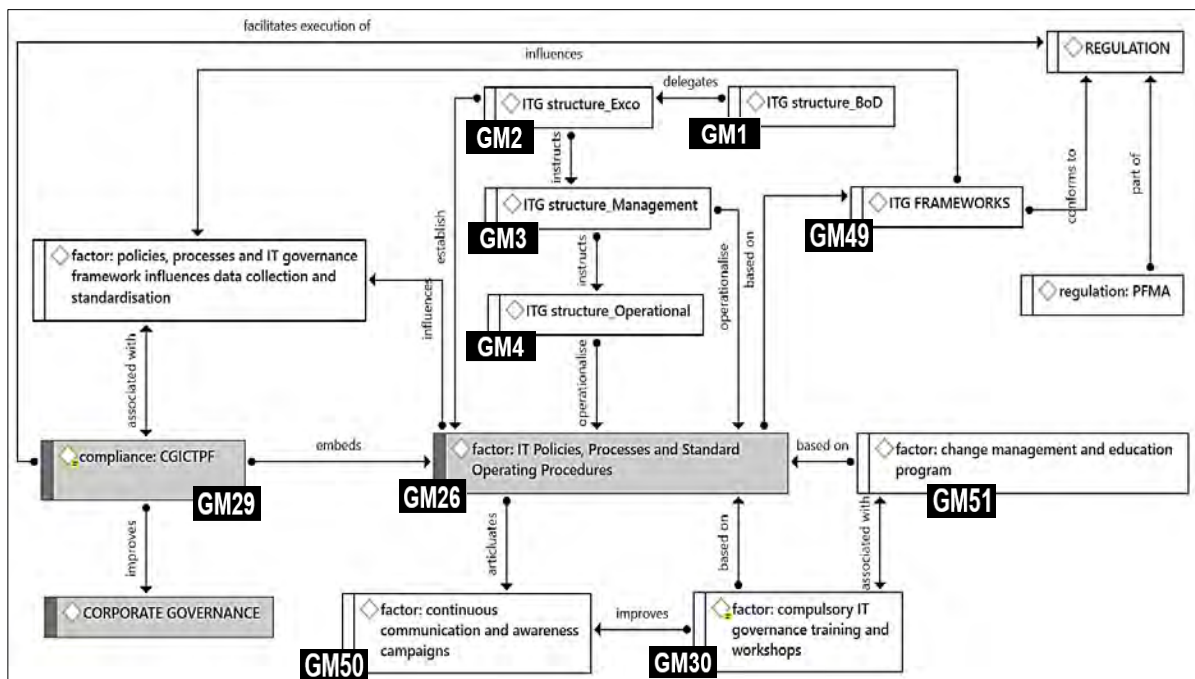


Figure 7–49: IT policies, processes and procedures code co-occurrences

### 7.5.3.2 Survey data: IT policies, processes and procedures

- Survey data shows that a significant number of respondents believe that IT policies are clearly written so that employees can understand them. As shown in Figure 7–50 below, a significant 76% of the respondents agreed and 12% strongly agreed with that notion, with no respondents disagreeing. Only 12% of the respondents neither agreed nor disagreed.

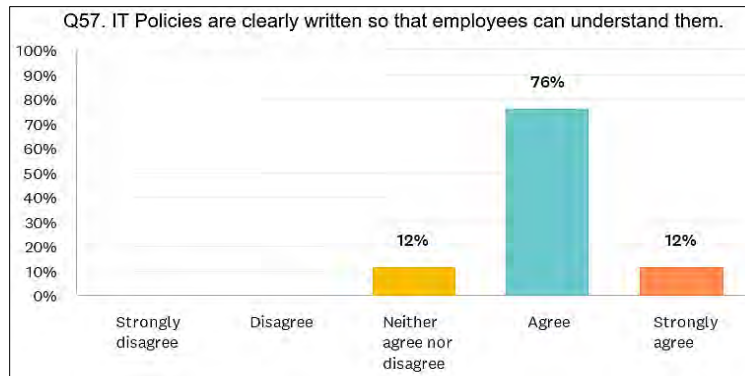


Figure 7–50: Survey responses about IT Policies clearly written and understood by employees

- In addition, survey data also affirms that IT policies clearly define the objectives of the policies and what expectations are held for employees, including where accountability and responsibility lie for the actions defined in the policies. As shown in Figure 7–51 below, a significant 71% of the respondents agreed and 12% strongly agreed with that notion, with only 6% of the respondents disagreeing and 12% neither agreeing nor disagreeing.

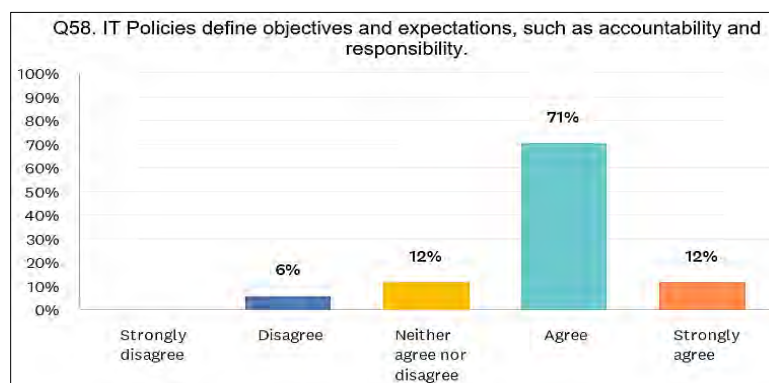


Figure 7–51: Survey responses for IT policies defining objectives and expectations

- Lastly, survey data also affirms that IT policies are effectively articulated and are accessible to all employees of the organisation. As shown in Figure 7–52 below, a significant 76% of the respondents agreed and 18% strongly agreed with that notion, while only 6% disagreed.

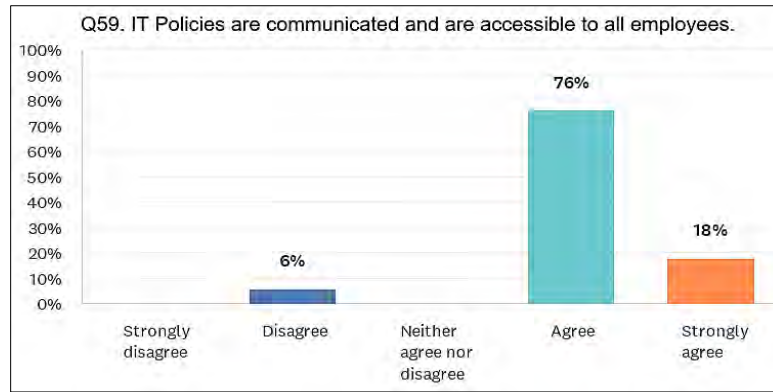


Figure 7–52: Survey responses about IT policies being communicated and accessible to all employees

### 7.5.3.3 IT policies, processes and procedures benefits and challenges

The benefits and challenges associated with the IT policies, processes and procedures factor were derived from the data by observing which benefits co-occur with that factor. The eight benefits and nine challenges are depicted in Figure 7–53 and Figure 7–54 below, respectively.

	◇ factor: IT Policies, Processes and Standard Operating Procedures ⊙ 18	
● ◇ benefit: access to information	⊙ 1	1 (0,06)
● ◇ benefit: accurate decision-making	⊙ 14	2 (0,07)
● ◇ benefit: accurate monitoring and reporting	⊙ 13	3 (0,11)
● ◇ benefit: business cases for IT investments	⊙ 6	2 (0,09)
● ◇ benefit: cyber security	⊙ 11	1 (0,04)
● ◇ benefit: IT alignment to business strategic objectives	⊙ 24	3 (0,08)
● ◇ benefit: IT investments and IT business value	⊙ 12	1 (0,03)
● ◇ benefit: stabilise and standardise the IT environment	⊙ 3	2 (0,11)

Figure 7–53: Co-occurring benefit codes associated with IT policies, processes and procedures

	◇ factor: IT Policies, Processes and Standard Operating Procedures ⊙ 18	
● ◇ challenge: business process silos	⊙ 2	1 (0,05)
● ◇ challenge: data intelligence not explored	⊙ 10	1 (0,04)
● ◇ challenge: ineffective IT governance structures	⊙ 2	1 (0,05)
● ◇ challenge: intergovernmental collaboration and data sharing not optimal	⊙ 4	1 (0,05)
● ◇ challenge: IT policies, processes and standard operating procedures not maintained and approved	⊙ 1	1 (0,06)
● ◇ challenge: key vacancies not filled	⊙ 4	1 (0,05)
● ◇ challenge: lack of integrated data collection and storage	⊙ 7	1 (0,04)
● ◇ challenge: lack of qualified and experienced staff for roles	⊙ 6	1 (0,04)
● ◇ challenge: lack of understanding the benefit of IT governance	⊙ 5	2 (0,10)

Figure 7–54: Co-occurring challenge codes associated with IT policies, processes and procedures

#### *7.5.3.4 IT projects, IT investments and enterprise architecture*

Consistent with the literature discussed in section 5.2.2, this section presents IT projects, investments and enterprise architecture. IT projects is presented because it is a factor that encapsulates both the intent and use of processes, such as drafting business cases for IT-related investments, based on the organisation's enterprise architecture.

As shown in Figure 7–55 below, IT project implementation (i.e. GM22) is premised on IT investment prioritisation (i.e. GM24) which is positively associated with the way in which business value is derived from IT investments (i.e. GM23). GM24 is underpinned by business cases (i.e. GM27) which take into account the IT strategy (i.e. GM52) and is supported by top management (i.e. GM51). IT alignment (i.e. GM25) is a cause of an optimised IT investment prioritisation process, and is enhanced by compliance with the CGICTPF (i.e. GM29) and by implementing an enterprise architecture strategy (i.e. GM28), which is a tool to aid business strategy.



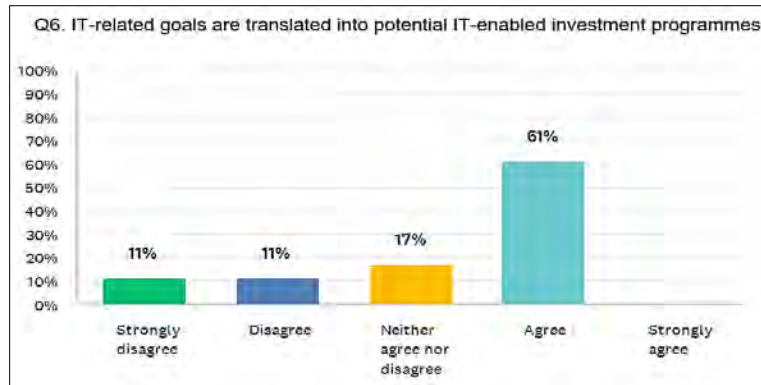


Figure 7–56: Survey responses about IT-related goals translated into IT-enabled investment programmes

- In relation to GM27, the effective use of business cases, survey data affirms that business cases for IT investments have clear and agreed business requirements. As shown in Figure 7–57 below, 61% of the respondents agreed with that notion, while only 17% disagreed; 22% of the respondents neither agreed nor disagreed.

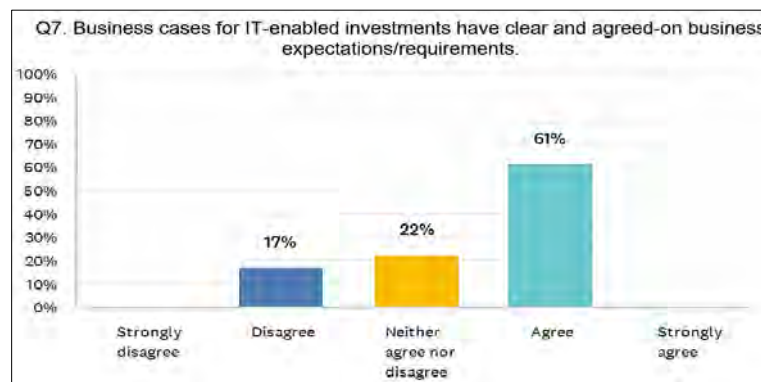


Figure 7–57: Survey data about business cases for IT investments having clear and agreed business requirements

In addition to the above, business cases are used as a formal process for prioritising IT investments and projects, and business and IT are involved. As shown in Figure 7–58 below, 65% of the respondents agreed with that notion while only 18% disagreed; only 18% of the respondents neither agreed nor disagreed.

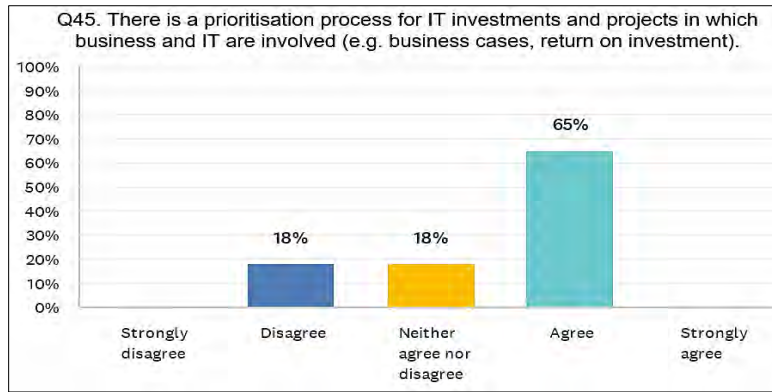


Figure 7–58: Survey responses about prioritising IT investments and projects by business and IT

- Survey data affirms that typical IT project steering committees are comprised of business and IT representatives. As shown in Figure 7–59 below, 56% of the respondents agreed and 11% strongly agreed with that notion, while only 17% of the respondents disagreed and another 17% neither agreed not disagreed.

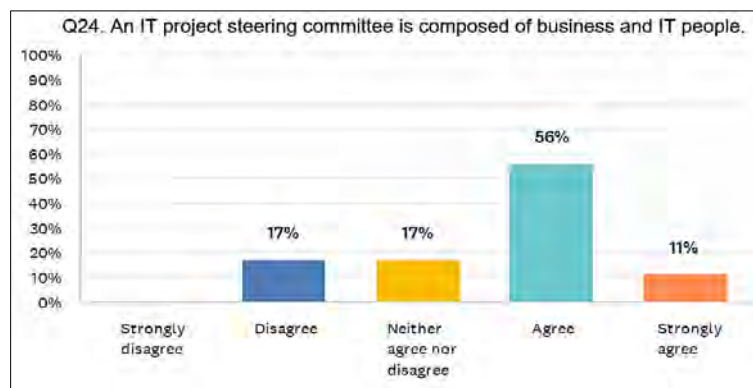


Figure 7–59: Survey responses about the IT project steering committee composition

- 1) In addition, as shown in Figure 7–60 below, survey data shows that 44% of the respondents agreed and 11% strongly agreed that the IT project steering committee focuses on prioritising and managing IT projects; only 28% of the respondents disagreed while 17% neither agreed nor disagreed.

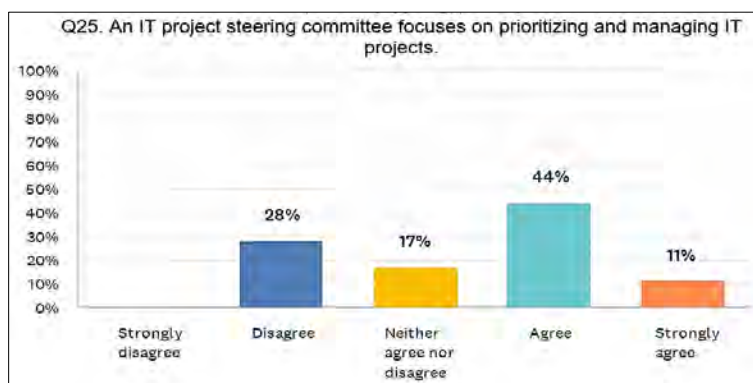


Figure 7–60: Survey data about the IT project steering committee focusing on prioritising and managing IT projects

- 2) Survey data also shows that 41% of the respondents agreed with the notion that formal agreements exist between business and IT departments about the software development projects or IT operations; only 24% of the respondents disagreed while 35% neither agreed nor disagreed, as shown in Figure 7–61 below.

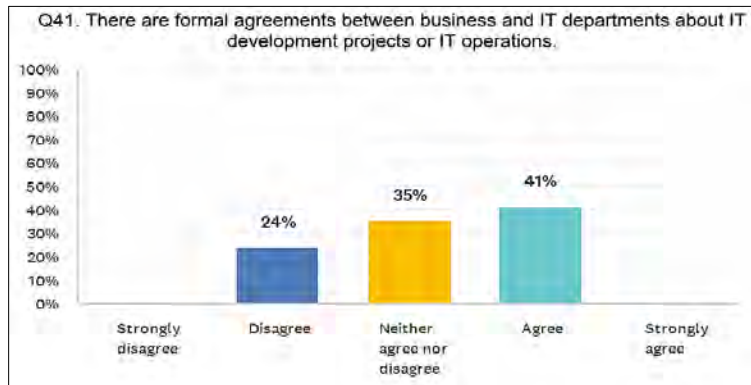


Figure 7–61: Survey responses about a formal agreement process between business and IT about IT development projects

- 3) Survey data also shows that 47% of the respondents agreed with the notion that formal and explicit criteria are used to help evaluate IT projects; only 24% of the respondents disagreed while 29% neither agreed nor disagreed, as shown in Figure 7–62 below.

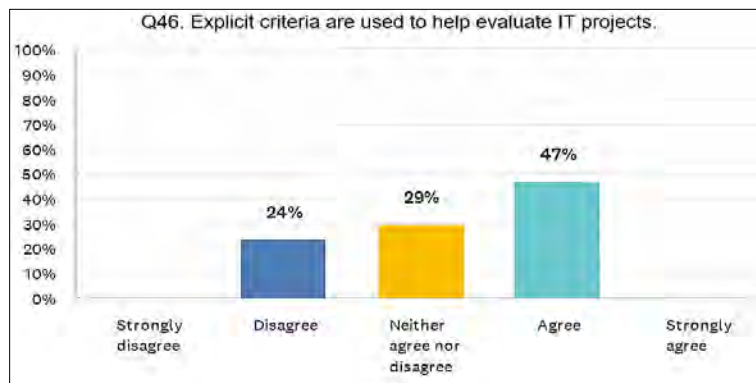


Figure 7–62: Survey responses about using explicit criteria to evaluate projects

- 4) Survey data also shows that 41% of the respondents agreed with the notion that qualitative and quantitative criteria are used to evaluate IT projects while another 41% disagreed and 18% neither agreed nor disagreed, as shown in Figure 7–63 below.

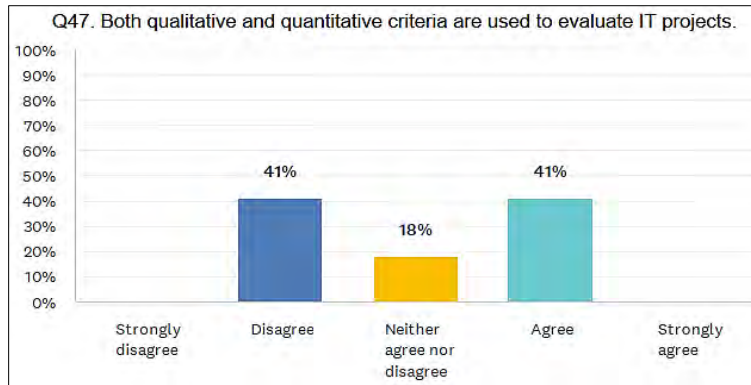


Figure 7–63: Survey responses about the qualitative and quantitative criteria used to evaluate IT projects

- 5) Survey data also shows that 59% of the respondents agreed and 6% strongly agreed with the notion that cost/benefit analysis is used to evaluate IT projects; 24% of the respondents disagreed while 12% neither agreed nor disagreed, as shown in Figure 7–64 below.

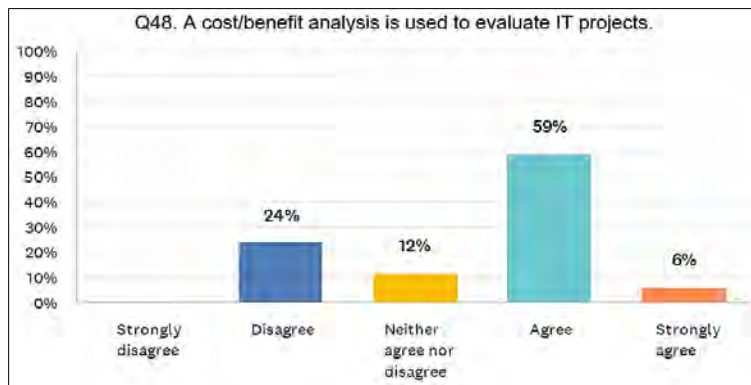


Figure 7–64: Survey responses about cost/benefit analysis to evaluate IT projects

- 6) Survey data also shows that 29% of the respondents agreed and 6% strongly agreed with the notion that project costs for IT projects are fully identified and managed. A further 24% of the respondents disagreed while 6% strongly disagreed; significantly, 35% neither agreed nor disagreed, as shown in Figure 7–65 below.

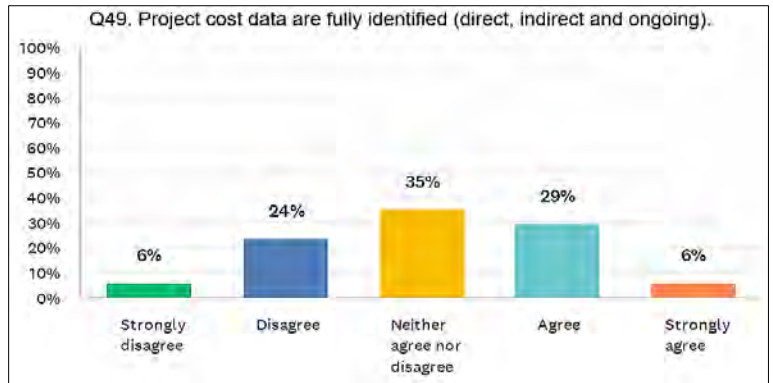


Figure 7–65: Survey responses about project cost data identification and analysis

7) Survey data shows that a significant 88% of the respondents agreed with the notion that expected time frames are explicitly specified for IT development and implementation projects; 6% of the respondents disagreed while another 6% neither agreed nor disagreed, as shown in Figure 7–66 below.

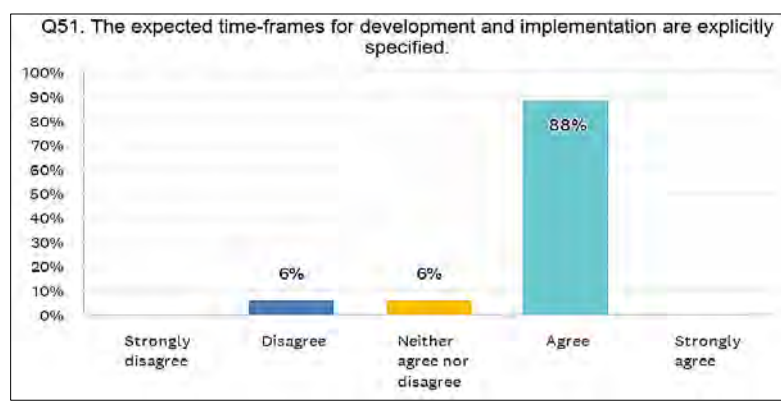


Figure 7–66: Survey responses about specifying time frames for development and implementation of IT projects

8) Survey data shows that 53% of the respondents agreed with the notion that organisational impacts for IT projects are evaluated; 18% of the respondents disagreed while 29% neither agreed nor disagreed, as shown in Figure 7–67 below.

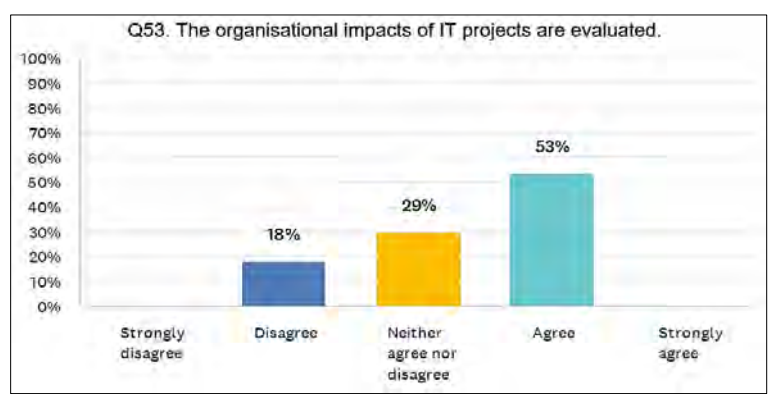


Figure 7–67: Survey responses about evaluating the organisational impact of IT projects

9) Survey data shows that a significant 53% of the respondents agreed with the notion that the availability of personnel resources relative to IT project demands is adequately assessed; a high 35% of the respondents disagreed while 12% neither agreed nor disagreed, as shown in Figure 7–68 below.

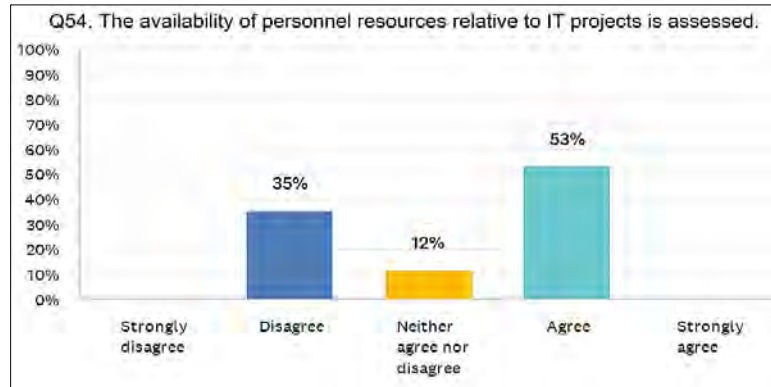


Figure 7–68: Survey data about assessing the availability of personnel resources for IT projects

10) Survey data shows that, overwhelmingly, 65% of the respondents agreed and a further 29% strongly agreed with the notion that a methodology is used to manage IT projects; 6% of the respondents neither agreed nor disagreed, as shown in Figure 7–69 below.

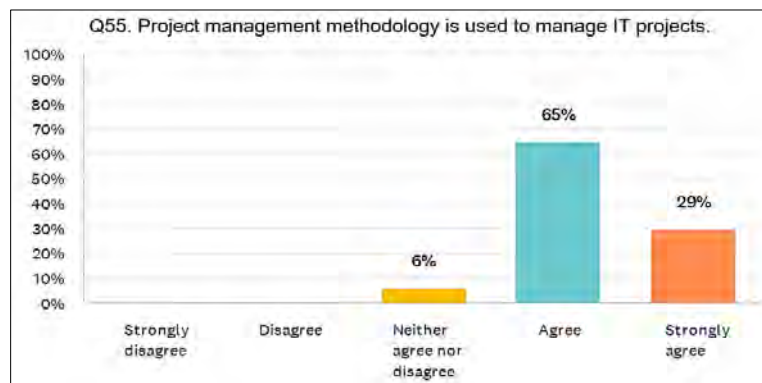


Figure 7–69: Survey responses about using a project management methodology to manage IT projects

- In relation to GM28, enterprise architecture strategy implementation, the survey data shows that a considerable 39% of the respondents disagreed with the notion that the IT architecture committee is comprised of business and IT representatives; 33% of the respondents agreed and 11% strongly agreed with that notion, while 17% neither agreed nor disagreed, as shown in Figure 7–70 below.

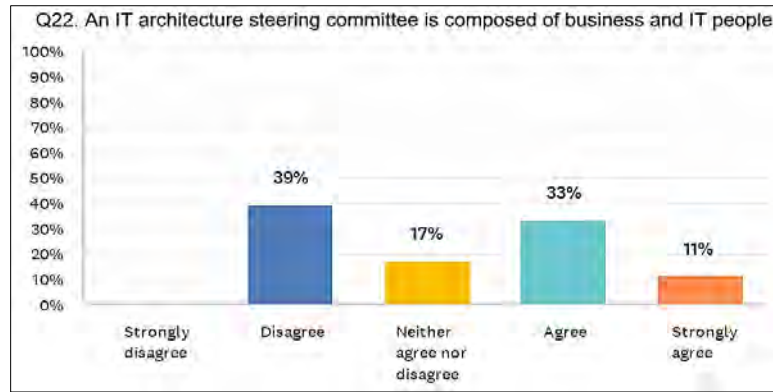


Figure 7–70: Survey data about the IT architecture steering committee being comprised of business and IT representatives

In addition, an overwhelming 83% of the respondents agreed with the notion that the IT architecture committee provides architecture guidelines and advice in relation to their applications and their development, as shown in Figure 7–71 below; 17% neither agreed nor disagreed.

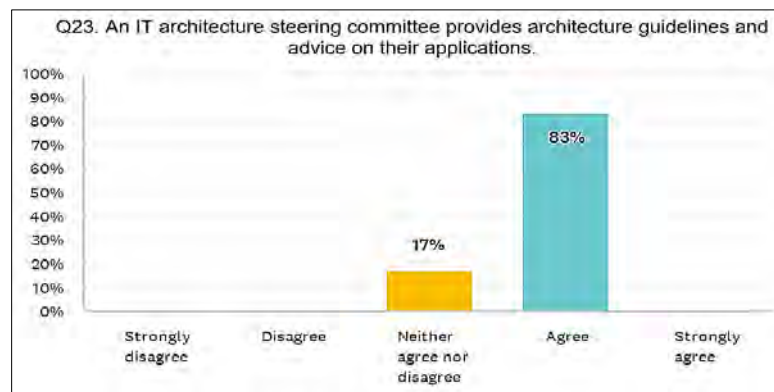


Figure 7–71: Survey data about the IT architecture committee providing guidelines on applications

#### 7.5.3.6 *IT projects, IT investments and enterprise architecture: benefits and challenges*

The benefits and challenges associated with the IT projects, IT investments and enterprise architecture codes were derived from data by analysing which benefits co-occur with GM22, GM23, GM24, GM27 and GM28. The 21 benefits and 11 challenges are depicted in Figure 7–72 and Figure 7–73 below, respectively.

● ◇ benefit: access to information	⑩ 1
● ◇ benefit: accurate decision-making	⑩ 14
● ◇ benefit: accurate monitoring and reporting	⑩ 13
● ◇ benefit: business cases for IT investments	⑩ 6
● ◇ benefit: business process efficiencies	⑩ 1
● ◇ benefit: collaboration and engagement	⑩ 3
● ◇ benefit: collaboration and seamless integration of all levels of governance	⑩ 1
● ◇ benefit: cyber security	⑩ 11
● ◇ benefit: improved public sector adoption of IT governance frameworks	⑩ 1
● ◇ benefit: improved service delivery through optimal use of resources	⑩ 12
● ◇ benefit: IT alignment to business strategic objectives	⑩ 24
● ◇ benefit: IT controls	⑩ 3
● ◇ benefit: IT infrastructure management	⑩ 2
● ◇ benefit: IT investments and IT business value	⑩ 12
● ◇ benefit: IT Investments prioritisation	⑩ 5
● ◇ benefit: IT risk management	⑩ 6
● ◇ benefit: procuring fit for purpose technology	⑩ 2
● ◇ benefit: rationalise and include agenda items in business meetings	⑩ 3
● ◇ benefit: speaking same language, understanding the why of IT governance	⑩ 7
● ◇ benefit: stabilise and standardise the IT environment	⑩ 3
● ◇ benefit: turning cost centres into profit centres	⑩ 2

Figure 7–72: Co-occurring benefit codes associated with processes

A Sankey diagram was preferred for visualising the benefits related to processes, since associated codes are three or more in number (see Appendix I).

● ◇ challenge: data intelligence not explored	⑩ 10
● ◇ challenge: ICT steering committee focuses on operational rather than strategic matters	⑩ 2
● ◇ challenge: inadequate business process ownership	⑩ 5
● ◇ challenge: IT considered as afterthought	⑩ 5
● ◇ challenge: IT projects scope creep	⑩ 2
● ◇ challenge: lack of integrated data collection and storage	⑩ 7
● ◇ challenge: lack of technology savvy executives	⑩ 4
● ◇ challenge: lack of understanding the benefit of IT governance	⑩ 5
● ◇ challenge: poor business ownership of IT governance processes	⑩ 7
● ◇ challenge: poor staff attitude and morale	⑩ 7
● ◇ challenge: succession planning	⑩ 2

Figure 7–73: Co-occurring challenge codes associated with processes

### 7.5.4 Governance mechanisms: relational

As discussed in section 5.2.2, relational governance mechanisms cover organisational communication channels to disseminate IT-related decisions and policies. Therefore, based on the interview data, this section presents codes related to communication, training and awareness campaigns.

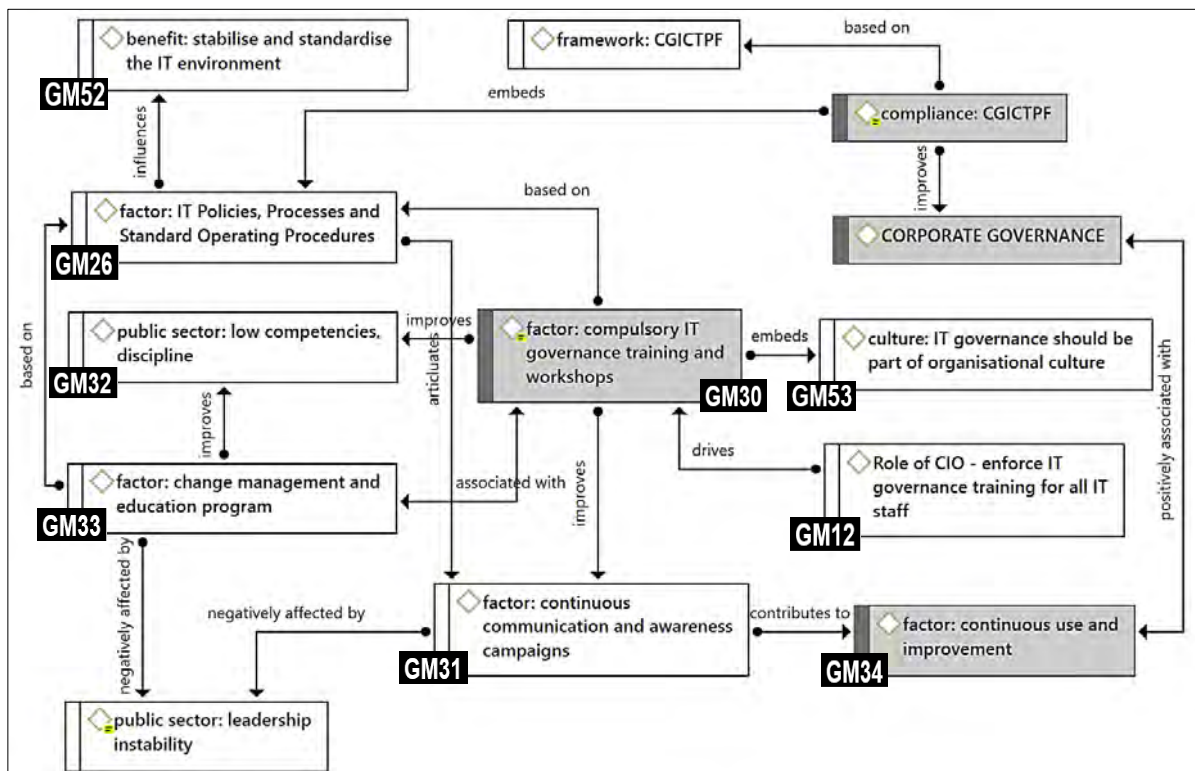


Figure 7–74: IT governance training and workshops code co-occurrences

Figure 7–74 above depicts code co-occurrences with the compulsory IT governance training and workshops (i.e. GM30) and provides a view of the relationships that pertain to this code. It must be noted that GM30 is based on and advances IT policies, processes and SOPs (i.e. GM26); this is deemed to be the optimal conceptualisation since GM26 is embedded by compliance with the CGICTPF and generally influences a stable and standardised IT environment (i.e. GM52). GM30 is positively associated with organisational change and education programmes (i.e. GM33) which are aimed at improving the low competencies of employees and enhancing discipline (i.e. GM32). Therefore, GM30 was also identified as being directly responsible for enhancing GM32. GM30 further enhances continuous communication and awareness campaigns (i.e. GM31), which contributes to the continuous

use and improvement of the CGICTPF (i.e. GM34) and corporate governance. GM30 embeds IT governance as part of the organisational culture (i.e. GM53) and is enforced by the CIO on all employees (i.e. GM12).

7.5.4.1 *Survey data: relational mechanisms*

- In relation to the effective achievement of GM30 objectives using various instruments:
  - 1) Survey data shows that job rotation, where IT staff are seconded to business units and business employees to the IT department, is not favoured. As shown in Figure 7–75 below, 29% of the respondents disagreed and a significant 47% strongly disagreed with the notion of job rotation. Interestingly, 6% of the respondents strongly agreed and no respondents just agreed, while 18% of the respondents neither agreed nor disagreed.

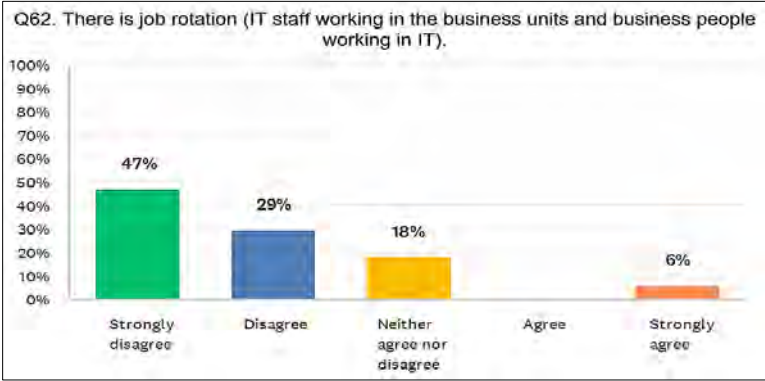


Figure 7–75: Survey responses about job rotation between business and IT

- 2) The survey data shows respondents largely disagreed that business people are trained in IT or that IT people are trained in business. As shown in Figure 7–76 below, 29% of the respondents agreed and 18% strongly disagreed with the notion that business people are trained in IT or IT people trained in business; only 12% of the people agreed with 6% strongly agreeing and 35% neither agreeing nor disagreeing.

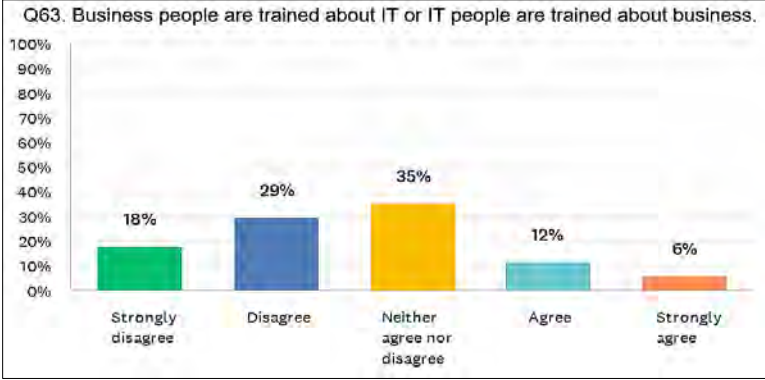


Figure 7–76: Survey responses about cross-training business and IT personnel

- 3) The survey data shows that respondents overwhelmingly agreed with the notion that the intranet is used to share knowledge about the IT governance framework, responsibilities and tasks. As shown in Figure 7–77 below, a significant 65% of the respondents agreed and 24% strongly agreed with that notion, while only 12% of the respondents disagreed.

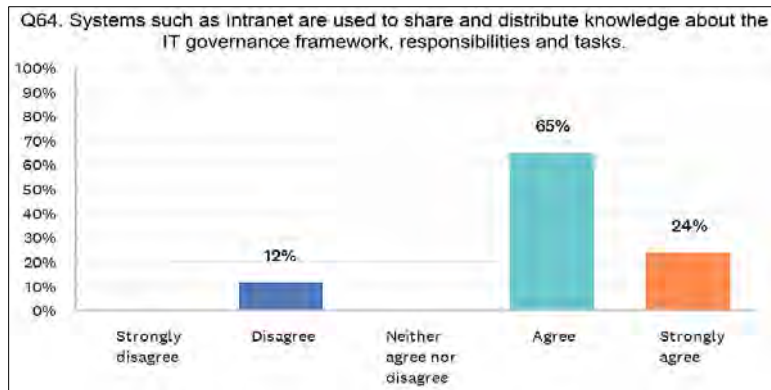


Figure 7–77: Survey responses about the use of the intranet to share IT governance-related knowledge

- 4) The survey data shows that 47% of the respondents agreed that senior business and IT management act in a partnership to advance business and IT governance objectives, as shown in Figure 7–78 below. By contrast, 12% of the respondents disagreed and 41% neither agreed nor disagreed.

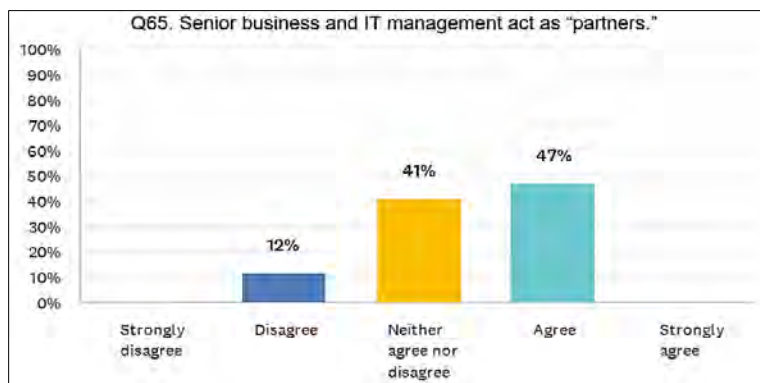


Figure 7–78: Survey responses about the senior business and IT management partnership

- 5) The survey data shows that an overwhelming 76% of the respondents agreed that senior business and IT management informally discuss organisational activities and the role of IT in them, as shown in Figure 7–79 below. Only 6% of the respondents disagreed and 18% neither agreed nor disagreed.

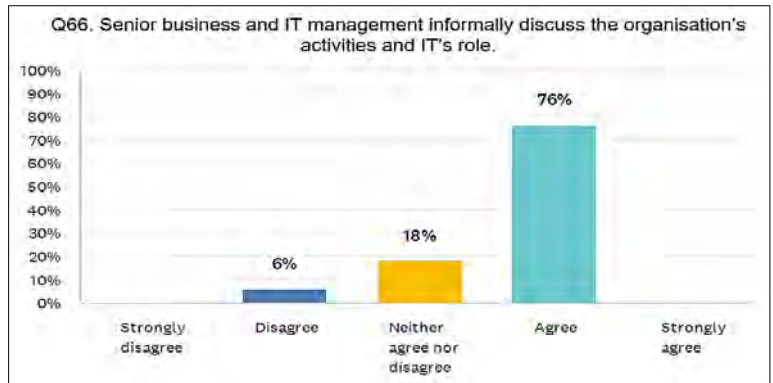


Figure 7–79: Survey responses about senior business and IT management discussing the IT role

- 6) The survey data shows that 53% of the respondents agreed that internal corporate communication regularly addresses general IT issues, as shown in Figure 7–80 below. Eighteen per cent of the respondents disagreed with 6% strongly disagreeing, while 24% neither agreed nor disagreed.

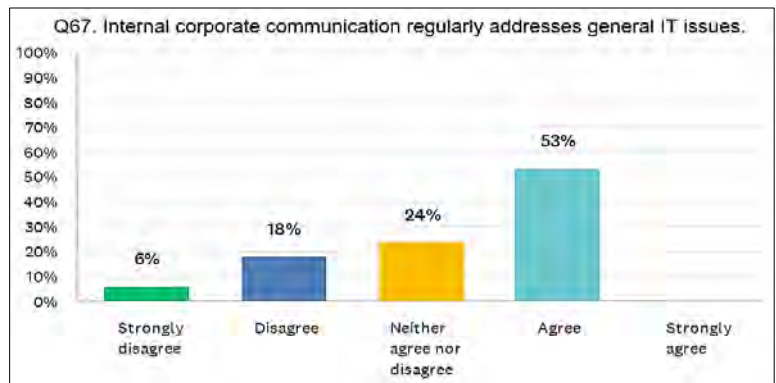


Figure 7–80: Survey responses about internal corporate communication addressing IT issues

- 7) The survey data shows that 47% of the respondents disagreed that there are campaigns explaining the need for IT governance to business and IT personnel, as shown in Figure 7–81 below. Twelve per cent of the respondents disagreed and 41% neither agreed nor disagreed.

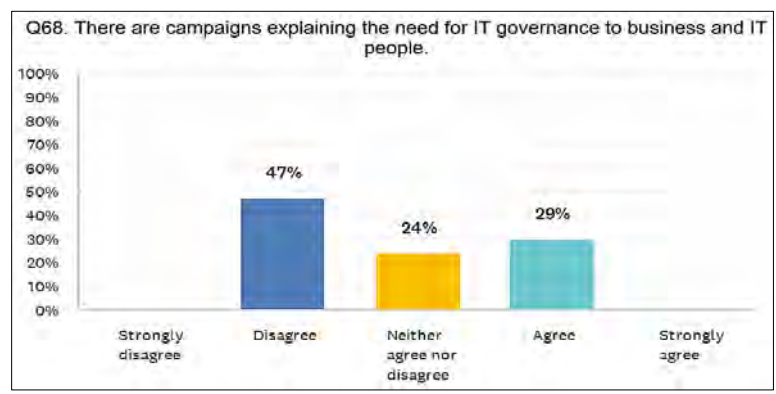


Figure 7–81: Survey responses about campaigns explaining the need for IT governance

#### 7.5.4.2 Relational mechanism: benefits and challenges

There are benefits and challenges associated with the IT governance and training code. These were derived from the data by analysing which benefits co-occur with GM30. The three benefits and eight challenges are depicted in Figure 7–82 and Figure 7–83 below, respectively.

		◇ factor: compulsory IT governance training and workshops ⑩ 17
● ◇ benefit: improved service delivery through optimal use of resources	⑩ 12	1 (0,04)
● ◇ benefit: speaking same language, understanding the why of IT governance	⑩ 7	2 (0,09)
● ◇ benefit: stabilise and standardise the IT environment	⑩ 3	1 (0,05)

Figure 7–82: Co-occurring benefit codes associated with the relational mechanism

		◇ factor: compulsory IT governance training and workshops ⑩ 17
● ◇ challenge: highly regulated environment	⑩ 3	1 (0,05)
● ◇ challenge: ineffective IT governance structures	⑩ 2	1 (0,06)
● ◇ challenge: IT governance practices and standards stifle innovation	⑩ 4	1 (0,05)
● ◇ challenge: key vacancies not filled	⑩ 4	1 (0,05)
● ◇ challenge: lack of qualified and experienced staff for roles	⑩ 6	1 (0,05)
● ◇ challenge: lack of understanding the benefit of IT governance	⑩ 5	2 (0,10)
● ◇ challenge: minimal autonomy	⑩ 3	1 (0,05)
● ◇ challenge: poor staff attitude and morale	⑩ 7	2 (0,09)

Figure 7–83: Co-occurring challenge codes associated with the relational mechanism

### 7.5.5 Top management support

As noted in the literature (see section 5.2.3), the term “top management” is used interchangeably with other terms such as senior management, upper management, and executive management. This section presents the results pertaining to top management support from executive management to middle management (i.e. TM1) in relation to CGICTPF adoption and use, as depicted in Figure 7–84 below. Top management buy-in (i.e. TM7) was also identified as a key factor associated with top management support. Top management buy-in to IT governance is driven by demonstrable top management IT governance competencies (i.e. TM4) which precede and facilitate the level of support that executive management is able to provide middle management. Both TM1 and TM7 derive from TM4; therefore, it was

necessary in this section to present the code co-occurrences of both factors to adequately cover the scope of top management support.

As depicted in Figure 7–84, TM1 is a crucial component for operationalising the IT strategy (i.e. TM3) that supports the business strategy, thereby fostering IT alignment. TM1 further supports the development of business cases for IT investments (i.e. TM5), which also fosters IT alignment. TM1 also aids the operationalisation of IT policies, processes and SOPs (i.e. TM2) which are approved by IT governance structures at the level of EXCO and the board of directors. Crucially, TM1 also facilitates consequence management (i.e. TM6) in instances where compliance with the CGICTPF is violated.

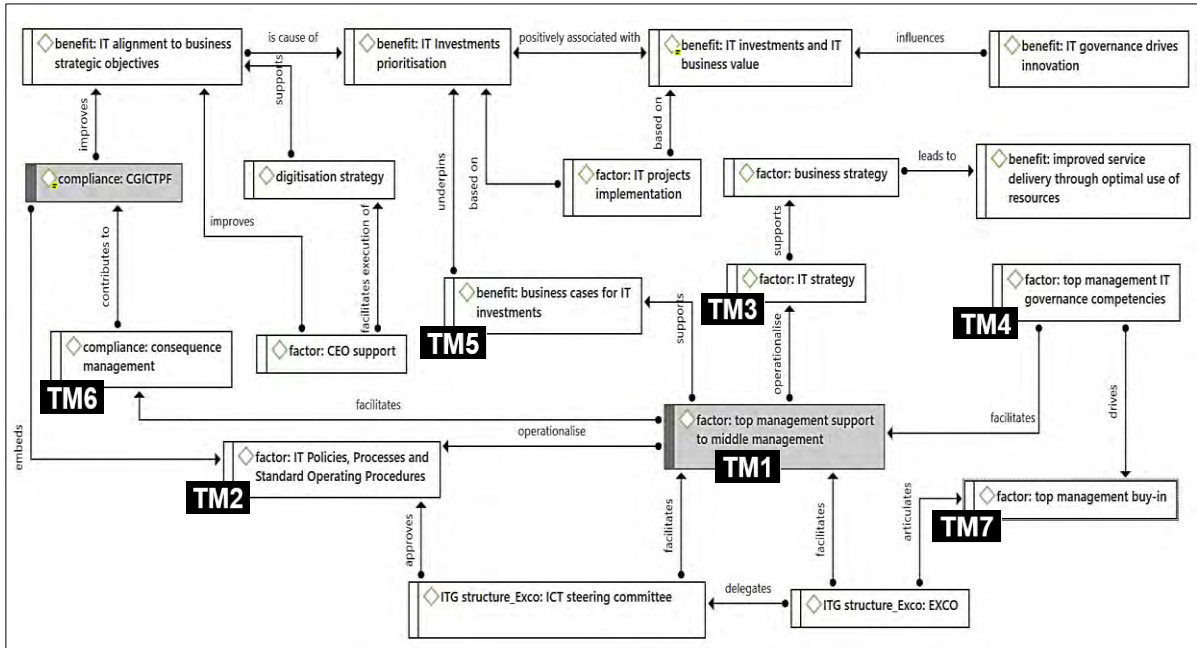


Figure 7–84: Top management support code co-occurrences

As mentioned above, top management buy-in by EXCO is associated with top management support and is presented in Figure 7–85 below. TM7 facilitates the accelerated public sector adoption of IT governance frameworks (i.e. TM9) such as the CGICTPF and is positively associated with customising governance frameworks to fit their specific organisational context (i.e. TM8). The use of a customised IT governance framework leads to its accelerated adoption and use by the public organisation, as it involves all layers of the organisation (i.e. TM10).

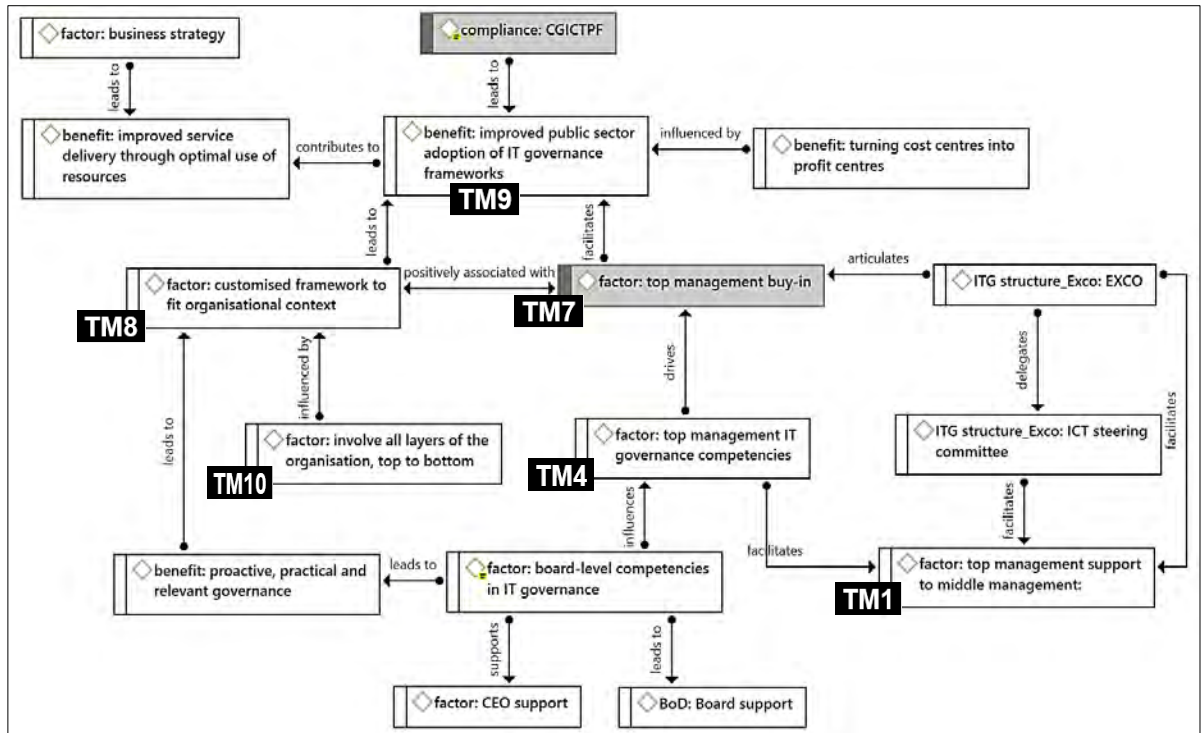


Figure 7–85: Top management buy-in code co-occurrences

#### 7.5.5.1 Survey data: top management support

- The survey data affirms that there is top management resource allocation for formal IT governance practice within the organisation. As shown in Figure 7–86, 59% of the respondents agreed and 6% strongly agreed with that notion, while 12% of the respondents disagreed and 24% neither agreeing nor disagreeing.

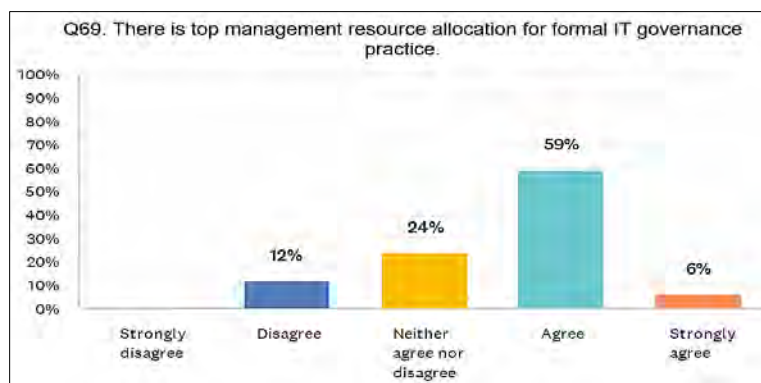


Figure 7–86: Survey responses about top management resource allocation for formal IT governance practice

- The survey data shows that 53% of the respondents agreed with the notion that there is top management vision sharing, articulation and promotion of formal IT governance practices

in their organisations, as depicted in Figure 7–87 below. Six per cent of the respondents disagreed, with a significant 41% neither agreeing nor disagreeing.

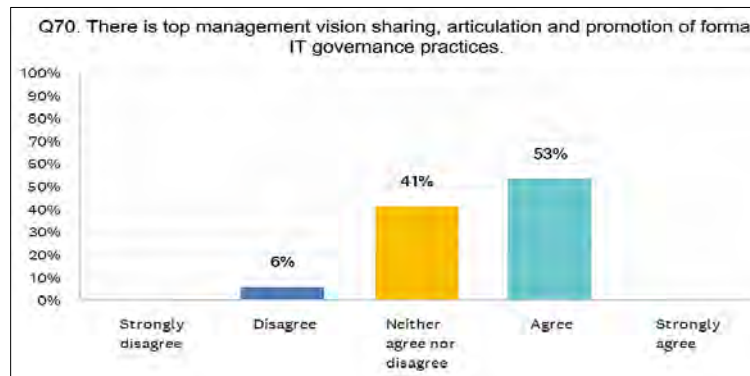


Figure 7–87: Survey responses about top management sharing vision, articulation and promotion of formal IT governance practices

- The survey data shows that 47% of the respondents agreed with the notion that top management is involved in formulating a strategy for formal IT governance practice in their organisations, as depicted in Figure 7–88 below. By contrast, 18% of the respondents disagreed, with a significant 35% neither agreeing nor disagreeing.

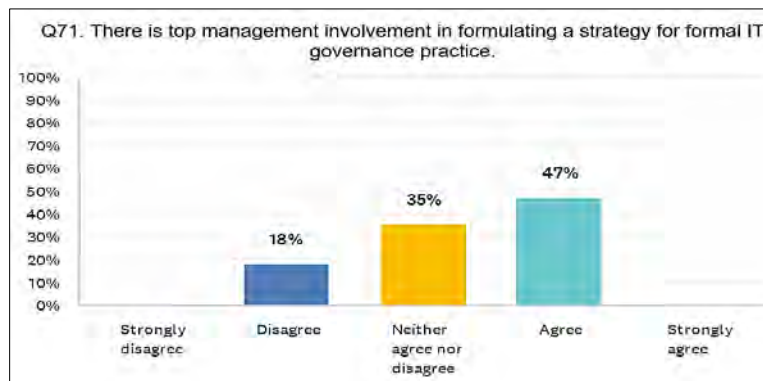


Figure 7–88: Survey responses about top management involvement in formulating a strategy for formal IT governance practice

- The survey data shows that 53% of the respondents agreed with the notion that top management is involved in key decision-making activities regarding formal IT governance practices in their organisations, as depicted in Figure 7–89 below. In contrast, 18% of the respondents disagreed, with 29% neither agreeing nor disagreeing.

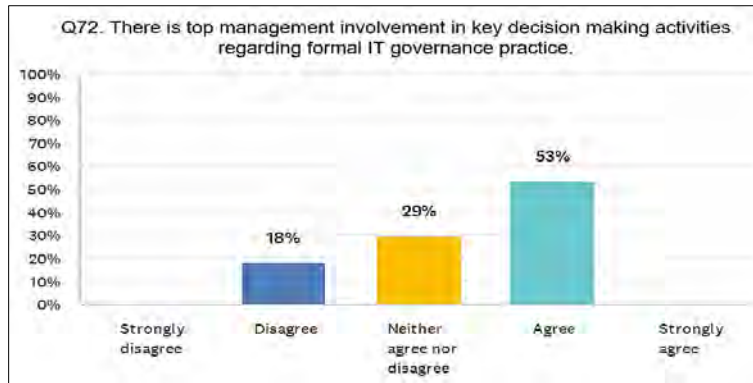


Figure 7–89: Survey responses about top management involvement in key decision-making activities regarding formal IT governance practice

- The survey data shows that 47% of the respondents agreed with the notion that top management takes risks towards the implementation of formal IT governance practices in their organisations, as depicted in Figure 7–90 below, while 24% of the respondents disagreed, with a 29% neither agreeing nor disagreeing.

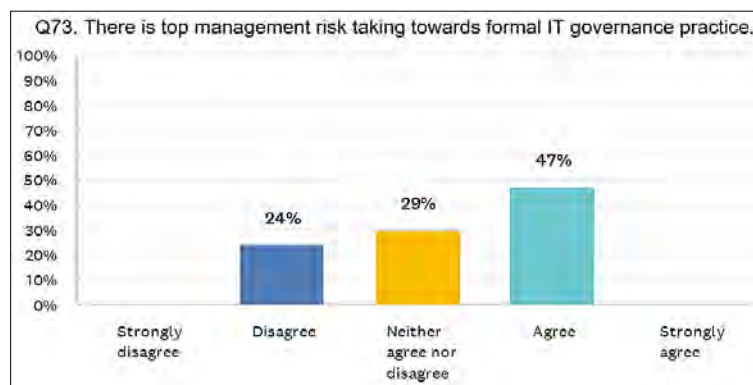


Figure 7–90: Survey responses about top management risk taking towards formal IT governance practice

### 7.5.5.2 *Top management support: benefits and challenges*

There are benefits and challenges associated with the top management support. These were derived from the data by analysing which benefits co-occur with codes TM1 and TM7. The seven benefits and four challenges are depicted in Figure 7–91 and Figure 7–92 below, respectively. Considering that the factor codes are not more than two in number, a table is preferred to present the benefits and challenges instead of a Sankey diagram.

		◇ factor: top management buy-in ⑤ 5	◇ factor: top management support to middle management ⑪ 11
● ◇ benefit: business cases for IT investments	⑥ 6		3 (0,21)
● ◇ benefit: business process efficiencies	① 1		1 (0,09)
● ◇ benefit: improved service delivery through optimal use of resourc...	⑫ 12	1 (0,06)	1 (0,05)
● ◇ benefit: IT alignment to business strategic objectives	⑫ 24	2 (0,07)	1 (0,03)
● ◇ benefit: IT governance supports innovation	③ 3		1 (0,08)
● ◇ benefit: IT investments and IT business value	⑫ 12		3 (0,15)
● ◇ benefit: IT Investments prioritisation	⑤ 5		2 (0,14)

Figure 7–91: Co-occurring benefit codes associated with top management support

		◇ factor: top management buy-in ⑤ 5	◇ factor: top management support to middle management ⑪ 11
● ◇ challenge: ICT steering committee focuses on operational rather t...	② 2	1 (0,17)	
● ◇ challenge: inadequate business process ownership	⑤ 5		1 (0,07)
● ◇ challenge: IT considered as afterthought	⑤ 5		2 (0,14)
● ◇ challenge: poor business ownership of IT governance processes	⑦ 7		1 (0,06)

Figure 7–92: Co-occurring challenge codes associated with top management support

## 7.5.6 Board-level IT governance competencies

IT governance is the responsibility of the board of directors which delegates IT governance functions to executive management. Therefore, IT governance competencies at the level of the board of directors is crucial for the implementation of the CGICTPF.

This section presents results pertaining to board-level IT governance competencies (i.e. CO1) in relation to CGICTPF adoption and use, as depicted in Figure 7–93 below. Fundamentally, CO1 further leads to accurate decision-making by the board of directors (i.e. CO2) which is positively associated with corporate governance. It also leads to improved board support (i.e. CO5) when members of the board of directors are competent in carrying out their IT governance duties. CO2 is dependent on the quality of information as presented in board and management reports (i.e. CO6), which enhances accurate monitoring and reporting. CO1 influences management IT governance competencies (i.e. TM4) which, in turn, leads to improved top management support for IT governance practices. CO1 also enables the proactive implementation of practical and relevant governance in the organisation (i.e. CO4); and CEO support (i.e. CO3). Although CO4 is not a co-occurring code with CO1, it has a direct relationship with CO1 that is important to highlight.

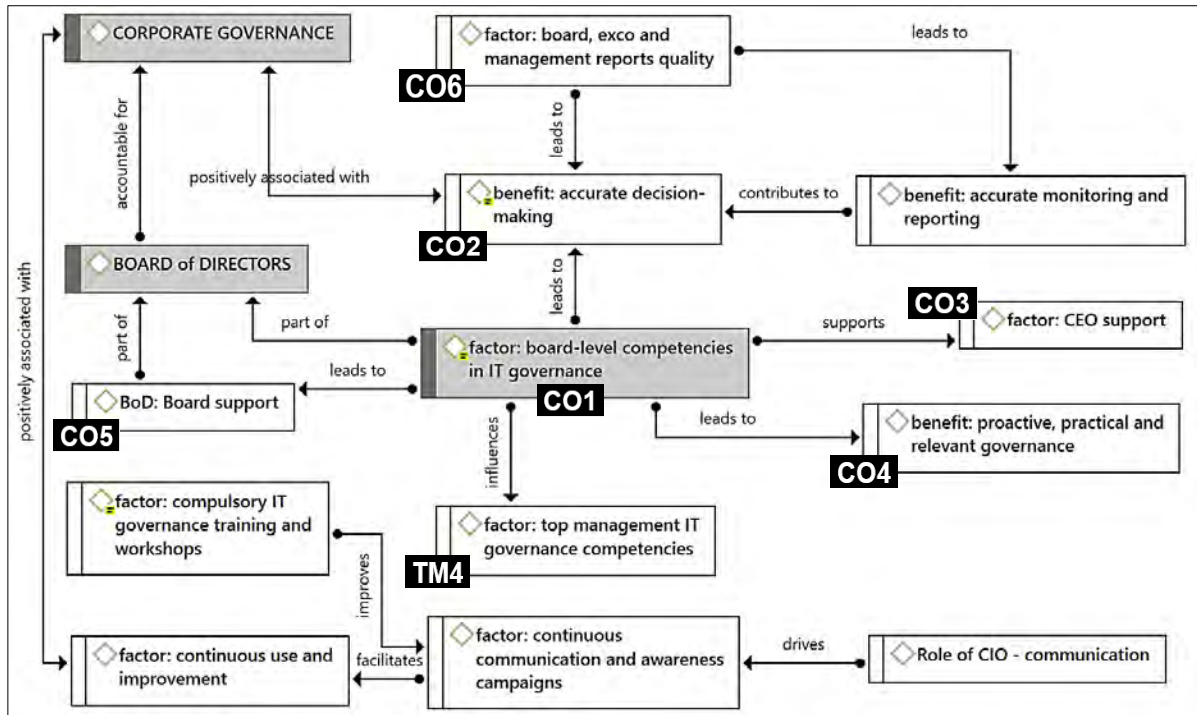


Figure 7–93: Board-level IT governance competencies code co-occurrences and linked code

#### 7.5.6.1 Survey data: board-level IT governance competencies

- In relation to attaining and maintaining IT governance competencies by the board of directors, survey data shows that only 39% of the respondents agreed that the board of directors is committed to an ongoing IT training programme, while 17% disagreed and 11% strongly disagreed; 33% of the respondents neither agreed nor disagreed, as depicted in Figure 7–94 below.

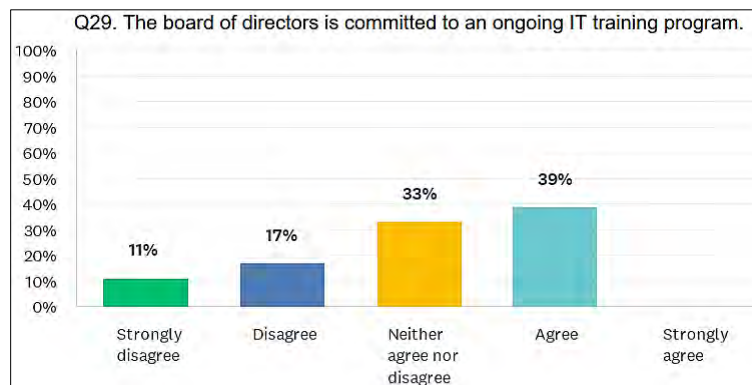


Figure 7–94: Board of directors’ commitment to an ongoing IT training programme

- In addition, the survey data shows that 39% of the respondents agreed and 6% strongly agreed that the board of directors has a thorough understanding of IT governance based on discussions with the IT executive and the audit committee members, as depicted Figure

7–95 below. On the other hand, 22% of the respondents disagreed and 33% neither agreed nor disagreed with that notion.

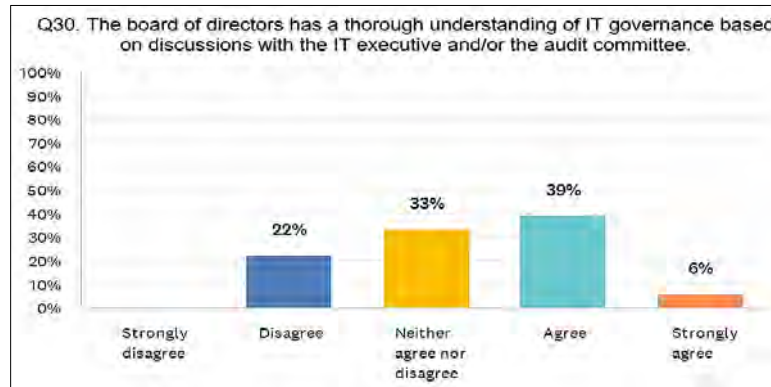


Figure 7–95: Survey responses about the board of directors’ understanding of IT governance

### 7.5.6.2 Board-level IT governance competencies: benefits and challenges

The benefits and challenges associated with the board-level IT governance competencies were derived from the data by analysing which benefits co-occur with code CO1. The two benefits and 12 challenges are depicted in Figure 7–96 and Figure 7–97 below, respectively.

		◇ factor: board-level competencies in IT governance n=13
● ◇ benefit: accurate monitoring and reporting	n=13	1 (0,04)
● ◇ benefit: speaking same language, understanding the why of IT governance	n=7	1 (0,05)

Figure 7–96: Co-occurring benefit codes associated with IT governance competencies

		◇ factor: board-level competencies in IT governance n=13
● ◇ challenge: highly regulated environment	n=3	1 (0,07)
● ◇ challenge: inadequate business process ownership	n=5	1 (0,06)
● ◇ challenge: IT governance frameworks, charter and standards not updated	n=2	1 (0,07)
● ◇ challenge: IT governance not taken seriously at Board level	n=1	1 (0,08)
● ◇ challenge: IT governance practices and standards stifle innovation	n=4	1 (0,06)
● ◇ challenge: IT governance responsibilities and decision-making not clear	n=2	1 (0,07)
● ◇ challenge: IT processes not followed internally	n=3	1 (0,07)
● ◇ challenge: minimal autonomy	n=3	1 (0,07)
● ◇ challenge: poor business ownership of IT governance processes	n=7	2 (0,11)
● ◇ challenge: poor staff attitude and morale	n=7	1 (0,05)
● ◇ challenge: top management support not reaching all levels	n=4	1 (0,06)
● ◇ challenge: top management support to middle management	n=4	1 (0,06)

Figure 7–97: Co-occurring challenges codes associated with board-level IT governance competencies

### 7.5.7 IT as a strategic enabler

Of the four modes of IT dependency (see section 5.2.5), it emerged that IT was viewed as a strategic partner and enabler of business in the case organisations. This section presents the results pertaining to IT as a strategic enabler of business (i.e. DP1), as depicted in Figure 7–98 below.

Figure 7–98 shows that DP1 is a result of compliance with the CGICTPF (i.e. DP7) and strong CEO support for compliance with the CGICTPF (i.e. DP5). DP5 and DP7 both improve the alignment of IT to the organisation’s strategic objectives (i.e. DP3). The latter, DP7, further facilitates the execution of the organisation’s digitisation strategy (i.e. DP6), which supports DP3. DP1 also directly contributes to IT alignment with business strategic objectives, but fundamentally leads to IT use that enables and embeds efficient business processes (i.e. DP2), and ultimately improves service delivery through the optimal use of organisational resources (i.e. DP10).

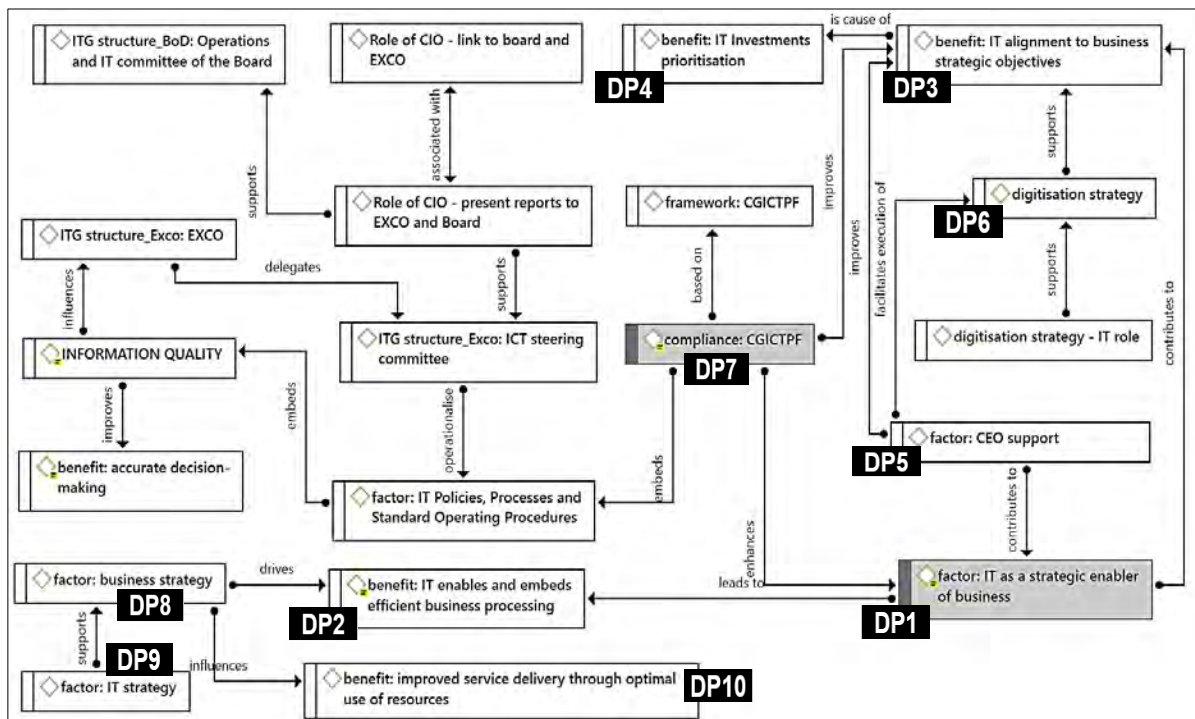


Figure 7–98: IT as a strategic enabler code co-occurrences

### 7.5.7.1 Survey data: IT as a strategic enabler

The survey data presented in sections 7.6.2.2 and 7.6.3.5 can also be associated with this section. However, in addition, the following survey data applies:

- Considering that IT strategy is an important component to drive IT as a strategic enabler, survey data shows variable results in relation to the update of the IT strategic plan within the last 12 months as depicted in Figure 7–99 below. 28% of the respondents agree and 17% strongly agree with that notion; 33% of the respondents disagree and 6% strongly disagree, while 17% neither agreed nor disagreed.

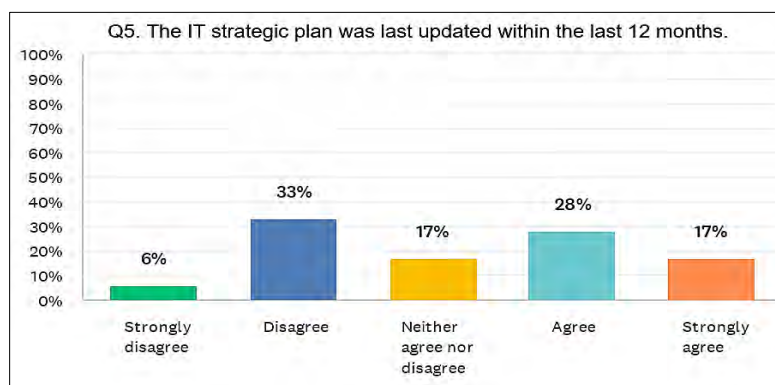


Figure 7–99: Survey responses about the update of the IT strategic plan within the last 12 months

- The survey data in Figure 7–100 below shows that a significant 71% of the respondents agreed and 6% strongly agreed that a formal planning process is used to define and update the IT strategy; only 12% disagreed and another 12% neither agreed nor disagreed.

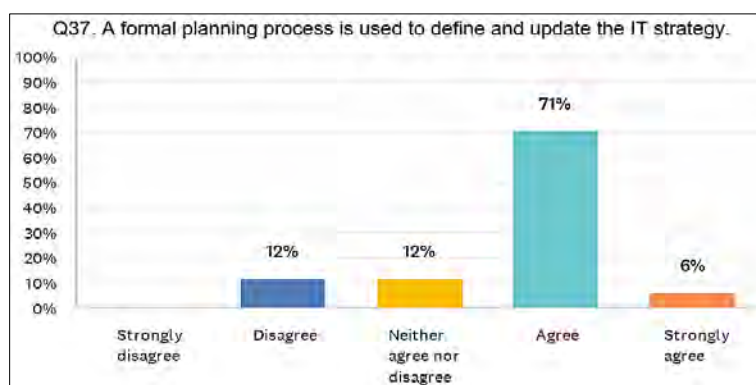


Figure 7–100: Survey responses about a formal planning process for defining and updating the IT strategy

- The survey data in Figure 7–101 below shows that 41% of the respondents agreed with the notion that IT investment benefits are identified and related directly to business

strategy, business value and performance improvement. Conversely, 29% of the respondents disagreed and 6% strongly disagreed while 24% neither agreed nor disagreed.

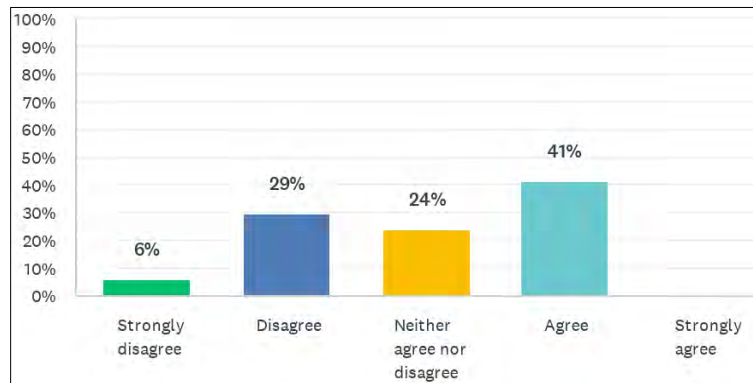


Figure 7–101: Survey responses about IT investment benefits being identified and relating to business strategies and performance improvement

- The survey data shows that 59% of the respondents agreed that processes are in place to monitor business benefits for every IT investment or project, 18% of the respondents disagreed, while 24% neither agreed nor disagreed, as shown in Figure 7–102 below.

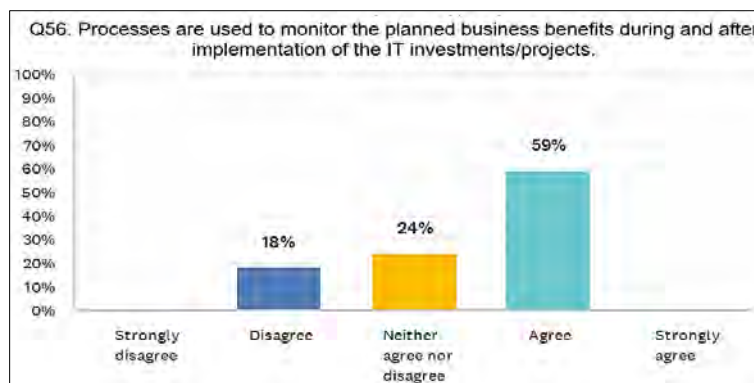


Figure 7–102: Survey responses about the processes being used to monitor planned business benefits

### 7.5.7.2 *IT as a strategic enabler: benefits and challenges*

There are benefits and challenges associated with IT as a strategic enabler of business. These were derived from the data by analysing which benefits co-occur with code DP1. The seven benefits and four challenges are depicted in Figure 7–103 and Figure 7–104 below, respectively.

		◇ factor: IT as a strategic enabler of business ② 22
● ◇ benefit: accurate decision-making	② 14	1 (0,03)
● ◇ benefit: improved service delivery through optimal use of resources	② 12	2 (0,06)
● ◇ benefit: IT alignment to business strategic objectives	② 24	10 (0,28)
● ◇ benefit: IT enables and embeds efficient business processing	② 4	1 (0,04)
● ◇ benefit: IT governance supports innovation	② 3	1 (0,04)
● ◇ benefit: IT Investments prioritisation	② 5	1 (0,04)
● ◇ benefit: rationalise and include agenda items in business meetings	② 3	1 (0,04)

Figure 7–103: Co-occurring benefit codes associated with IT as a strategic enabler

		◇ factor: IT as a strategic enabler of business ② 22
● ◇ challenge: inadequate business process ownership	② 5	1 (0,04)
● ◇ challenge: IT projects scope creep	② 2	1 (0,04)
● ◇ challenge: succession planning	② 2	1 (0,04)
● ◇ challenge: top management support to middle management	② 4	1 (0,04)

Figure 7–104: Co-occurring challenge codes associated with IT as a strategic enabler

## 7.5.8 IT governance: stakeholders and consultancy services

### 7.5.8.1 IT governance stakeholders

Code groups for IT governance stakeholders (i.e. SC1) and collaborating organisations (i.e. SC2) are presented in Figure 7–105 below. Code group SC1 is comprised of various stakeholders which include the Department of Home Affairs, internal auditors, the Auditor-General, the government CIO and the Government IT Officers Council (GITOC). The relationships that underpin IT governance stakeholders are regulated by the CGICTPF which defines the roles of and the relationship with stakeholders (i.e. SC3).

The relationships between external stakeholders and the case organisations are governed by a memorandum of understanding (MOU) (i.e. SC4). SC4 also applies to collaborating organisations (i.e. SC2); these are peer public sector organisations whose mandate is aligned with the case organisations.

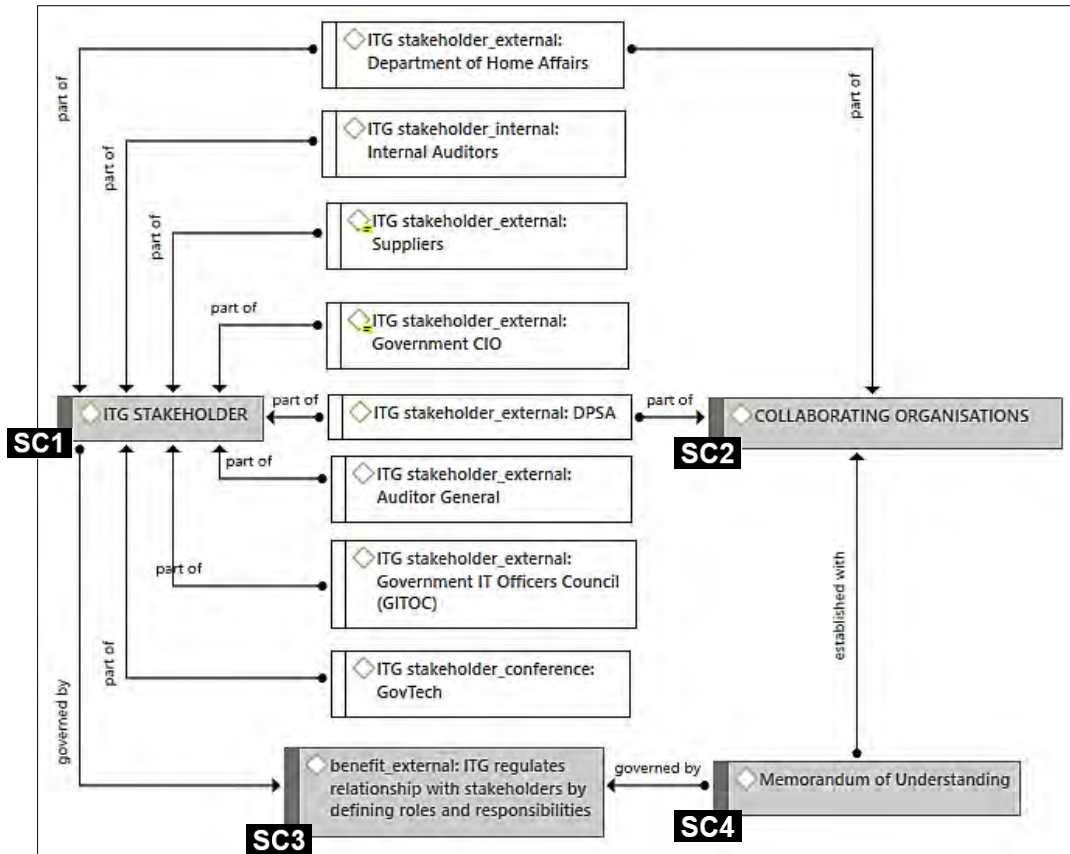


Figure 7–105: IT governance stakeholders and collaborating organisations

7.5.8.2 *Survey data: IT governance stakeholders*

- One of the key IT governance stakeholders is the GITOC. Survey data shows that a significant 59% of the respondents disagreed that there are on-hand incentives from the GITOC for formal IT governance practice in case organisations, as depicted Figure 7–106. No respondents agreed and 41% of the respondents neither agreed nor disagreed.

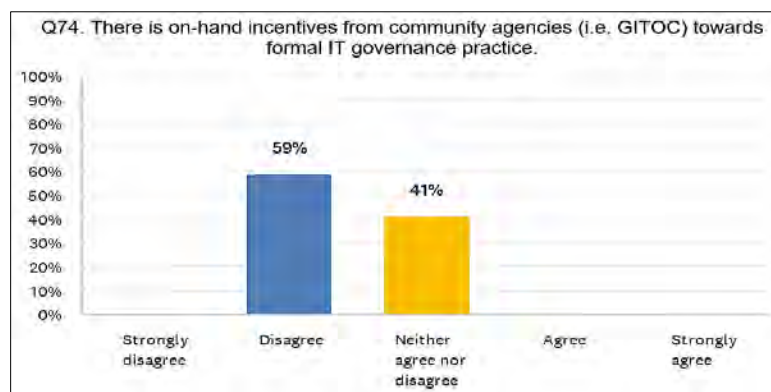


Figure 7–106: Survey responses about on-hand incentives from community agencies for formal IT governance practice

- The survey data also shows that only 6% of the respondents agreed that there is on-hand training in formal IT governance practice from community agencies, as depicted in Figure 7–107 below. A significant 53% of the respondents disagreed and 41% neither agreed nor disagreed.

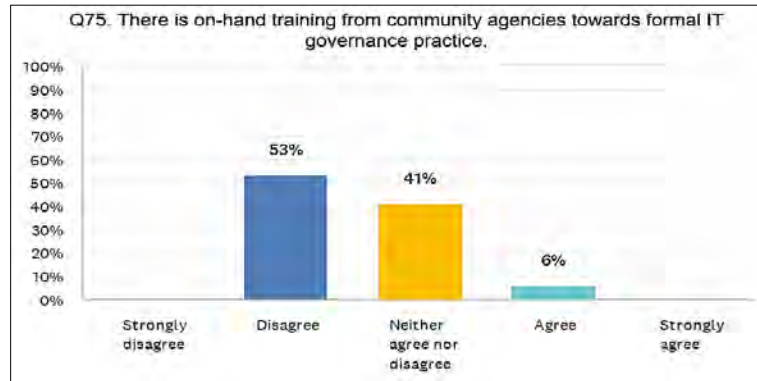


Figure 7–107: Survey responses about on-hand training in formal IT governance practice from community agencies

- The survey data shows that a significant 53% of the respondents neither agreed nor disagreed that government provides leadership in formal IT governance practice initiatives for the case organisations, as depicted in Figure 7–108 below. By contrast, 29% of the respondents agreed with that notion and 18% disagreed.

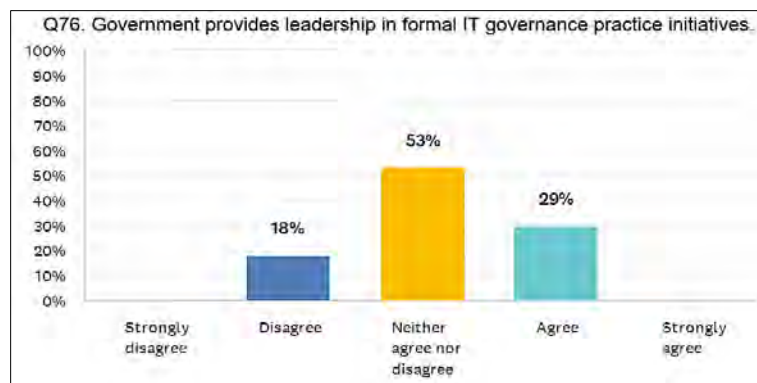


Figure 7–108: Survey responses about government providing leadership in formal IT governance practice initiatives

- The survey data shows that a significant 47% of the respondents disagreed and 6% strongly disagreed with the notion that it is easy to get outside help in resolving unexpected formal IT governance practice problems, as depicted in Figure 7–109 below. By contrast, only 12% of the respondents agreed while 35% neither agreed nor disagreed.

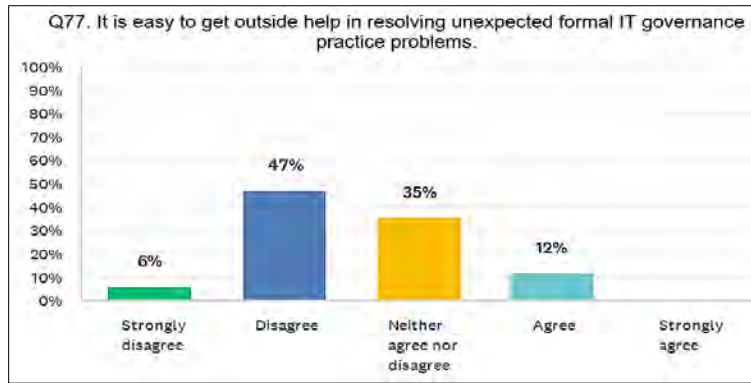


Figure 7–109: Survey responses about the ease of getting outside help in resolving unexpected formal IT governance practice problems

- The survey data shows that a significant 53% of the respondents disagreed and 6% strongly disagreed with the notion that government provides subsidies/budget for formal IT governance practice, as depicted in Figure 7–110 below. On the other hand, only 6% agreed while 35% neither agreed nor disagreed.

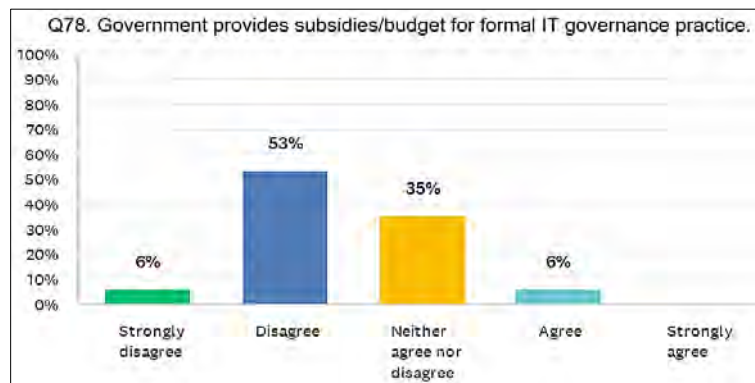


Figure 7–110: Survey responses about government provision of subsidies/budget for formal IT governance practice

### 7.5.8.3 Consultancy services

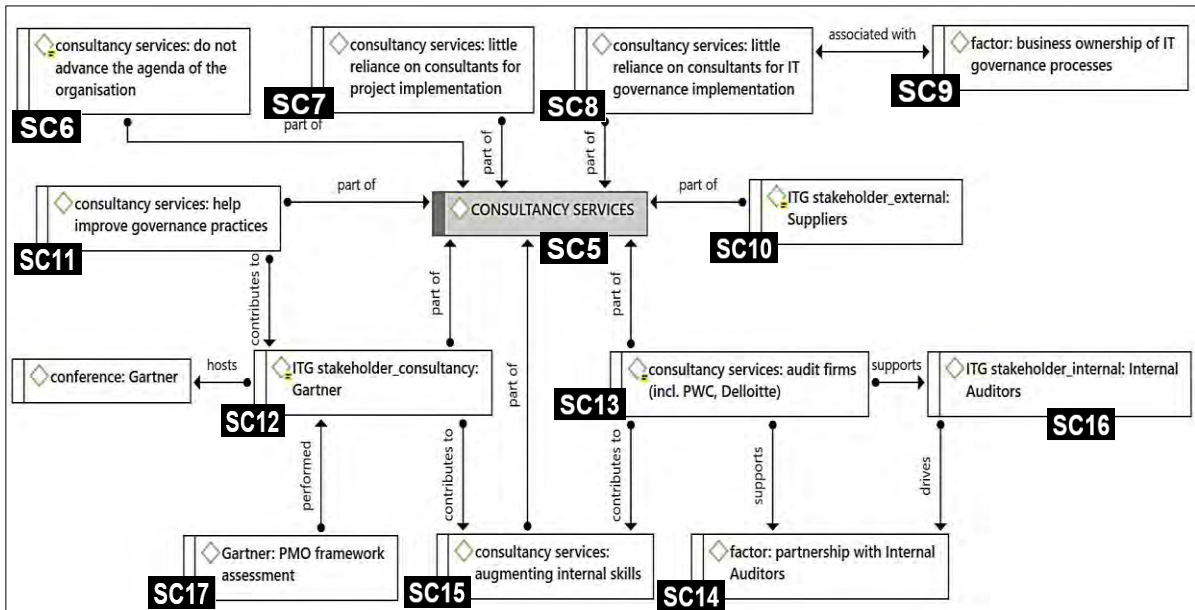


Figure 7–111: Consultancy services code group

### 7.5.8.4 Survey data: consultancy services

The survey data affirms the little to no substantive value is derived from consultancy services in relation to IT governance.

- The survey data shows that a low 41% of the respondents agreed that consultants have prior experience in providing quality service for formal IT governance practice, as depicted in Figure 7–112 below. Conversely, 6% of the respondents disagreed and a significant 53% neither agreed nor disagreed.

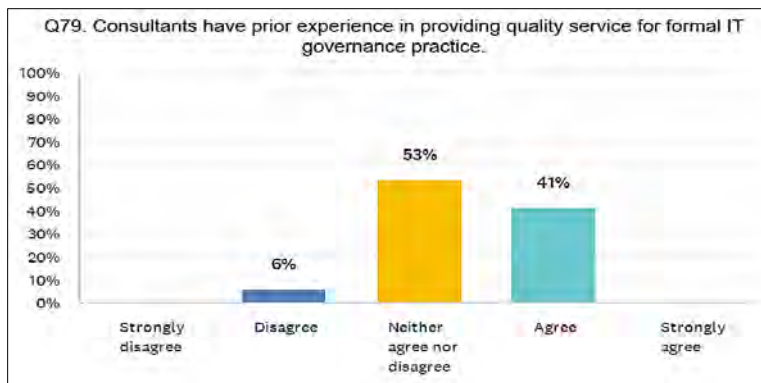


Figure 7–112: Survey responses about consultants’ prior experience in providing quality service for formal IT governance practice

- The survey data shows that 47% of the respondents agreed that consultants have the capability to provide relevant solutions for formal IT governance practice, as depicted in

Figure 7–113 below. Six per cent of the respondents disagreed, however, and a significant 47% neither agreed nor disagreed.

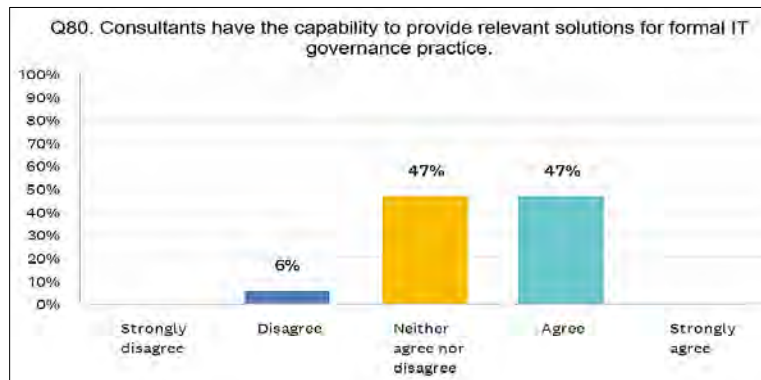


Figure 7–113: Survey data about consultants’ capability to provide relevant solutions for formal IT governance practice

- The survey data shows that 47% of the respondents agreed that consultants have prior experience in providing quality training for formal IT governance practice, as depicted in Figure 7–114 below. By contrast, 12% of the respondents disagreed and a high 41% neither agreed nor disagreed.

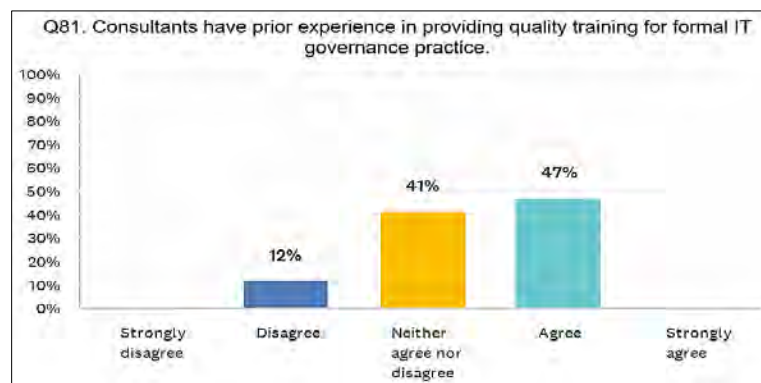


Figure 7–114: Survey responses about consultants’ prior experience in providing quality training for formal IT governance practice

- The survey data shows that a significant 65% of the respondents neither agreed nor disagreed with the notion that consultants have good relationships with all relevant parties in the case organisations, as depicted in Figure 7–115 below. Twenty-nine per cent of the respondents agreed and 6% disagreed.

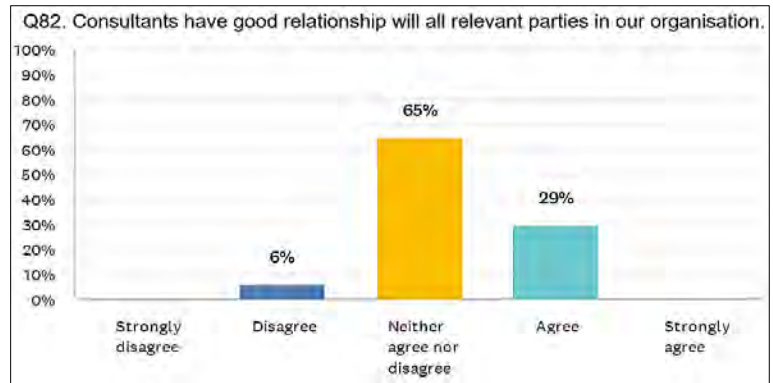


Figure 7–115: Survey responses about consultants’ good relationships with all relevant parties in our organisation

- The survey data shows that a significant 53% of the respondents neither agreed nor disagreed with the notion that consultants are effective in recommending suitable solutions for formal IT governance practice in the case organisations, as depicted in Figure 7–116 below. On the other hand, 35% of the respondents agreed and 12% disagreed.

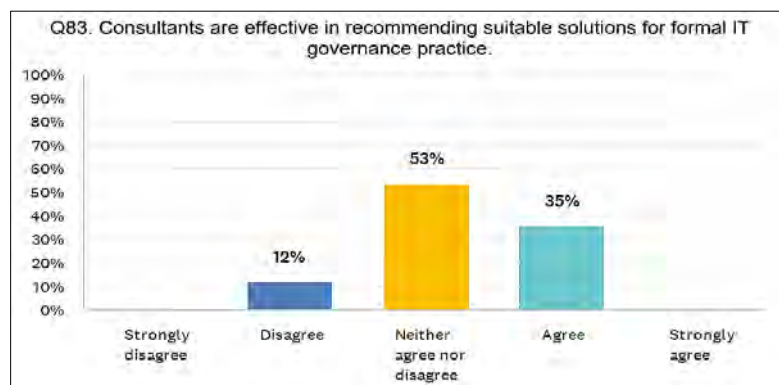


Figure 7–116: Survey responses about consultants’ effectiveness in recommending suitable solutions for formal IT governance practice

#### 7.5.8.5 *IT governance stakeholders and consultancy services: benefits and challenges*

There are benefits and challenges associated with the IT governance stakeholders and consultancy services codes. These were derived from data by analysing which benefits co-occur those codes. The ten benefits and eight challenges are depicted in Figure 7–117, Figure 7–118, Figure 7–119 and Figure 7–120 below. Sankey diagrams were also preferred to better visualise the benefits and challenges related to the IT governance stakeholders and consultancy services codes, since those codes are three or more in number.

● ◇ benefit: asset management	④ 4
● ◇ benefit: cyber security	⑪ 11
● ◇ benefit: IT controls	③ 3
● ◇ benefit: IT enables and embeds efficient business processing	④ 4
● ◇ benefit: IT risk management	⑥ 6
● ◇ benefit: proper usage of public resources	② 2
● ◇ benefit: reduced audit findings	⑧ 8
● ◇ benefit: self-assessments conducted routinely	④ 4
● ◇ benefit: supplier contracts	③ 3
● ◇ benefit_external: ITG regulates relationship with stakeholders by defining r...	⑥ 6

Figure 7–117: Co-occurring benefit codes associated with IT governance stakeholders and consultancy services

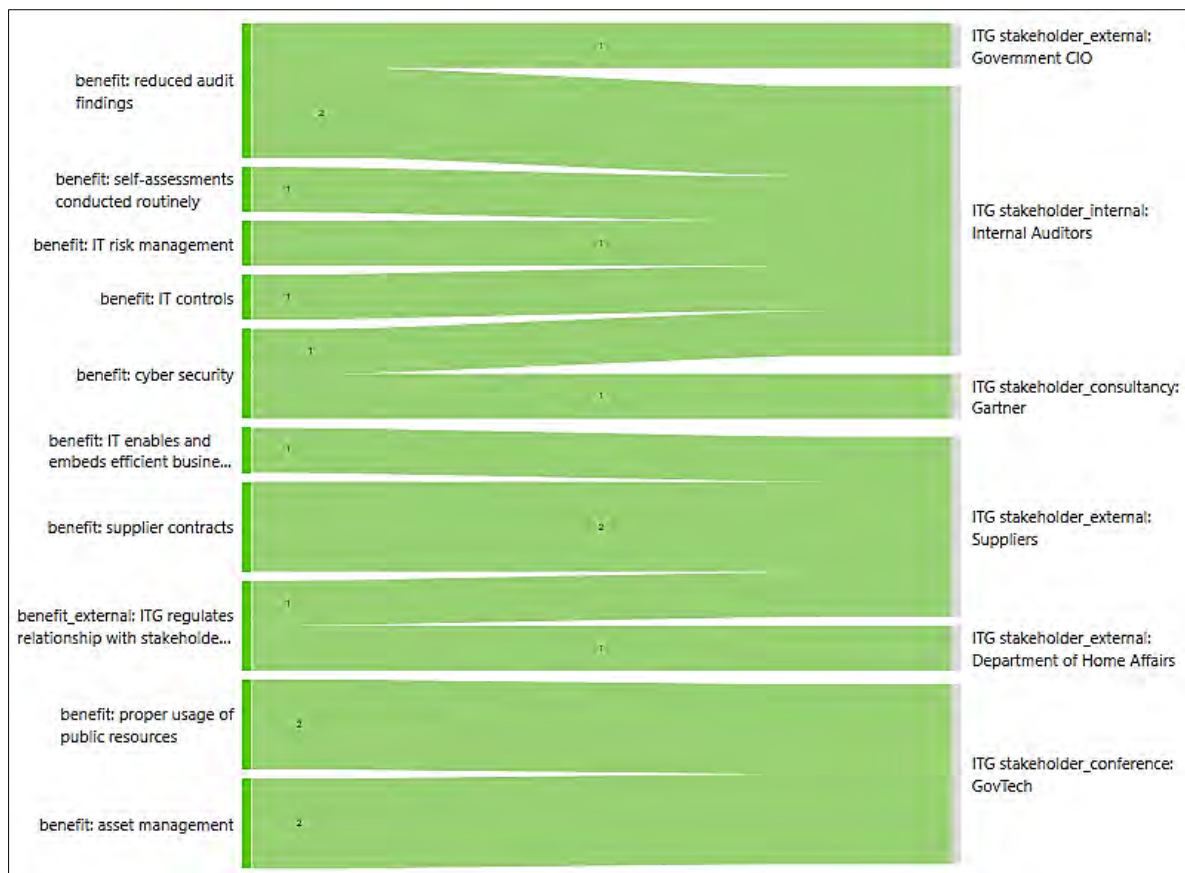


Figure 7–118: Sankey diagram of co-occurring benefit codes associated with overall IT governance stakeholders and consultancy services

challenge: CGICTPF document not updated	3
challenge: highly regulated environment	3
challenge: intergovernmental collaboration and data sharing not optimal	4
challenge: lack of qualified and experienced staff for roles	6
challenge: minimal autonomy	3
challenge: minimal to no external stakeholder support from DPSA	4
challenge: no support from GITOC	1
challenge: professional will to drive IT governance implementation	3

Figure 7–119: Co-occurring challenge codes associated with IT governance stakeholders and consultancy services

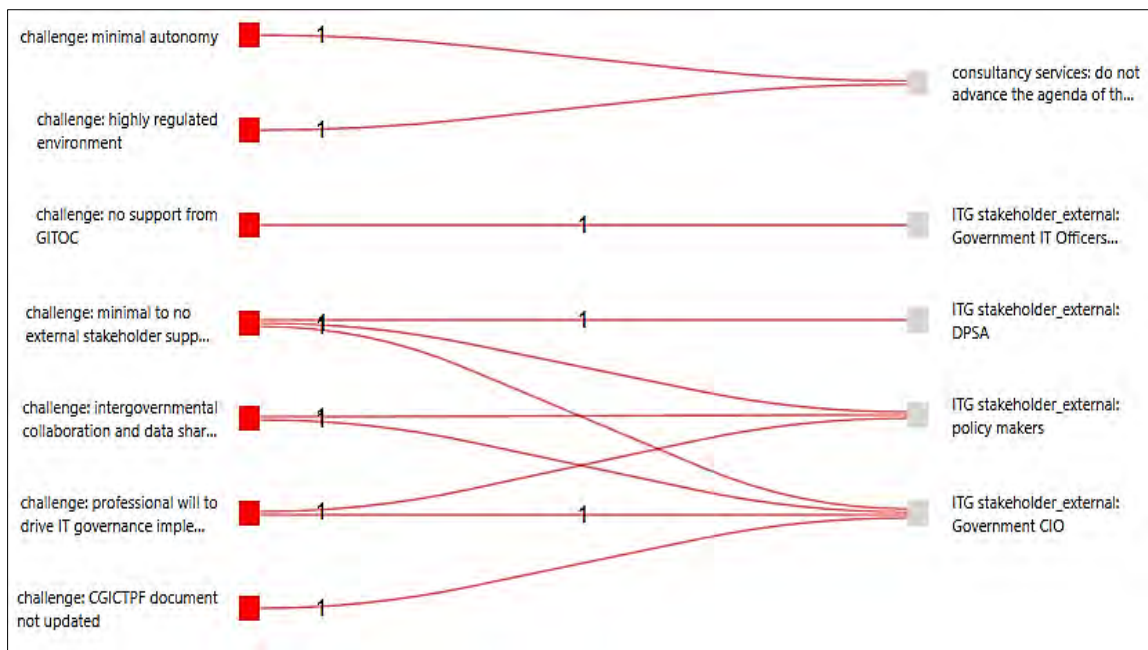


Figure 7–120: Sankey diagram of co-occurring challenge codes associated with overall IT governance stakeholders and consultancy services

### 7.5.9 Emerging construct: organisational culture

Taking the public sector context (i.e. PS1) into account, organisational culture (i.e. CL1) was found to be an emergent theme based on the thematic analysis undertaken following the coding process. This section presents the results pertaining to organisational culture, as depicted in Figure 7–121 below.

Considering that P1 and CL1 are interlinked, Figure 7–121 below shows the codes that make up the public sector context, as well as how P1 has primary links to CL1 through CL2 and CL7. P1 also has secondary links to CL1 through CL10, CL11 and CL12. Whereas other

parts of CL1 do not have primary or secondary links to PS1, they still exert influence on PS1 through other organisational mechanisms such as CL8, which is further associated with IT alignment through compliance with the CGICTPF (see section 7.6.3.4).

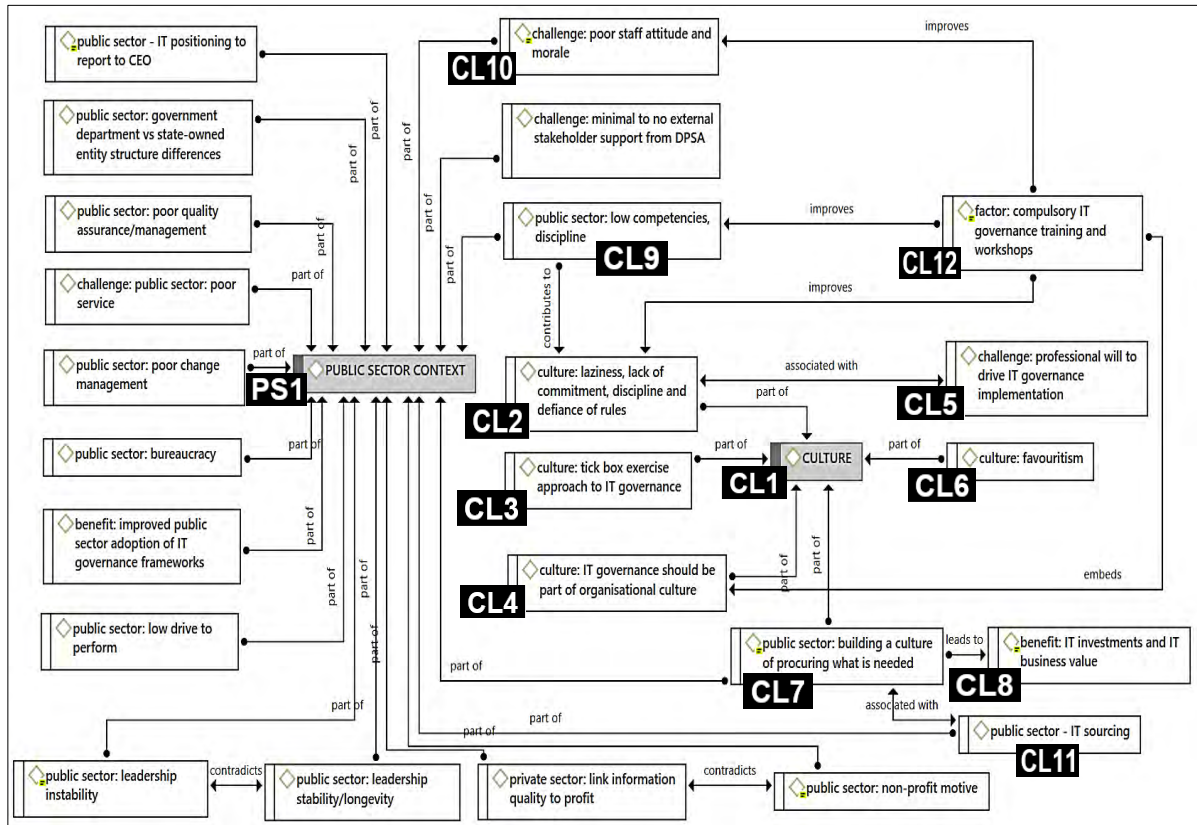


Figure 7–121: Organisational culture code group

Since organisational culture is an emergent construct, no survey data was collected in relation to it.

### 7.5.9.1 Organisational culture: benefits and challenges

The benefits and challenges associated with organisational culture were derived from the data by analysing which benefits co-occur with code group CL1. The four benefits and eight challenges are depicted in Figure 7–122, Figure 7–123 and Figure 7–124 below. A Sankey diagram was also preferred to better visualise the challenges related to organisational culture codes, since those codes are three or more in number, as depicted in Figure 7–124 below.

	◇ culture: IT governance should be part of organisational culture ① 1	◇ public sector: building a culture of procuring what is needed ② 2
◇ benefit: accurate decision-making ① 14		1 (0,07)
◇ benefit: IT alignment to business strategic objectives ① 24	1 (0,04)	1 (0,04)
◇ benefit: IT investments and IT business value ① 12		1 (0,08)
◇ benefit: procuring fit for purpose technology ① 2		1 (0,33)

Figure 7–122: Co-occurring benefit codes associated with organisational culture

◇ challenge: highly regulated environment ① 3
◇ challenge: IFMS wasteful expenditure ① 1
◇ challenge: IT governance practices and standards stifle innovation ① 4
◇ challenge: lack of qualified and experienced staff for roles ① 6
◇ challenge: minimal autonomy ① 3
◇ challenge: professional will to drive IT governance implementation ① 3
◇ challenge: top management support not reaching all levels ① 4
◇ challenge: top management support to middle management ① 4

Figure 7–123: Co-occurring challenge codes associated with organisational culture

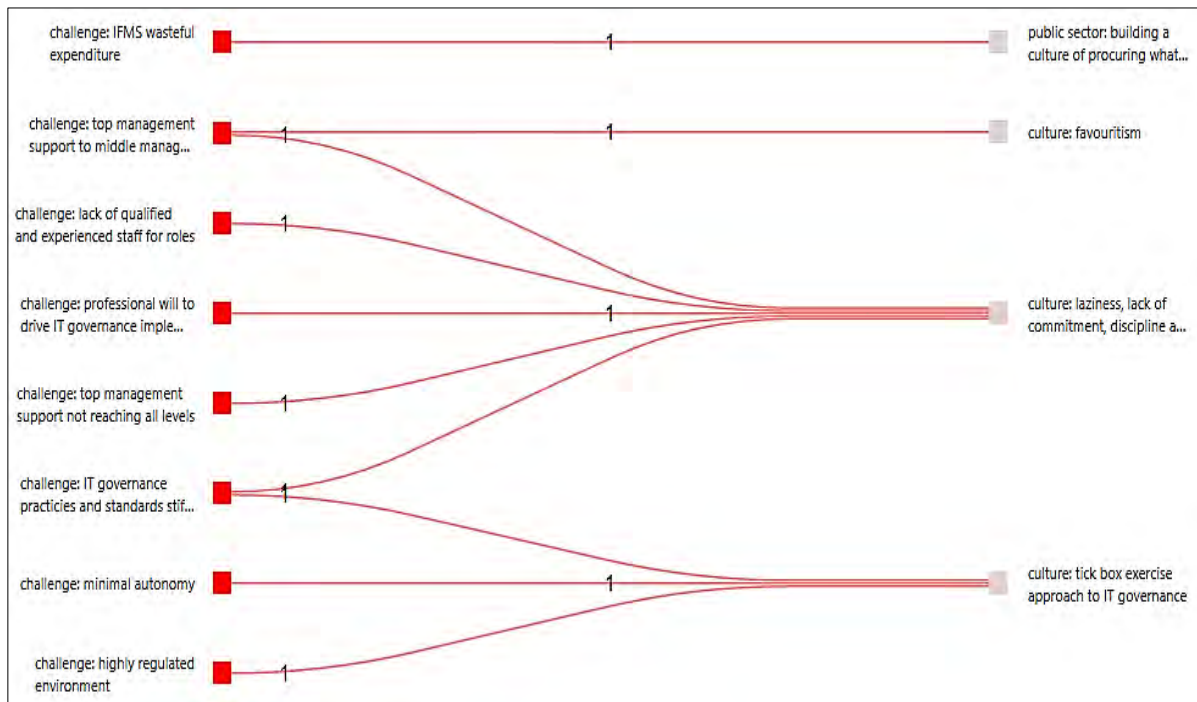


Figure 7–124: Sankey diagram of co-occurring challenge codes associated with overall IT governance stakeholders and consultancy services

## **7.6 RSQ2: How do public sector characteristics affect IT governance adoption and use?**

Public sector characteristics necessitate an idiosyncratic approach to IT governance research in the public sector, as discussed in section 3.6.1 generally, and specifically identified in Table 3–3. This section presents the results in relation to how those characteristics affect the adoption and use of the CGICTPF. It should be noted that the codes for public sector characteristics were categorised and labelled as benefits and code groups during the coding process, as they accrue as a result of, and explain, the factors that are presented in section 7.5.

### **7.6.1 Goals: public value**

The key objective of the public sector is to dispense public value through the delivery of public services. As depicted in Figure 7–125 below, organisational strategy leads to improved service delivery to the citizens through the optimal use of resources (i.e. PV1). The adoption and use of the CGICTPF is facilitated by adequate management buy-in to corporate governance and premised on compliance (i.e. PV5) with the customised framework for the specific organisational context (i.e. PV4). When public resources are used effectively and efficiently (i.e. PV3) it contributes significantly towards PV1. Therefore, IT governance contributes towards the proper and efficient use of public resources, including IT resources. A crucial element of that service delivery is ensuring the availability of IT systems and infrastructure, business continuity and disaster recovery functions which lead to PV1.

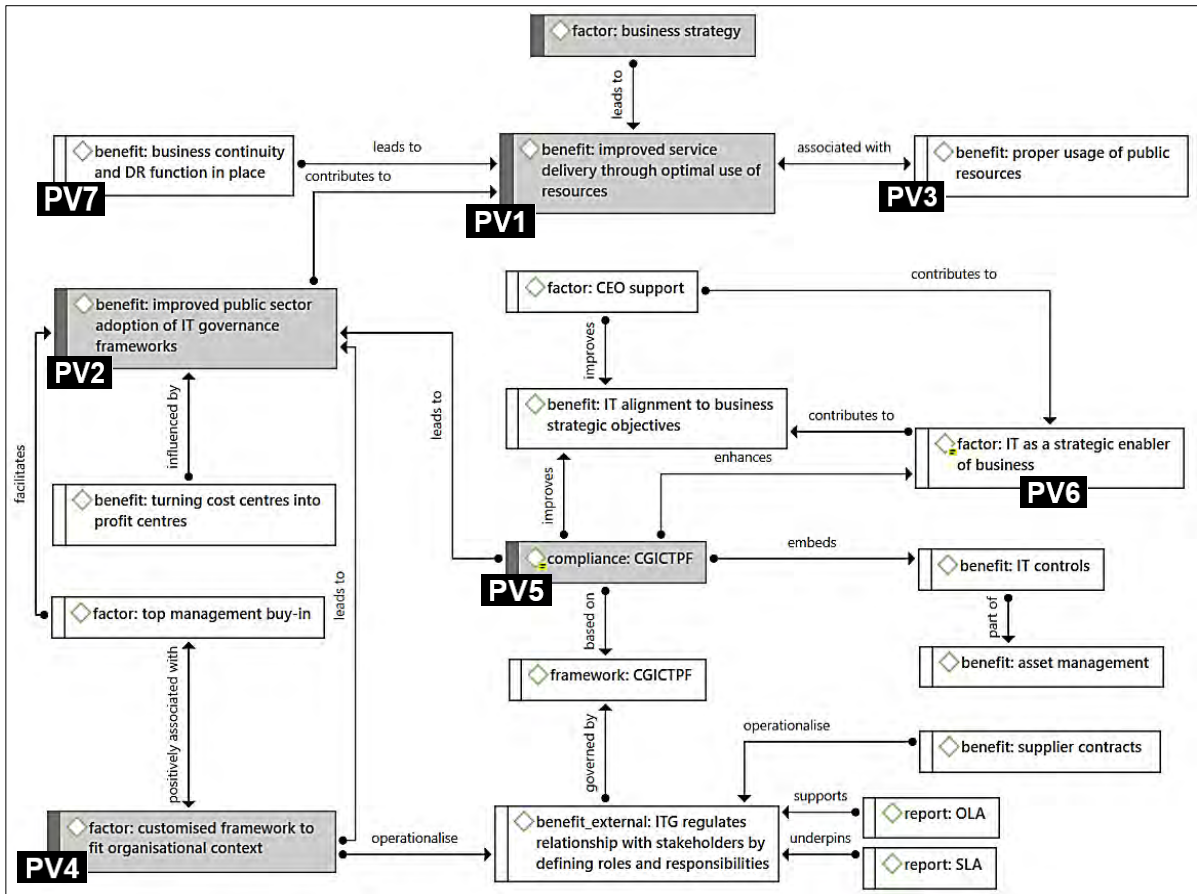


Figure 7–125: Improved service delivery (i.e. public value) code co-occurrences

7.6.1.1 *Survey data: service delivery*

- In relation to the way in which effective service delivery and the contribution of IT to public value are perceived, the survey data shows mixed results. As depicted in Figure 7–126 below, only 39% of the respondents agreed with the notion that business process owners were satisfied with IT service delivery meeting the agreed service levels, while a significant 44% disagreed; 17% neither agreed nor disagreed.

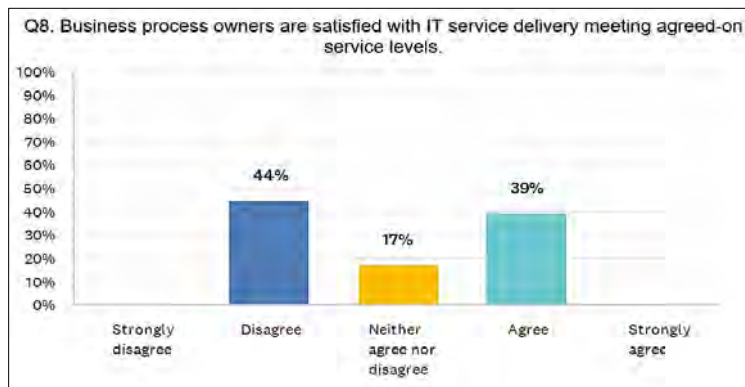


Figure 7–126: Survey data about business process owners’ level of satisfaction with IT service delivery meeting the agreed service levels

### 7.6.1.2 Service delivery: benefits and challenges

The benefits and challenges associated with public value were derived from the data by analysing which benefits co-occur with code PV1. The 13 benefits and three challenges are depicted in Figure 7–127 and Figure 7–128 below, respectively.

	● ◇ benefit: improved service delivery through optimal use of resources ① 12	
● ◇ benefit: accurate decision-making	① 14	1 (0,04)
● ◇ benefit: accurate monitoring and reporting	① 13	1 (0,04)
● ◇ benefit: asset management	① 4	1 (0,07)
● ◇ benefit: improved public sector adoption of IT governance frameworks	① 1	1 (0,08)
● ◇ benefit: IT alignment to business strategic objectives	① 24	3 (0,09)
● ◇ benefit: IT controls	① 3	1 (0,07)
● ◇ benefit: IT governance supports innovation	① 3	1 (0,07)
● ◇ benefit: resolving IT issues so they do not recur	① 2	1 (0,08)
● ◇ benefit: speaking same language, understanding the why of IT governance	① 7	3 (0,19)
● ◇ benefit: stabilise and standardise the IT environment	① 3	1 (0,07)
● ◇ benefit: supplier contracts	① 3	1 (0,07)
● ◇ benefit: turning cost centres into profit centres	① 2	1 (0,08)
● ◇ benefit_external: ITG regulates relationship with stakeholders by defining roles and responsibilities	① 6	1 (0,06)

Figure 7–127: Co-occurring benefit codes associated with public value

	● ◇ benefit: improved service delivery through optimal use of resources ① 12	
● ◇ challenge: IT considered as afterthought	① 5	1 (0,06)
● ◇ challenge: lack of integrated data collection and storage	① 7	1 (0,06)
● ◇ challenge: no tool to measure usability of IT services	① 2	1 (0,08)

Figure 7–128: Co-occurring challenge codes associated with public value

## 7.6.2 Stakeholders

Refer to section 7.5.8 for a presentation of the results pertaining to IT governance stakeholders.

## 7.6.3 Regulations

IT standards (i.e. REG3) and IT governance frameworks, including the CGICTPF and IT policies, processes and SOPs, conform to regulations (i.e. REG1), as depicted below in Figure

7–129 of the regulation code group. In essence, compliance with the CGICTPF (i.e. REG4) facilitates the execution of REG1.

Reference must be made to Appendix H for a comprehensive list of regulations applicable to the case organisations. However, the following regulations were specifically cited by the respondents during the data collection process: the Public Finance Management Act (PFMA) and Protection of Personal Information Act (PoPIA).

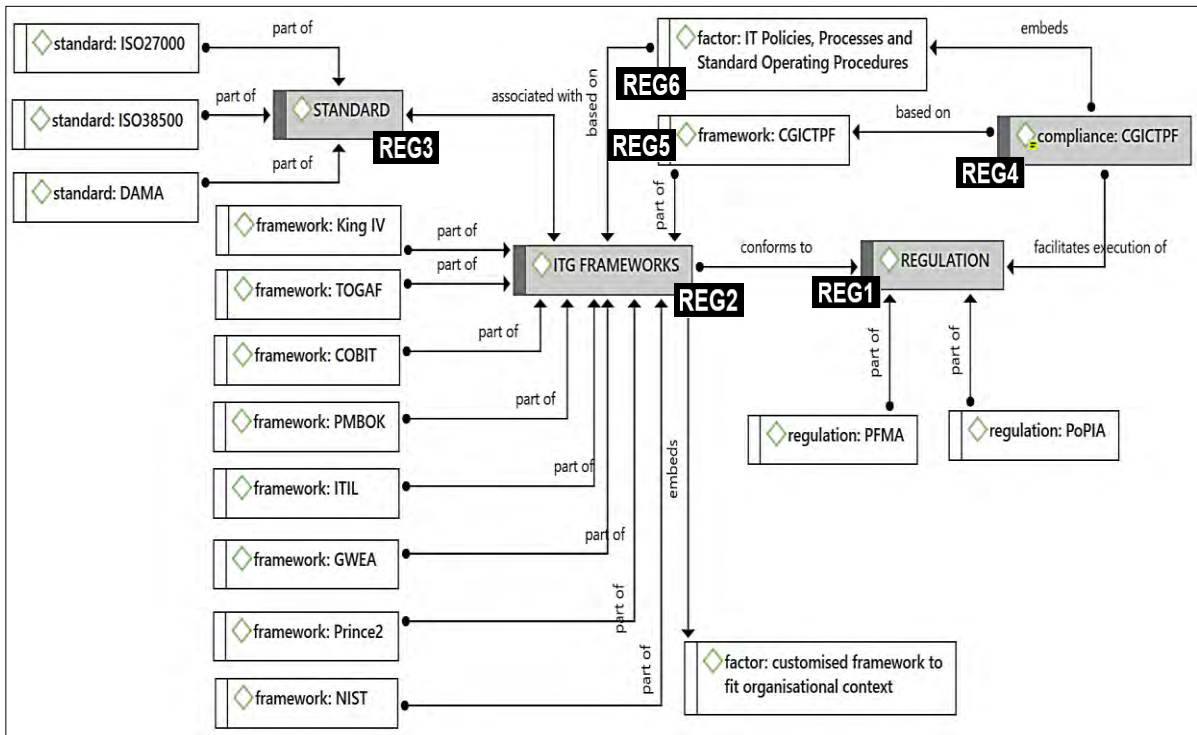


Figure 7–129: Regulation code group

### 7.6.3.1 Regulations: benefits and challenges

The benefits and challenges associated with public value were derived from the data by analysing which benefits co-occur with code group REG1. The four benefits and two challenges are depicted below in Figure 7–130 and Figure 7–131, respectively.

		◇ regulation: PFMA ① 4	◇ regulation: PoPIA ① 3
● ◇ benefit: accurate decision-making	① 14		1 (0,06)
● ◇ benefit: accurate monitoring and reporting	① 13		1 (0,07)
● ◇ benefit: IT alignment to business strategic objectives	① 24		1 (0,04) ●
● ◇ benefit: IT risk management	① 6	1 (0,11)	

Figure 7–130: Co-occurring benefit codes associated with the regulation code group



### 7.6.5.1 Survey data: IT risk management

- The survey data shows that 50% of the respondents agreed with the notion that members of the board of directors have expertise and experience regarding IT value and risk, as depicted in Figure 7–133 below. On the other hand, 28% of the respondents disagreed and 6% strongly disagreed with that notion, while 17% neither agreed nor disagreed.

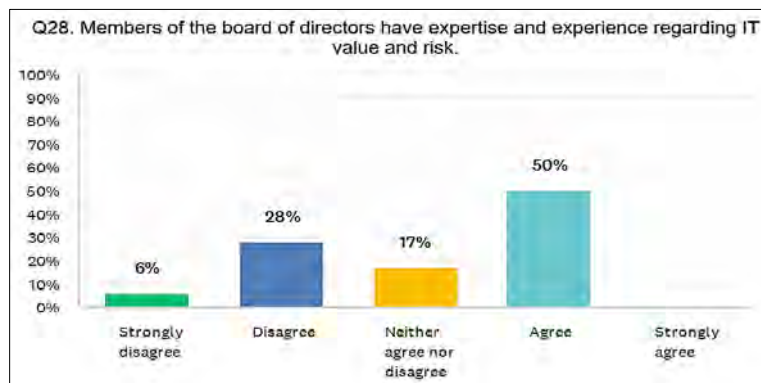


Figure 7–133: Survey data about members of the board of directors having expertise and experience regarding IT value and risk

- In relation to IT risks and security, survey data shows that a significant 61% of the respondents agreed with the notion that IT-related risks and security issues receive attention in the IT steering committee, as depicted below in Figure 7–134. Only 6% of the respondents disagreed while 33% neither agreed nor disagreed.

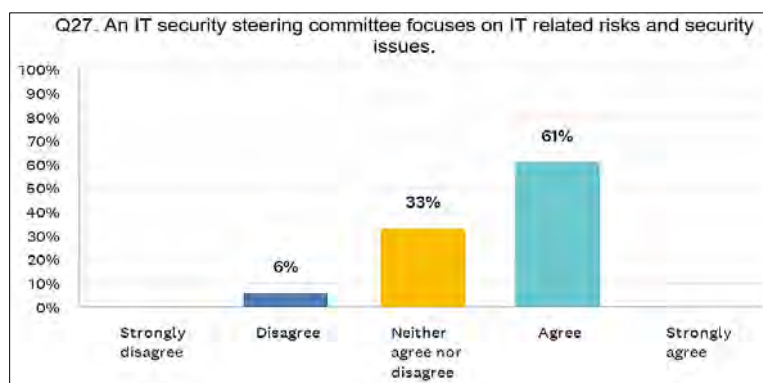


Figure 7–134: An IT security steering committee focuses on IT-related risks and security issues

The survey data also shows that only 22% of the respondents agreed and 11% strongly agreed that the IT steering committee members comprised of members of business and IT who are competent in IT security, as depicted below in Figure 7–135. By contrast, 28% of the respondents disagreed while a high 39% neither agreed nor disagreed.

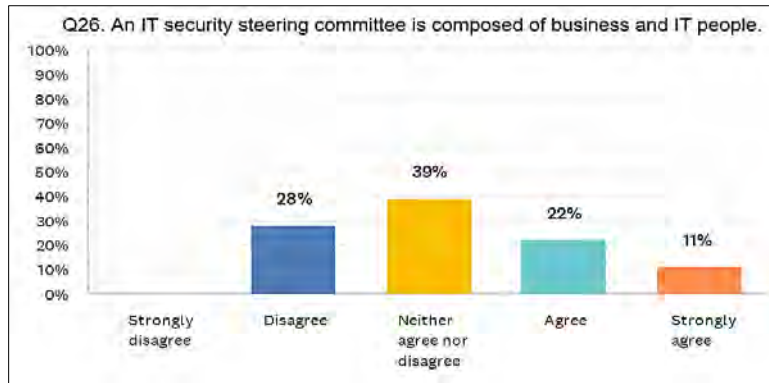


Figure 7–135: Survey responses about An IT security committee being composed of IT and business people

- The survey data affirms the notion that an ERM framework for internal control is used to govern IT. As depicted below in Figure 7–136, a significant 65% of the respondents agreed and a high 24% of the respondents strongly agreed with that notion, while 6% strongly disagreed and another 6% neither agreed nor disagreed.

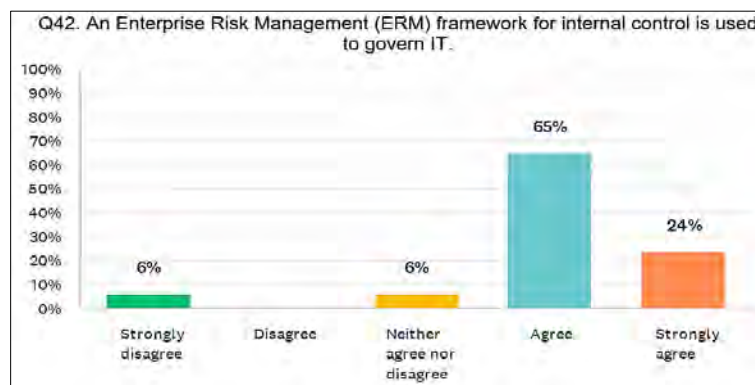


Figure 7–136: Survey responses about the use of an ERM framework for internal control to govern IT

The survey data also shows that a significant 71% of the respondents agreed and 6% strongly agreed with the notion that all foreseeable IT risks are identified, as depicted below in Figure 7–137. Conversely, 12% of the respondents disagreed and 6% strongly disagreed, while 6% neither agreed nor disagreed.

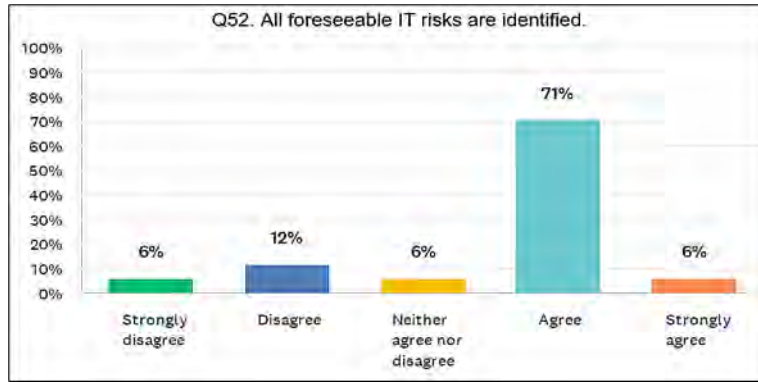


Figure 7–137: Survey responses about identifying all foreseeable IT risks

- The survey data shows that 53% of the respondents agreed and 24% strongly agreed with the notion that regular self-assessments and independent assurance activities are conducted in relation to IT governance and controls, as depicted below in Figure 7–138. On the other hand, 18% of the respondents disagreed while only 6% neither agreed nor disagreed.

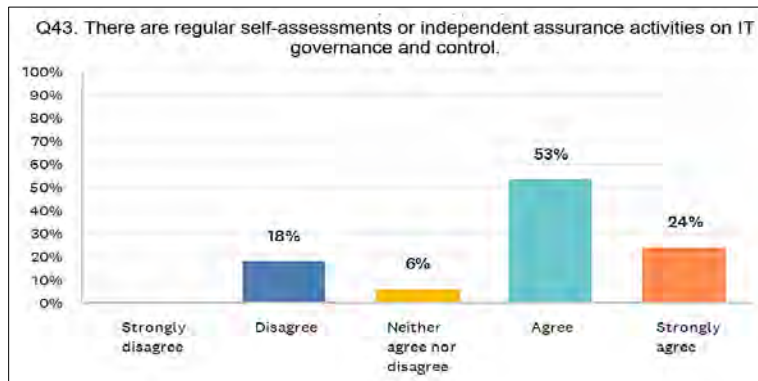


Figure 7–138: Survey responses about regular self-assessments of IT controls and governance

- The survey data shows that a significant 53% of the respondents agreed and a significant 29% strongly agreed with the notion that their organisation regularly engages outside agencies to test its security systems or to conduct security audits, as depicted below in Figure 7–139. Conversely, 12% disagreed and 6% strongly disagreed.

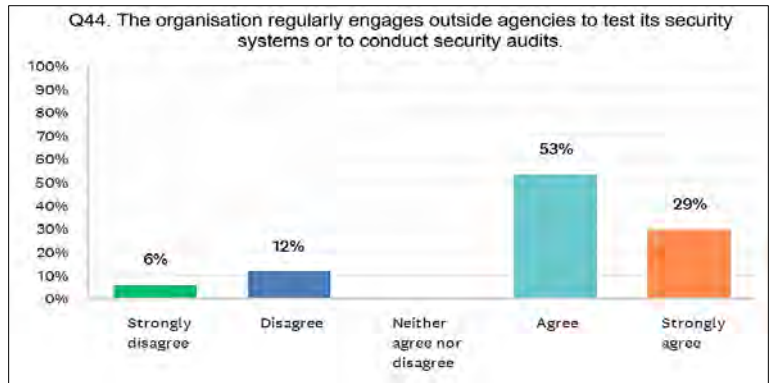


Figure 7–139: Survey responses about the regular testing of security systems and conducting of security audits

7.6.5.2 *IT risk management: benefits and challenges*

The benefits and challenges associated with IT risk management were derived from the data by analysing which benefits co-occur with code group RM1. The four benefits and two challenges are depicted below in Figure 7–140 and Figure 7–141, respectively.

	benefit: IT risk management n 6
benefit: cyber security n 11	1 (0,06)
benefit: IT investments and IT business value n 12	1 (0,06)
benefit: proactive, practical and relevant governance n 2	1 (0,14)

Figure 7–140: Co-occurring benefit codes associated with IT risk management

	benefit: IT risk management n 6
challenge: poor staff attitude and morale n 7	1 (0,08)

Figure 7–141: Co-occurring challenge codes associated with IT risk management

7.6.6 **IT innovation**

This section must be considered concurrently with section 7.5.3.4, as IT innovation is expressed through IT projects which are motivated using business cases and are based on enterprise architecture. As depicted in below in Figure 7–142, IT governance supports innovation (i.e. IV1) and this influences IT-related investments and the business value derived from them (i.e. IV2). From IV2 onwards, the process assumes project implementation and IT investment prioritisation (see section 7.5.3.4).

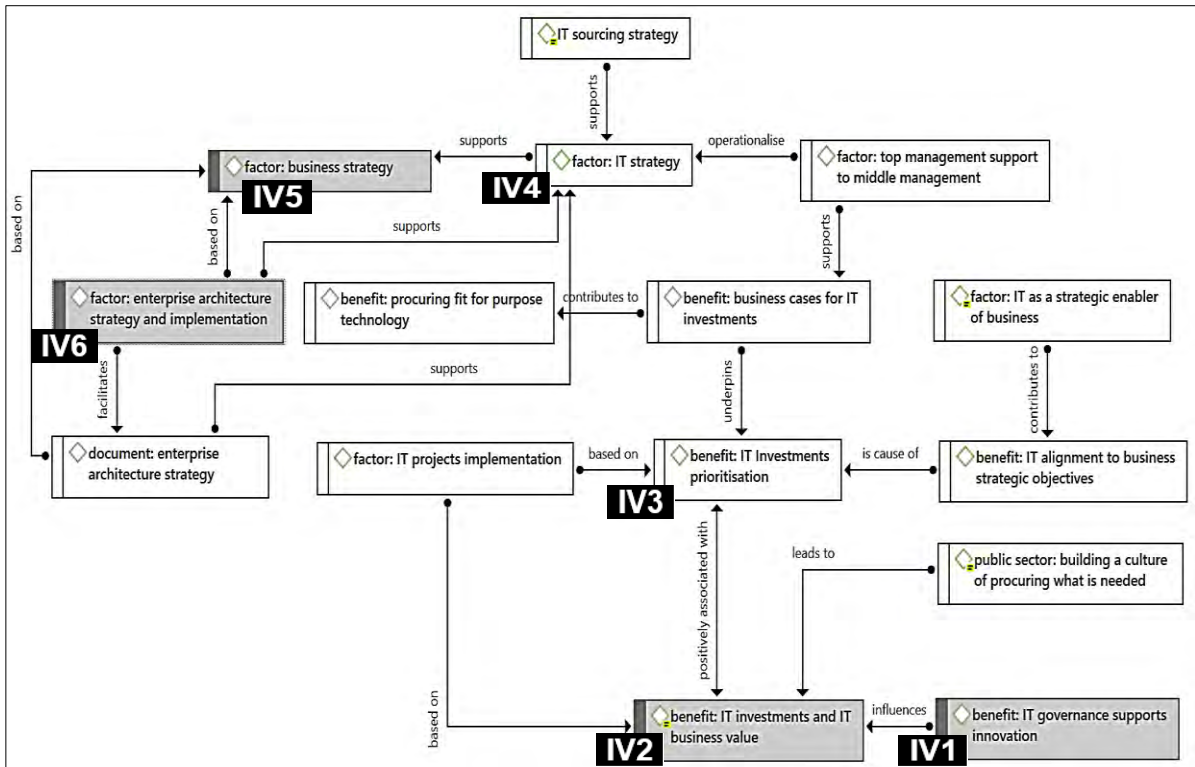


Figure 7–142: IT governance supports innovation code co-occurrences

### 7.6.6.1 Survey data: IT innovation

The survey data shows that a significant 67% of the respondents agreed and 6% strongly agreed with the notion that an IT steering committee at an executive level promotes IT strategic flexibility to meet the changing needs of the organisation’s internal and external environment, as depicted below in Figure 7–143. Only 11% of the respondents disagreed while 17% neither agreed nor disagreed.

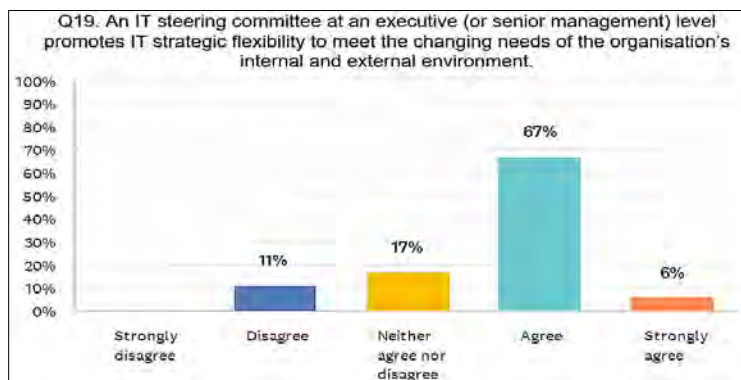


Figure 7–143: Survey responses about the IT steering committee promoting IT strategic flexibility to meet the changing needs of the organisations

### 7.6.6.2 IT innovation: benefits and challenges

The benefits and challenges associated with IT innovation were derived from the data by analysing which benefits co-occur with code group IV1. The four benefits and two challenges are depicted below in Figure 7–144 and Figure 7–145, respectively.

	●◇ benefit: IT governance supports innovation ④ 3	
●◇ benefit: improved service delivery through optimal use of resources	④ 12	1 (0,07)
●◇ benefit: organisational learning	④ 1	1 (0,33)
●◇ benefit: speaking same language, understanding the why of IT governance	④ 7	1 (0,11)
●◇ benefit: stabilise and standardise the IT environment	④ 3	1 (0,20)
●◇ benefit_external: ITG regulates relationship with stakeholders by defining roles and responsibilities	④ 6	1 (0,13)

Figure 7–144: Co-occurring benefit codes associated with IT innovation

	●◇ benefit: IT governance supports innovation ④ 3	
●◇ challenge: IT considered as afterthought	④ 5	1 (0,14)

Figure 7–145: Co-occurring challenge codes associated with IT innovation

## 7.6.7 IT competencies

Refer to section 7.5.6 for the presentation of results pertaining to IT governance competencies, which is the scope of this study.

## 7.6.8 IT sourcing

This section must be considered concurrently with sections 7.6.6 and 7.5.3 in which IT strategy and how it is expressed through IT project implementation based on IT investments and enterprise architecture is discussed. This section presents the relationships pertaining to the IT sourcing strategy in particular, as depicted below in Figure 7–146. It is important to highlight that the IT sourcing strategy needs to conform to the prescripts of the PFMA and must support the IT strategy. The process of IT sourcing must follow the approved internal sourcing policies and other relevant organisational and public sector-wide supply chain management processes.

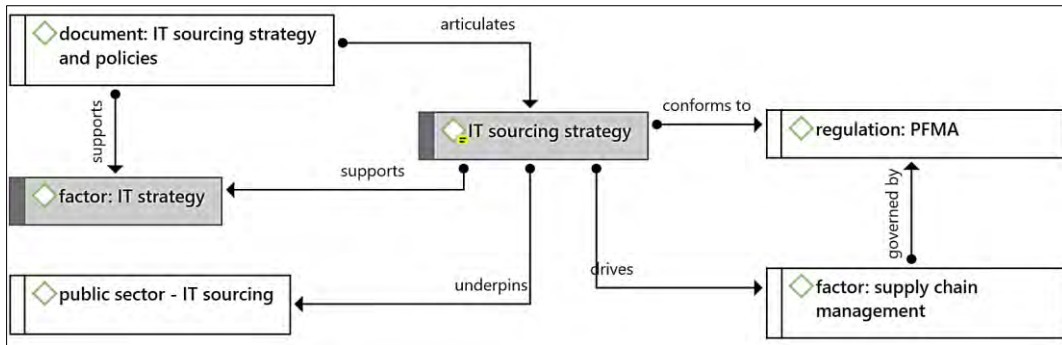


Figure 7–146: IT sourcing code co-occurrences

### 7.6.8.1 *IT sourcing: benefits and challenges*

The benefits and challenges associated with IT sourcing were derived from the data by analysing which benefits co-occur with code IT sourcing strategy and public sector – IT sourcing. The three benefits and one challenge are depicted in a Sankey diagram in Figure 7–147 below.

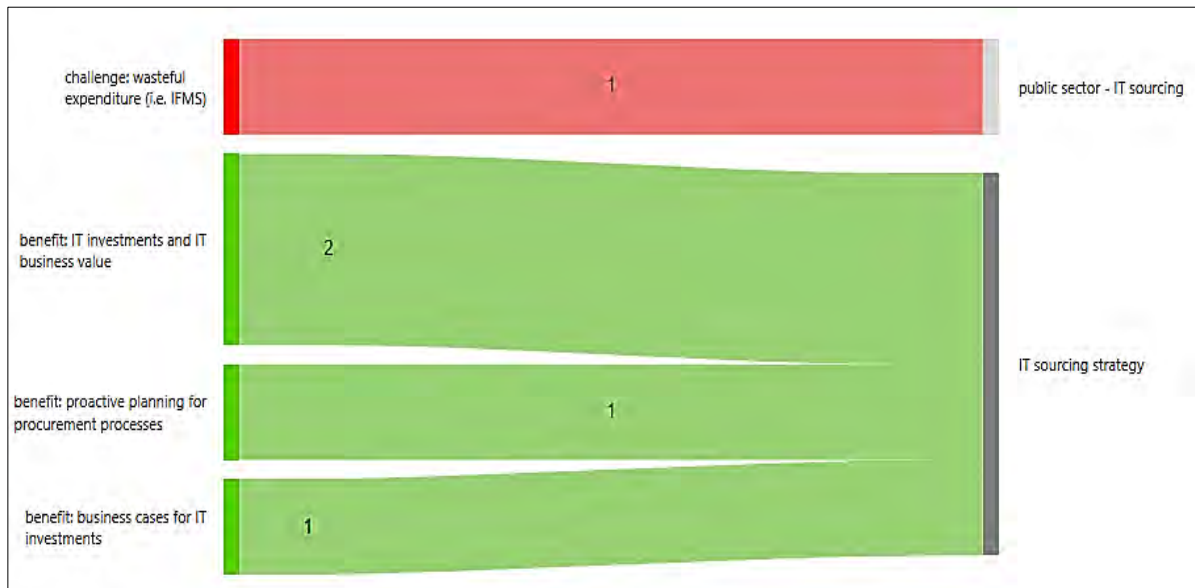


Figure 7–147: Sankey diagram of IT sourcing benefits and challenges

## 7.6.9 Competition

The public sector is characterised by little to no competition among state-owned entities. However, state-owned entities are expected to collaborate with peer entities (i.e. CP3), especially in relation to information sharing, integration, seamless service provision and the single view of the customer (e.g. citizen, regulated entities) for efficient service provision, as depicted in Figure 7–148 below.

The CGICTPF helps to regulate the relationships that case organisations have with collaborating organisations (i.e. CP1), both local and international, by driving the establishment of MOU to define the roles and responsibilities in that relationship (i.e. CP2). The collaborating organisations are peer public sector organisations against which the case organisations benchmark their IT modernisation and service provision and with whom they collaborate to meet their respective mandates. CP3 is comprised of organisations such as the South Africa Reserve Bank (SARB), South African Revenue Services (SARS), Financial Intelligence Centre (FIC), Prudential Authority (PA), Department of Public Service Administration (DPSA), Road Traffic Management Corporation (RTMC), State IT Agency (SITA) and international peer organisations.

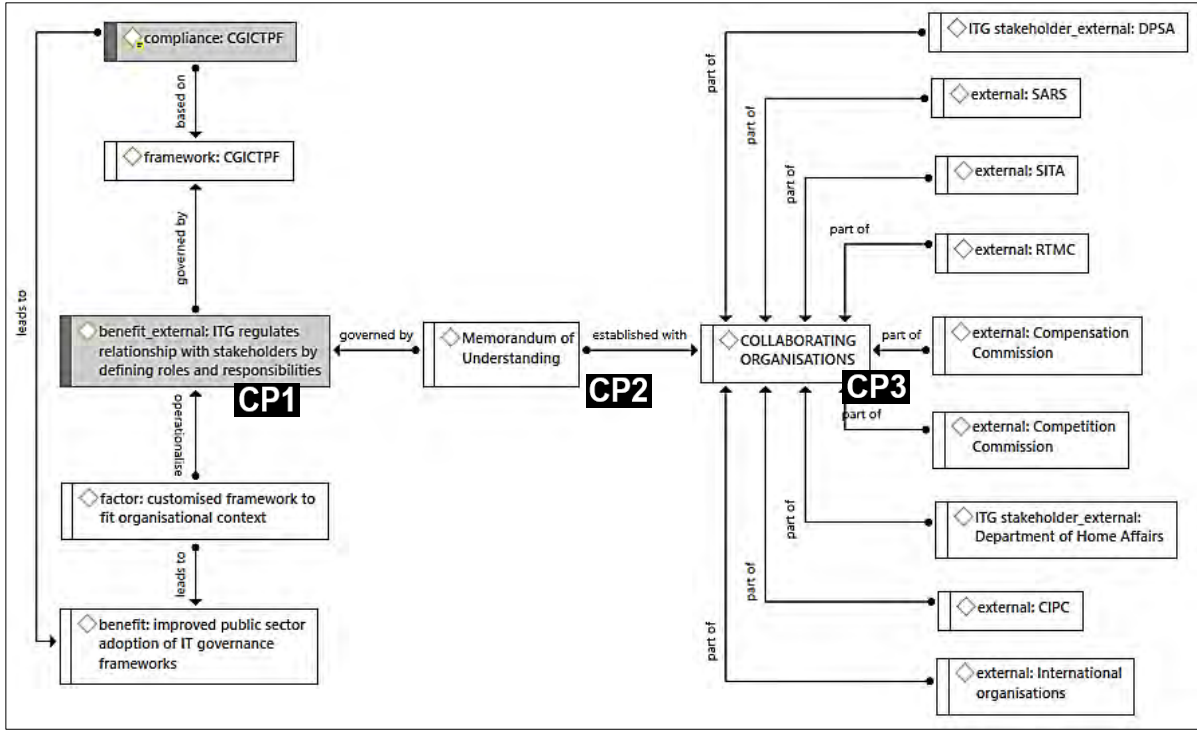


Figure 7–148: Collaborating organisations code group

7.6.9.1 Collaborating organisations: benefits and challenges

The benefits and challenges associated with IT sourcing were derived from data by analysing which benefits co-occur with code CP1. The seven benefits and one challenge are depicted in Figure 7–149 and Figure 7–150, respectively.

	●◇ benefit_external: ITG regulates relationship with stakeholders by defining roles and responsibilities ⑥ 6	
●◇ benefit: improved service delivery through optimal use of resources	⑫ 12	1 (0,06)
●◇ benefit: IT governance supports innovation	③ 3	1 (0,13)
●◇ benefit: organisational learning	① 1	1 (0,17)
●◇ benefit: speaking same language, understanding the why of IT governance	⑦ 7	1 (0,08)
●◇ benefit: stabilise and standardise the IT environment	③ 3	1 (0,13)
●◇ benefit: stakeholder management	② 2	1 (0,14)
●◇ benefit: supplier contracts	③ 3	1 (0,13)

Figure 7–149: Co-occurring benefit codes associated with collaborating organisations

	●◇ benefit_external: ITG regulates relationship with stakeholders by defining roles and responsibilities ⑥ 6	
●◇ challenge: IT governance responsibilities and decision-making not clear	② 2	1 (0,14)

Figure 7–150: Co-occurring challenge codes associated with collaborating organisations

### 7.6.10 IT resources

Refer to section 7.6.1 for a presentation of the results pertaining to IT resources and their impact on service delivery.

## 7.7 RSQ3: How does IT governance adoption and use influence corporate governance in state-owned entities?

### 7.7.1 CGICTPF compliance

As explained, the networks presented here are based on code co-occurrence frequencies and this researcher’s use of links to associate codes based on raw data. This accounts for a much more reliable means of deriving meaning from the data.

#### 7.7.1.1 Compliance

IT alignment to business strategic objectives (i.e. PF1) and complying with best practice (i.e. PF2), as depicted below in Figure 7–151, are associated with the effort made by case organisations to comply to the CGICTPF (i.e. PF4); in turn, compliance with the CGICTPF improves corporate governance (i.e. PF6). This occurrence is aligned to the literature, as discussed in section 3.5, about the drivers of IT governance in the public sector because the

data shows that compliance with the CGICTPF is associated with the two core imperatives for implementing the CGICTPF in the public sector: compliance and strategic alignment.

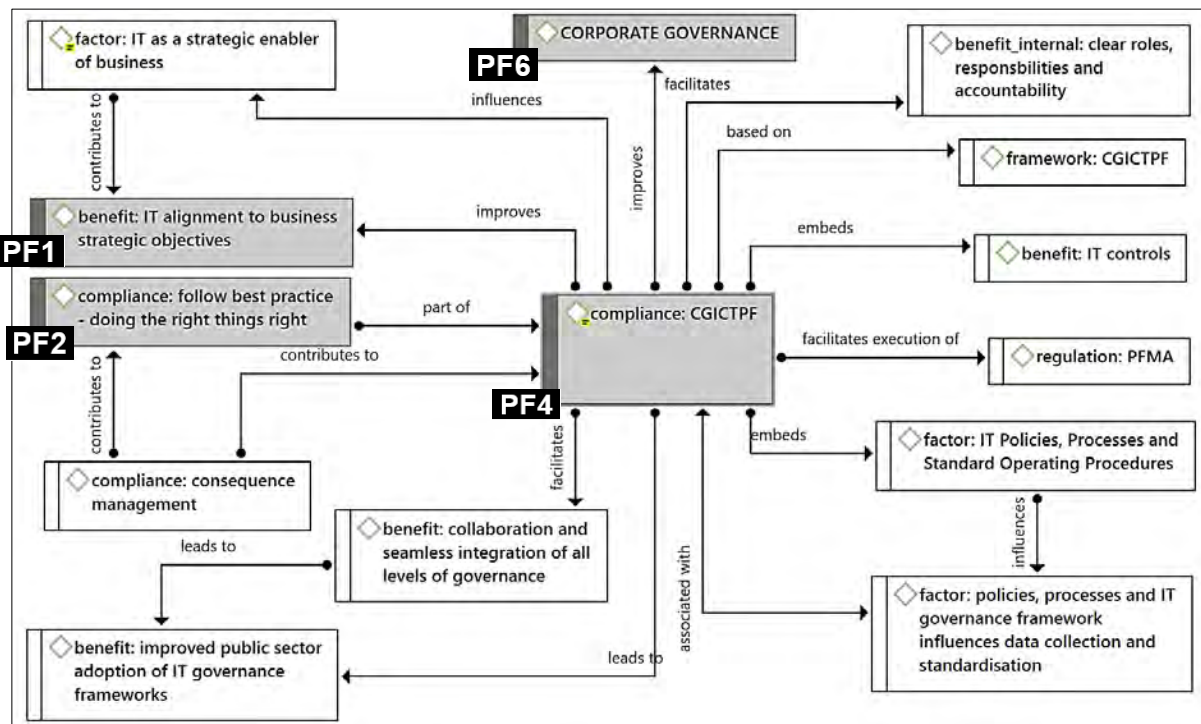


Figure 7–151: CGICTPF compliance code co-occurrences

### 7.7.1.2 Survey data: compliance

Overall descriptive statistics from cases 1 and 2 garnered from the survey show that non-compliance with IT-related governance frameworks, regulations and policies is considered a strategic matter and is reported to the board of directors, with 50% of respondents agreeing and 11% strongly agreeing, as shown below in Figure 7–152. Only 17% of respondents disagreed with this while 22% of respondents neither agreed nor disagreed with the statement.

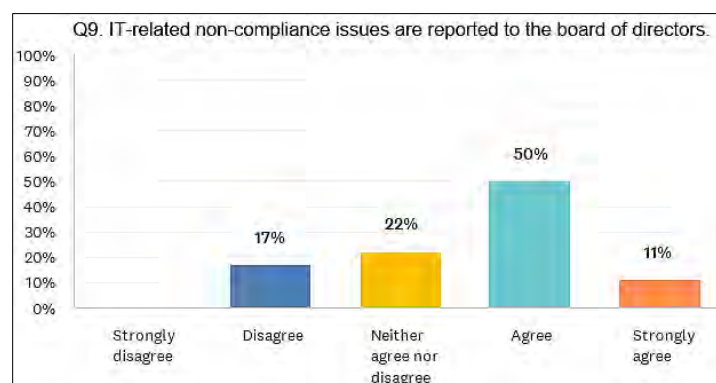


Figure 7–152: IT-related non-compliance reported to the board

### 7.7.1.3 Strategic alignment

A dedicated analysis of PF1 shows that it is a property of the IT ALIGNMENT code group (i.e. PF3), which is a logical grouping of codes related to IT alignment, as shown in Figure 7–153 below. In addition, Figure 7–153 depicts the rest of the associations that correlate to PF1 from code group PF3. This level of analysis of code group PF3 was necessitated by the need to represent all key co-occurrences with PF1, thereby accounting for the appropriate scope of the interview data. The reason for this is that Atlas.ti version 9 does not analyse co-occurrence at the level of the code group, only for individual codes.

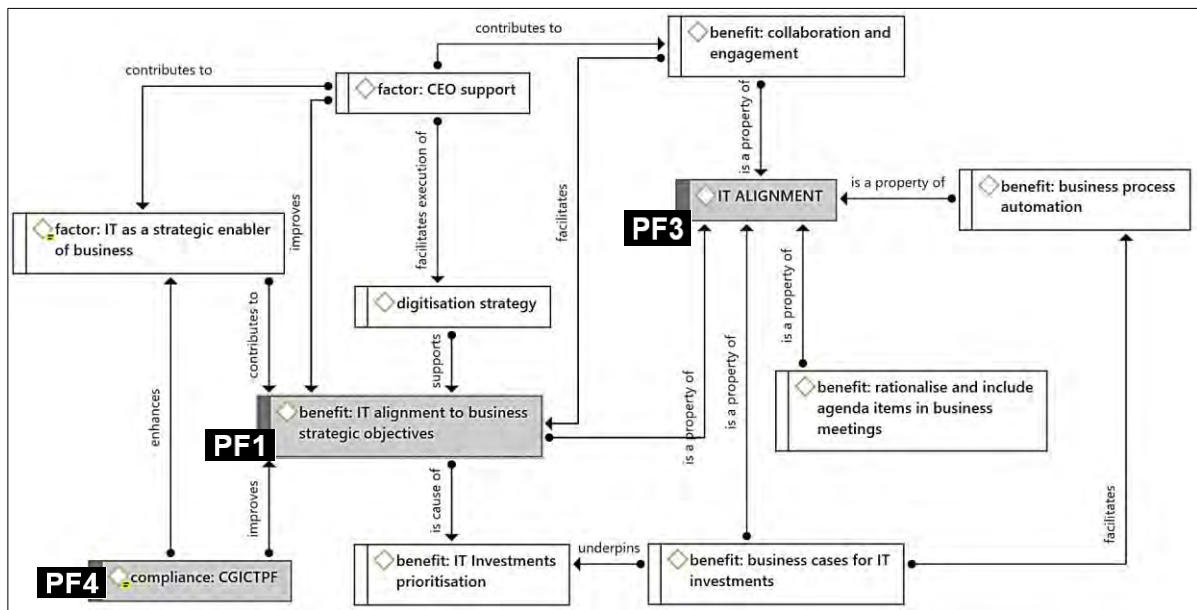


Figure 7–153: IT alignment to business strategic objectives code co-occurrences

In addition, strategic alignment is premised on the case organisations’ IT strategy supporting the business strategy, as depicted below in Figure 7–154. As shown, there are various other strategies that ensue from and support the IT strategy, including data digitisation, content management, IT sourcing, cybersecurity and enterprise architecture strategies.

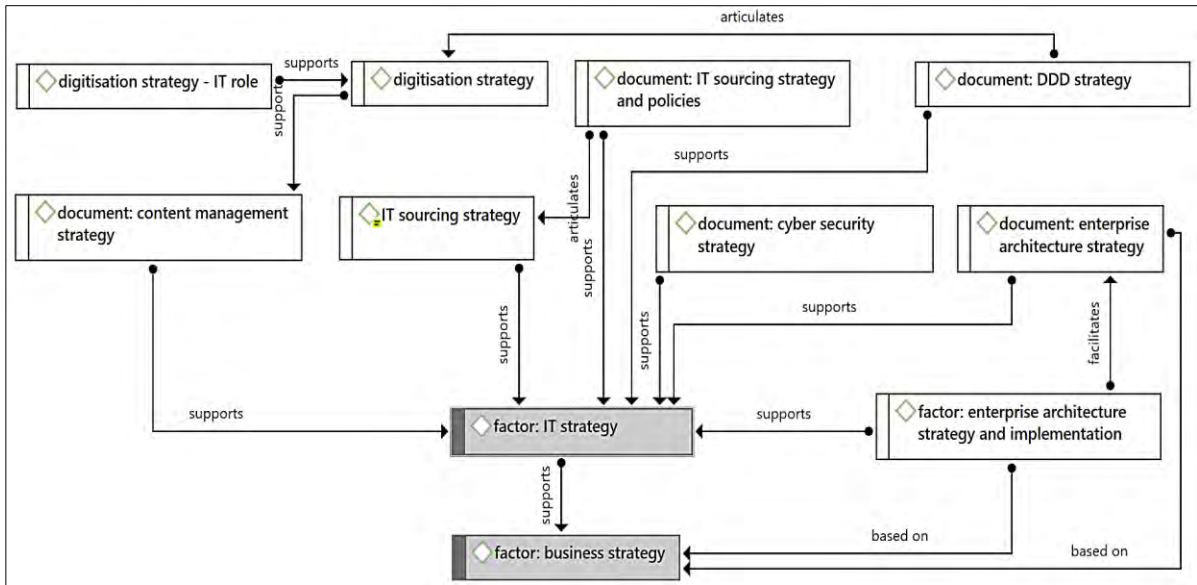


Figure 7–154: IT strategy code group

There is a concurrence between this section and section 7.5.2; as a result, survey data relating to strategic alignment presented in section 7.5.2 applies to this section as well.

7.7.1.4 *CGICTPF compliance: benefits and challenges*

The benefits and challenges associated with compliance with the CGICTPF were derived from the data by analysing which benefits co-occur with code PF4. The 24 benefits and 17 challenges are depicted below in Figure 7–155 and Figure 7–156, respectively.

		● ◇ compliance: CGICTPF ④ 44	
● ◇ benefit: access to information	④ 1	1 (0,02)	●
● ◇ benefit: accurate decision-making	④ 14	4 (0,07)	
● ◇ benefit: accurate monitoring and reporting	④ 13	2 (0,04)	
● ◇ benefit: asset management	④ 4	1 (0,02)	●
● ◇ benefit: business cases for IT investments	④ 6	1 (0,02)	●
● ◇ benefit: business continuity and DR function in place	④ 2	1 (0,02)	●
● ◇ benefit: collaboration and engagement	④ 3	1 (0,02)	●
● ◇ benefit: collaboration and seamless integration of all levels of governance	④ 1	1 (0,02)	●
● ◇ benefit: cyber security	④ 11	3 (0,06)	
● ◇ benefit: improved public sector adoption of IT governance frameworks	④ 1	1 (0,02)	●
● ◇ benefit: improved service delivery through optimal use of resources	④ 12	10 (0,22)	
● ◇ benefit: IT alignment to business strategic objectives	④ 24	10 (0,17)	
● ◇ benefit: IT controls	④ 3	1 (0,02)	●
● ◇ benefit: IT governance drives innovation	④ 3	2 (0,04)	●
● ◇ benefit: IT investments and IT business value	④ 12	6 (0,12)	
● ◇ benefit: IT Investments prioritisation	④ 5	2 (0,04)	●
● ◇ benefit: IT risk management	④ 6	2 (0,04)	●
● ◇ benefit: rationalise and include agenda items in business meetings	④ 3	3 (0,07)	●
● ◇ benefit: resolving IT issues so they do not recur	④ 2	3 (0,07)	●
● ◇ benefit: speaking same language, understanding the why of IT governance	④ 7	4 (0,09)	●
● ◇ benefit: stakeholder management	④ 2	1 (0,02)	●
● ◇ benefit: supplier contracts	④ 3	3 (0,07)	●
● ◇ benefit: turning cost centres into profit centres	④ 2	2 (0,05)	●
● ◇ benefit_external: ITG regulates relationship with stakeholders by defining roles and responsibilities	④ 6	4 (0,09)	●

Figure 7–155: Benefits associated with compliance with the CGICTPF

		◇ compliance: CGICTPF ④ 44	
● ◇ challenge: business process silos	④ 2	1 (0,02)	●
● ◇ challenge: data intelligence not explored	④ 10	1 (0,02)	
● ◇ challenge: ICT steering committee focuses on operational rather than strategic matters	④ 2	1 (0,02)	●
● ◇ challenge: inadequate business process ownership	④ 5	1 (0,02)	●
● ◇ challenge: ineffective IT governance structures	④ 2	1 (0,02)	●
● ◇ challenge: intergovernmental collaboration and data sharing not optimal	④ 4	1 (0,02)	●
● ◇ challenge: IT considered as afterthought	④ 5	1 (0,02)	●
● ◇ challenge: IT governance responsibilities and decision-making not clear	④ 2	1 (0,02)	●
● ◇ challenge: IT projects scope creep	④ 2	1 (0,02)	●
● ◇ challenge: key vacancies not filled	④ 4	2 (0,04)	●
● ◇ challenge: lack of integrated data collection and storage	④ 7	1 (0,02)	●
● ◇ challenge: lack of qualified and experienced staff for roles	④ 6	2 (0,04)	●
● ◇ challenge: lack of understanding the benefit of IT governance	④ 5	4 (0,09)	●
● ◇ challenge: no tool to measure usability of IT services	④ 2	1 (0,02)	●
● ◇ challenge: poor business ownership of IT governance processes	④ 7	1 (0,02)	●
● ◇ challenge: poor staff attitude and morale	④ 7	1 (0,02)	●
● ◇ challenge: wasteful expenditure (i.e. IFMS)	④ 1	1 (0,02)	●

Figure 7–156: Challenges related to compliance with the CGICTPF

### 7.7.2 CGICTPF: continuous use and improvement

The continuous use and improvement of the CGICTPF (i.e. PF5) was cited as being key to successful compliance (i.e. PF4) and improved corporate governance (i.e. PF6), as depicted below in Figure 7–157. This is an important depiction of all the key code relationships that pertain to the code PF5.



		◇ factor: continuous use and improvement ① 16	
● ◇ challenge: IT governance frameworks, charter and standards not updated	① 2	2 (0,13)	●
● ◇ challenge: IT governance not taken seriously at Board level	① 1	1 (0,06)	●
● ◇ challenge: lack of technology savvy executives	① 4	1 (0,05)	
● ◇ challenge: operational firefighting mode, no time for governance planning	① 2	1 (0,05)	●

Figure 7–159: Co-occurring challenge codes associated with continuous use and improvement

## 7.8 Overview of top grounded codes

A total of 238 codes were generated during the coding of interview data; 41 of these codes were benefits and 46 were challenges. This section presents a high-level snapshot of high-ranking codes based on their percentage of groundedness. Groundedness denotes the frequency of code use – the frequency with which codes are linked to quotations from the transcripts of the interview data.

### 7.8.1 Top 30 codes ranked by groundedness

The highest ranked code related to the adoption and use of the CGICTPF is “compliance: CGICTPF”, with a frequency of use of 18,5%. The 30th highest ranked code is “document: enterprise architecture strategy” with a frequency of use of 3,8%, as depicted below in Figure 7–160.

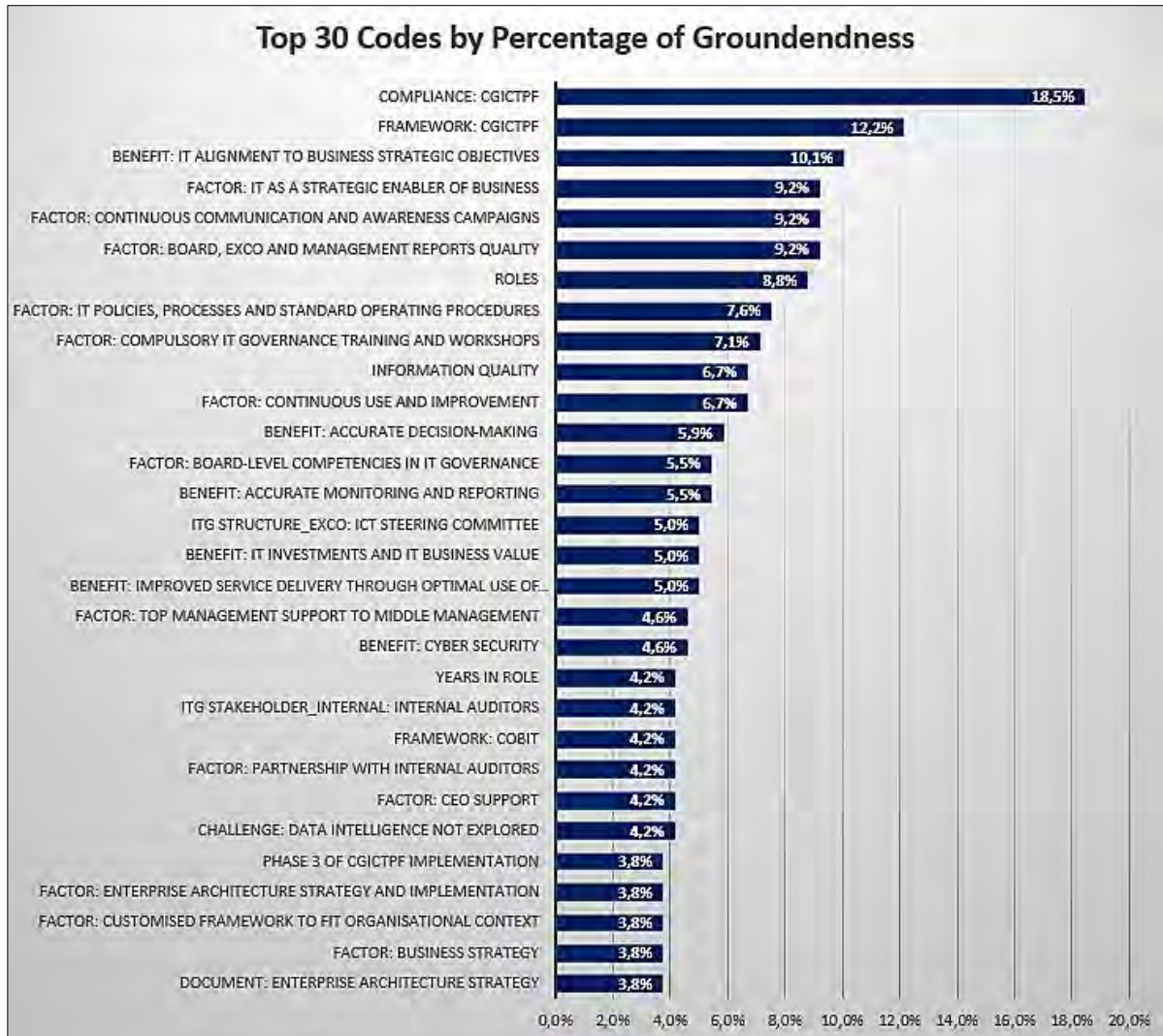


Figure 7–160: Top 30 overall codes ranked by percentage of groundedness

### 7.8.2 Top 30 benefit codes ranked by groundedness

The highest ranked benefit code associated with the adoption and use of the CGICTPF is “benefit: IT alignment to business strategic objectives”, with a frequency of use of 58,5% among the total of 41 benefits codes. The benefit rated in the 30th highest spot is “benefit: business continuity and DR function in place” with a frequency of 4,9%, as depicted below in Figure 7–161.

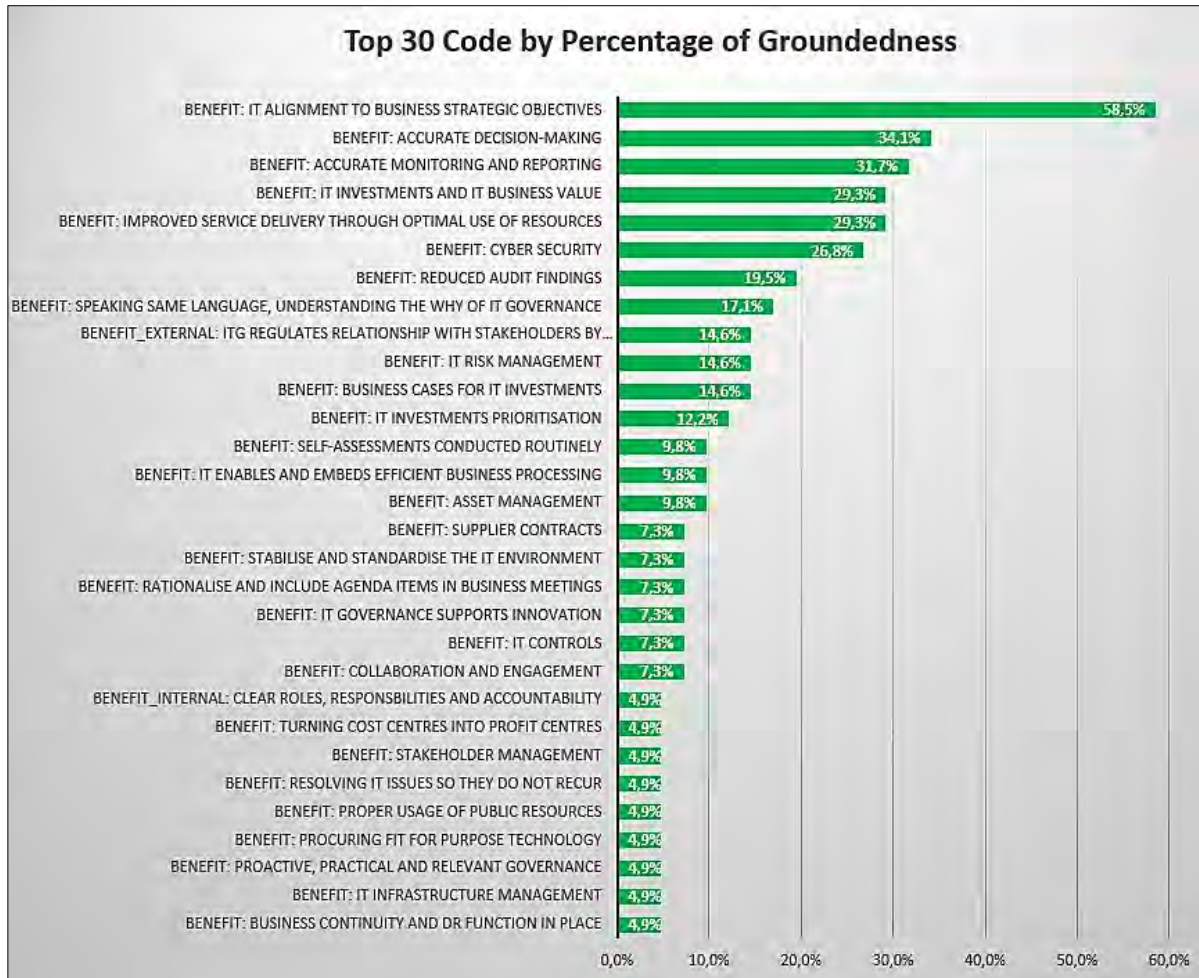


Figure 7–161: Top 30 benefit codes ranked by percentage of groundedness

### 7.8.3 Top 30 challenge codes ranked by groundedness

The highest ranked challenge code associated with the adoption and use of the CGICTPF is “challenge: data intelligence not explored”, with a frequency of use of 21,7% among the total of 46 challenge codes. The challenge rated in the 30th highest spot is “challenge: ineffective IT governance structures” with a frequency of use of 4,3%, as depicted below in Figure 7–162.

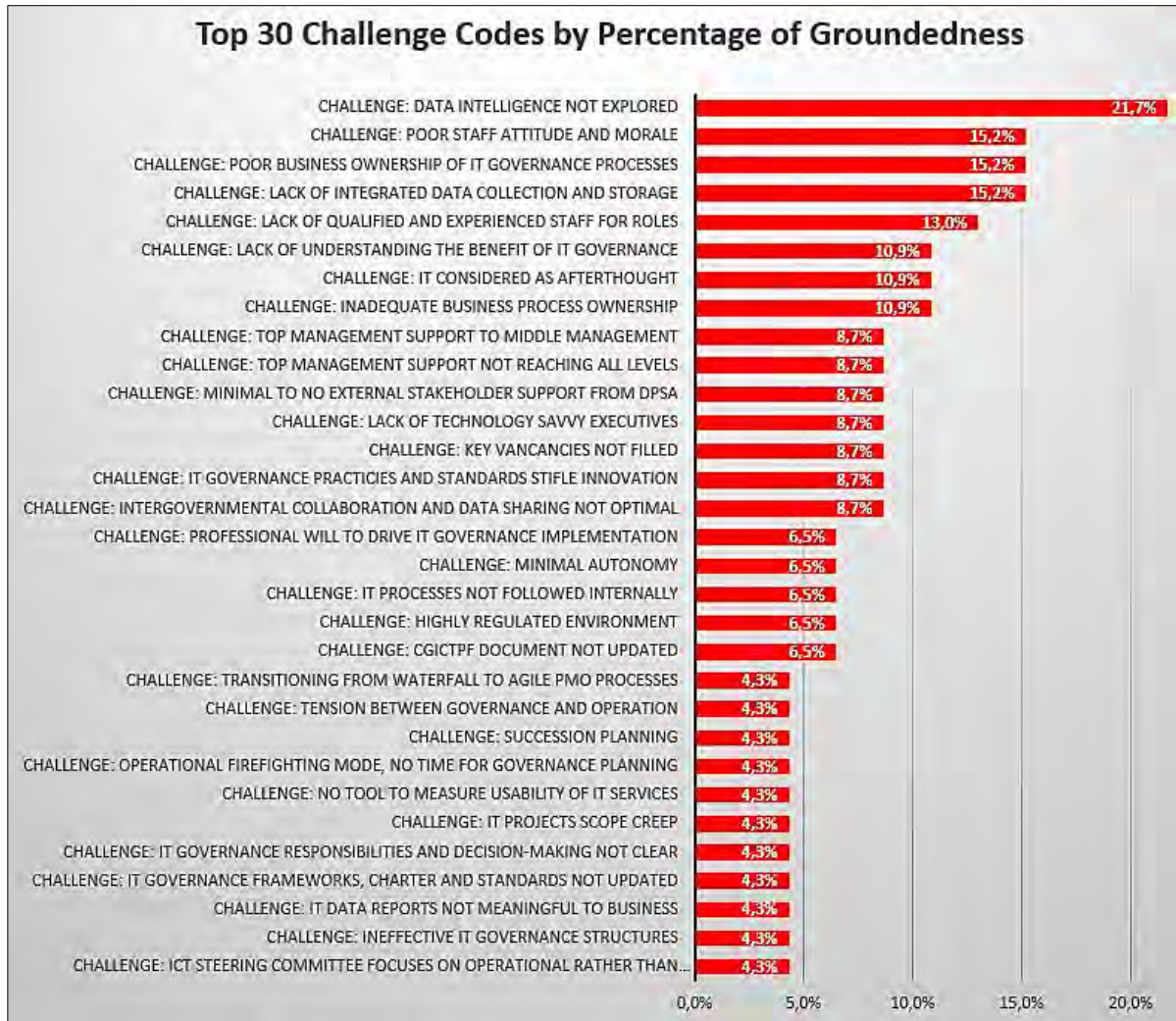


Figure 7–162: Top 30 challenge codes ranked by percentage of groundedness

## 7.9 Conclusion

This chapter presented a comprehensive analysis of the interview and survey data in a triangulated fashion, as depicted in Figure 6–14. The data analysis was arranged according to the three research sub-questions so as to maintain a logical thematic flow of the results and triangulation. The qualitative data from the interviews and the descriptive statistical data from the survey were reported under corresponding themes. The survey data was presented in the form of bar graphs that depict respondents’ answers in percentages based on a Likert scale. The qualitative data from the interviews was presented using network diagrams to visualise the links/relationship among the codes in an accessible manner that assisted in the imperative to build theory from the data.

Networks were explained as essentially comprising nodes and links, where nodes refers to data objects such as codes and code groups and links refers to labels that explicate the symmetric and asymmetric associations between the nodes. The crucial feature of the networks presented in this study is that they are based on code co-occurrence frequencies. The analysis of code co-occurrence frequencies in qualitative data demonstrates a correlation between the codes, and thus enhances the validity and reliability of the networks in drawing inferences from the data.

In relation to research sub-question one (i.e. What are the factors that influence IT governance adoption and use in state-owned entities?), data analysis affirmed the validity of the constructs of the preliminary compliance framework. Further, an emergent construct of organisational culture was identified. Therefore, the factors that were analysed were information quality, governance mechanisms (i.e. structures, processes and relational), top management support, board-level IT governance competencies, IT as a strategic enabler, IT governance stakeholders and consultancy services, and the emergent construct of organisational culture.

In relation to research sub-question two (i.e. How do public sector characteristics affect IT governance adoption and use?), data analysis was based on public sector characteristics adapted from the literature and discussed in section 3.6.1, and specifically identified in Table 3–3. The characteristics were categorised as follows: goals, stakeholders, regulations, incentives, risk, IT innovation, IT competencies, IT sourcing, competition, and IT resources. The “incentives” category was not in scope for this study and no relevant data emerged from the thematic analysis process. The analysis for the rest of the characteristics shows that public value was the goal, and it is associated with the appropriate use of public resources, including IT resources, to deliver services; the stakeholders category concurs with the IT governance stakeholders presented in section 7.5.8; regulations influenced the IT policies, processes and procedures and governance frameworks; IT risk management was based on the organisations’ ERM framework; IT innovation was encouraged by IT governance and was concurrent with section 7.5.3.4 as IT innovation is expressed through IT projects which are motivated using business cases and are based on enterprise architecture; IT competencies dealt with the IT governance competencies, which form the scope of this study, and data was presented in section 7.5.6; IT sourcing also concurs with sections 7.6.6 and 7.5.3 wherein IT strategy and how it is expressed through IT project implementation based on IT investments and enterprise

architecture; in terms of competition, the public sector is characterised by little to no competition among state-owned entities. However, state-owned entities were expected to collaborate with peer entities; and IT resources concurs with section 7.6.1, as IT resources contribute to service delivery.

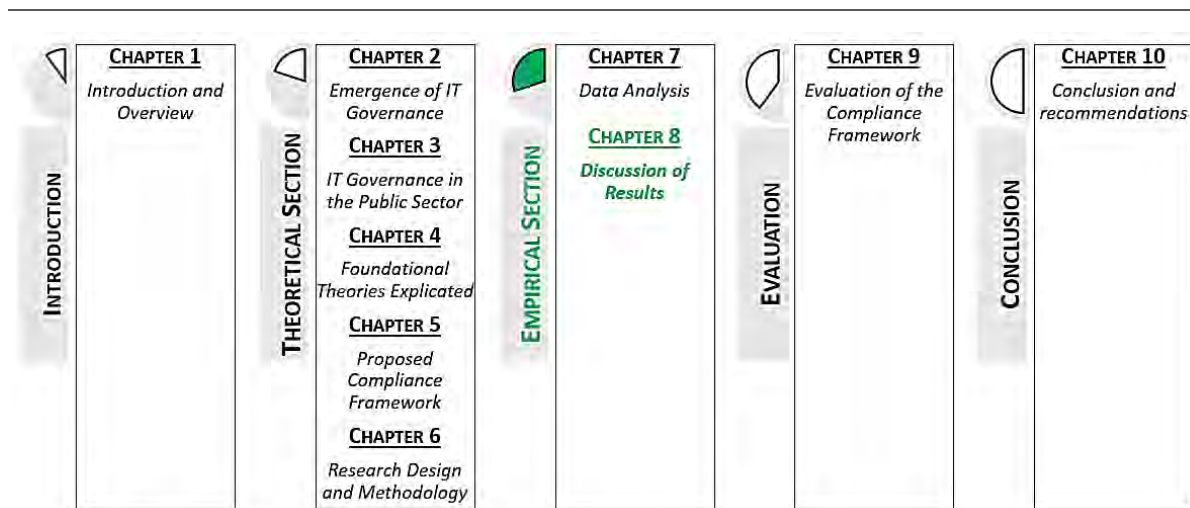
In relation to research sub-question three (i.e. How does IT governance adoption and use influence corporate governance in state-owned entities?), the data affirms that CGICTPF adoption and use are driven by regulatory compliance and strategic alignment imperatives. In addition, continuous use and improvement had a positive impact on corporate governance.

Finally, in all sections in this chapter, benefit and challenge codes that co-occur with the factor codes were presented to enrich the understanding of the adoption and use of the CGICTPF. Further, a top 30 snapshot of the codes generated in the interview data was presented in relation to the top 30 overall codes, top 30 benefit codes and top 30 challenge codes. The codes were ranked by frequency of use. The top-ranked overall code was “compliance: CGICTPF”, the top-ranked benefit code was “benefit: alignment to strategic objectives”, and the top-ranked challenge code was “challenge: data intelligence not explored”.

The next chapter draws from the extant literature and theory and integrates, compares and contrasts them with the analysis presented in the current chapter.

# 8

## Discussion of Results



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## 8.1 Introduction

This chapter presents a synthesis of the empirical and theoretical analyses. It should be noted that the theoretical analyses presented in Chapters 2, 3 and 4 led to the development of the preliminary compliance framework in Chapter 5. The theory from the literature triangulates with the empirical analysis in Chapter 7, since the empirical analysis is structured according to the research sub-questions and the framework constructs. Consequently, the basic structural configuration of this chapter follows from the propositions associated with each of the framework constructs that were introduced in Chapter 5.

The introductory sections under each proposition precede the discussion on findings and provides for a brief review of the literature relating to the proposition in question.

## 8.2 Research questions, framework constructs and propositions

This study answered the following main research question:

*How should IT governance adoption and use be enhanced by state-owned entities in South Africa?*

Three sub research questions include:

- (a) What are the factors that influence IT governance adoption and use in state-owned entities?
- (b) How do public sector characteristics affect IT governance adoption and use?
- (c) How does IT governance adoption and use influence corporate governance in state-owned entities?

Table 8–1: Mapping of research questions to preliminary framework constructs and propositions

<b>RESEARCH QUESTIONS, PRELIMINARY FRAMEWORK CONSTRUCTS AND PROPOSITIONS</b>			
<i>Title</i>	<i>Research Question</i>	<i>Construct</i>	<i>Proposition</i>
<b>Main Research Question</b>	<b><i>How should IT governance adoption and use be enhanced in state-owned entities in South Africa?</i></b>		
Research Sub-Question (RSQ) 1	What are the factors that influence IT governance adoption and use in state-owned entities?	1. Information quality	P1: The quality of management information is positively related to IT governance use.
		2. Governance mechanisms	P2: Formalised governance mechanisms in the organisation positively influence IT governance use.
		3. Top management support	P3: Top management support is positively related to IT governance use.
		4. IT governance competencies	P4: Board-level IT governance competencies are positively related to IT governance adoption and use.
Research Sub-Question (RSQ) 2	How do public sector characteristics affect IT governance adoption and use?	5. IT dependency	P5: The organisation's strategic mode of IT dependence is positively related to IT governance use.
		6. External stakeholder and consultancy services support	P6: Support from external stakeholders and consultancy services is positively related to IT governance use.
Research Sub-Question (RSQ) 3	How does IT governance adoption and use influence corporate governance in state-owned entities?	7. IT governance adoption and use	P7: IT governance adoption and continuous use contributes positively to corporate governance.

As shown in Table 8–1, all of the sub-questions are accounted for in the preliminary compliance framework constructs, from which the propositions derive. Therefore, in this empirical analysis key findings are discussed as they relate to each proposition:

### **8.3 Discussion pertaining to P1: *The quality of management information is positively related to IT governance use.***

Information is a critical organisational resource, and information quality makes it possible for decision-makers to make high-quality decisions using information that is accurate, current,

relevant and complete (Batini and Scannapieco, 2016). *Accuracy* refers to “the extent to which information is correct and reliable” measure which is adapted from the intrinsic dimension (ISACA, 2019, p.42). *Currency* refers to “the extent to which information is sufficiently up to date for the task at hand”, *relevancy* refers to “the extent to which information is applicable and helpful for the task at hand” and *completeness* relates to “the extent to which information is not missing and is of sufficient depth and breadth for the task at hand” measures, which are adapted from the contextual dimension (ISACA, 2019, p.42). All these measures are aligned to section 16 of the Protection of Personal Information Act (PoPIA) 4 of 2013 (see section 5.2.1).

### **8.3.1 Key findings**

#### **8.3.1.1 Finding 1: *Business intelligence and data analytics capabilities should be adequately exploited to improve strategic decision-making based on accurate, timely, relevant and complete information***

Both case organisations have adopted data-centric strategies to digitise and streamline business processes in order to optimise the use of data for decision-making purposes. Case 1 drives the e-enablement strategy by modernising and integrating the outdated paper-based claims management system into a new Integrated Claims Management System (ICMS) that digitises the claim initiation and management process. The ICMS is also intended to seamlessly interface with systems from relevant collaborating organisations. Case organisation 2 drives a data-driven digital (DDD) strategy in support of the business strategy. The core objectives of the DDD strategy include business intelligence and data analytics, the use of cloud services and disruptive technologies (i.e. RegTech and SupTech), customer self-service and channels for customer engagement, as well as cybersecurity and resilience.

The idea is to integrate seamless service support and embed the optimal use of business insights and analytical decisions based on the advanced analysis of client and consumer data, which is currently not the case. The manual paper-based and siloed claim processing is prone to human interference and erroneous data accumulation. Similarly, an abundance of data is collected from regulated entities but never utilised optimally to draw intelligence using data analytics. However, the adoption of these strategies itself signals the strategic intent of exploiting organisational capabilities related to business intelligence and data analytics to

improve strategic decision-making based on accurate, timely, relevant and complete information.

**8.3.1.2 Finding 2: *Adherence to IT policies, processes and SOPs embeds information quality***

There is recognition that the quality of information in key board and management reports, on which key decisions are based, is also influenced by implementing policies and SOPs that are aligned to the CGICTPF and recognised industry standards such the Data Management Association's (DAMA) Data Management Body of Knowledge (DMBOK). Relevant IT policies, processes and SOPs are implemented to embed data collection processes and standardisation. In turn, this enhances the accuracy, timeliness, completeness and relevance of reporting on targets defined in the annual and divisional performance plans that are approved by the board of directors.

Further, compliance with IT policies, processes and SOPs reduces audit findings as policies are clearly designed and communicated. The key aspect of a policy lifecycle includes the approval process, where policies are categorised according to the materiality and scope of their organisational impact. Category A (i.e. overall organisational scope) policies are approved at board level, category B (regional scope) policies are approved at the CEO level and Category C (departmental scope) policies, processes and procedures are approved at the CIO level. Therefore, the change management and education programmes, extended through communiques and workshops, are necessary to improve employee understanding of the value and objectives of IT governance, to embed the IT governance practices in the daily operations and to enhance the business ownership of IT governance processes. This must be consistently applied in order to be effective.

The challenging aspects include a lack of automated tools to measure metrics such as the usability of IT services beyond the availability of such services.

**8.3.1.3 Finding 3: *Poor business process integration at organisational and sector levels compromises the quality of information***

Both case organisations experience a degree of poor business process integration at organisational (i.e. between internal business units/departments) and sector (i.e. with collaborating organisations) level. As an example, the data collected from regulated entities

by various departments within Case 2 is the same in some instances. Owing to the siloed approach of the departments, which is a legacy problem, this data remains duplicated and never consolidated to provide a single view of the regulated entities. This duplication also translates itself to board and management reports from the different departments. In an effort to mitigate this problem, Case 1 has established a centralised reporting assurance function that consolidates and performs quality verifications on reports intended for the board of directors from the various business units, specifically for reports relating to organisational performance targets.

Similarly, both case organisations experience poor integration with their external collaborating organisations when they receive or provide data for further processing. For example, in order to process the claims of accident victims, Case 1 needs to interface with the Department of Home Affairs (to confirm the victim's personal identity), the South African Police Service (to confirm the accident details and case details) and the Department of Health (to confirm the extent and nature of injuries). This collaboration is conducted manually, and the data remains vulnerable to human interference owing to inadequate security surrounding the data. The lack of integrated data collection and storage has a significant negative impact on service delivery.

### **8.3.2 P1 summary**

Compliance with the CGICTPF is positively associated with the setting of IT policies that improve the levels of information quality. Therefore, whereas P1 is affirmed in terms of design, it is not consistent or effective in practice. Recommendations for practice aim to address the issue of ineffective application in practice.

## **8.4 Discussion pertaining to P2: *Formalised governance mechanisms in the organisation positively influence IT governance use***

The three governance mechanisms include (1) decision-making *structures* such as committees, teams and specific roles that are responsible for making IT-related decision in the organisation; (2) alignment *processes* such as formalised IT investment proposals, EA processes, and SLAs that provide input to decision-makers based on approved IT policies; and (3) *relational mechanisms* that involve the organisational communication channels to disseminate IT-related decisions and policies (Van Grembergen, De Haes and Guldentops,

2004; Weill and Ross, 2004; De Haes and Van Grembergen, 2009; 2015b) (refer to section 3.3.5).

## **8.4.1 Key findings**

### **8.4.1.1 Finding 4: *Key organisational IT governance structures require a strategic outlook to be effective***

The case organisations have taken context into account and established IT governance structures at the board of directors and executive management level. The board of directors and top management extend support to lower levels through these IT governance structures, meaning that poor board or top management support signifies a lack of or dysfunctional IT governance structures. It was found that governance structures (i.e. Audit and Risk Committee, Operations and IT Committee) at the level of the board of directors were properly constituted and had IT as a standing agenda item. However, there was a disconnect between the board of directors and middle management, as evidenced by the high and frequent “neither agree nor disagree” responses in relation to the board of directors’ functions. This problem can be associated with two critical sub-problems: (1) the communication of decisions and delegated strategic objectives by the board of directors to the lower levels of management that must execute them is poor, and (2) the issue of instability at the board level makes it difficult for the board to focus on its fundamental fiduciary duties.

At the level of executive management, the EXCO and IT Steering Committee were also found to be properly constituted (e.g. the IT Steering Committee structure comprises all executive managers with the exclusion of the CEO, sits quarterly and is chaired by the Chief Operations Officer – also designated as the Governance Champion as recommended by the CGICTPF) and involved in IT decision-making, including IT investment prioritisation. However, this level was beset by problems related to key vacancies not being filled and poor IT governance competencies – resulting in poor staff morale in lower-level structures. The lack of skills at this level contributes to the operational (instead of strategic) focus, where executive and middle managers were consumed with firefighting problems rather than planning and monitoring performance in pursuance of service delivery objectives.

In addition to the board- and executive-level governance structures, it was noted that tactical and operational-level governance structures are also crucial for operationalising IT governance practices. The EA committee is one such operational-level structure, bringing

together IT and business participants, and is intended to foster operational IT alignment between IT and business. However, functionally, EA is not correctly understood or placed. Although EA is not an IT function, as is misconstrued in some organisations, but a business function, it is nonetheless driven by the IT personnel and reports functionally to the CIO.

The combination of this and the perception that business representatives in other key governance structures such as the IT Steering Committee are not technologically savvy, precipitates the irregularities of (1) a lack of business ownership of IT governance processes and (2) IT dictating to business what to do and what investments to make – thereby opening a window for corrupt IT leaders to tailor tender specifications to suit preferred bidders, while the support of business objectives remains a distant subordinate intent. Further, the IT Steering Committee can be bogged down in operational matters, leaving insufficient time to perform their directing and oversight functions. For example, strategic direction in relation to IT sourcing was regarded as low. This may mean that there is inadequate oversight in relation to IT sourcing decisions and the use of IT resources, skills and infrastructure – which is also an issue that is associated with insufficient board-level IT governance competencies (see section 8.6.1.1).

All IT governance structures are constrained by regulatory prescripts which inhibit business agility and make for an environment with limited autonomy, where key decisions must go through the slow government bureaucracy for endorsement before implementation.

#### **8.4.1.2 Finding 5: *The role of the CIO needs to be dynamic, multifaceted and fluent in business strategy***

The role of the CIO is integral to the adoption and use of IT governance. The IT organisational structures for both case organisations were primed to meet the organisations' operational business needs and strategic objectives, modelled on the principle of Plan, Build, Run and Monitor. Case 1 organisation has the following roles reporting to the CIO: IT Strategy and the Project Management Office (PMO) (with the subdivisions Strategy, PMO, Budget Man, IT Sourcing and Contracts Management; Business Analysis, Enterprise Architecture, Process Management), Application Development and Modernisation (with the subdivisions Application Development & Business Intelligence; Infrastructure Development and Business Continuity Management; IT Operations) and Information Security, IT Risk and Governance (with the subdivisions Information Security; IT Risk and Governance; Records Management;

IT Service Continuity). Case 2 organisation has the following roles reporting to the CIO: the PMO, ICT Applications and Operations, Data Analytics, ICT Security, Enterprise Information Governance, and ICT Governance, Risk and Compliance.

The new leadership role of the CIO is dynamic and encompasses the incumbent

- being a communicator, teacher and chief evangelist of the CGICTPF and IT policies, processes and SOPs throughout all levels of the organisation. CIOs drive the effective communication process using all channels such as the intranet, email and governance structures – this includes such using their duty of presenting reports to the EXCO and board, including their relevant subcommittees, to advance their communication agenda relating to the CGICTPF and IT policies. The CIOs with the help of the Governance Champion should also drive the inclusion of clearly defined IT governance-related KPIs in (1) the performance contracts of all executive and senior management, and (2) SLAs with suppliers;
- demonstrating experience as the link between the EXCO and the board in terms of articulating business-related IT matters. Therefore, CIOs have to be fluent in business strategy and speak the language of business in order to influence their peers in the business; in both case organisations it was noted that business leaders were not fluent in IT strategy and concepts;
- building strong relationships with internal and external stakeholders. CIOs build relationships to advance the strategic objectives of the organisation. They use formal governance structures to advance relationships with stakeholders; engagement models with all key stakeholders should be formalised;
- facilitating peer reviews of IT organisations by collaborating with organisations in the public sector and benchmarking IT service provision quality against peer organisations in the public sector both locally and internationally. This aspect has the potential to mitigating poor intergovernmental collaboration and data sharing;
- enforcing IT governance training for all IT staff through the use human resource (HR)-related mechanisms. CIOs use HR mechanisms by including training as a staff development tool in line with employees' performance contracts. This is important for holding employees accountable for IT governance practices and instituting consequence management where performance targets indicate non-compliance;

- consulting with all relevant stakeholders on key business-related IT decisions. The CIO consults the IT governance officer to embed IT governance practices. The CIO further consults with the internal auditors who are also key IT governance partners as they assist the CIO with ad hoc reviews on request and provide an opinion on key internal processes beyond the audit year plan.

One of the case organisations' CIOs was suspended and later released from his duties during the course of the data collection process of this study. This highlights the serious problem of fluidity of leadership tenure in state-owned entities, which leaves a void in terms of driving the aspirations attendant to this role as empirically shown. With the frequent leadership changes come new perspectives and different priorities, rendering the effort to implement programmes sustainably difficult, and IT governance adoption and continuous use are undermined and regress.

#### 8.4.1.3 **Finding 6: *A dedicated IT governance officer role is crucial for driving IT governance practices***

Both case organisations have a senior role of IT governance officer that reports directly to the CIO. This is a strategic role intended to support the CIO in the design and implementation of IT governance, risk and compliance strategy. The function of this role also includes embedding IT governance practices by defining IT policies; assisting with the building of relationships, and an engagement model, with internal and external auditors; identifying organisational IT risks (including information security and IT service continuity) and mitigation strategies through a well-defined IT Risk Universe in line with the ERM framework; conducting periodic control self-assessments; supporting IT governance maturity assessments by independent assurance providers; participating in governance structures and presenting reports as required.

#### 8.4.1.4 **Finding 7: *The practice of benefit realisation should ensue from the underpinning use of business cases, prioritisation of IT investments and enterprise architecture***

The PFMA and related Treasury Notes prescribe the manner in which sourcing must be conducted by state-owned entities. Business strategic objectives must underpin the justification of IT-related procurement in the form a business case for all IT investments and projects. A dedicated Project Management Office (PMO) in both case organisations runs projects and programmes according to governance frameworks such as PMBOK and Prince2,

which require the establishment of a project steering committee for each project. In addition, compliance with the prescripts of the CGICTPF, in alignment with the PFMA, enhances corporate governance by demanding that a competent IT governance structure such as the IT Steering Committee must prioritise IT-related investments using business cases, and that all new acquisitions and development projects must be approved by the EA committee on which business and IT are represented. It should be noted that the PFMA defines the delegation of authority for accounting officers in the approval of procurement deals based on the recommendation of a properly constituted bid adjudication committee.

However, the actual benefit realisation from IT investments scored high where respondents indicated they were uncertain about it. Therefore, this translates to the practice of benefit realisation not being effectively implemented in practice.

#### **8.4.2 P2 summary**

Formalised governance mechanisms positively influence IT governance use; however, the data shows that there are weaknesses in the way the governance mechanisms are functioning. Therefore, whereas P2 is affirmed in terms of design, it is not consistent or effective in practice. Recommendations for practice aim to address the issue of ineffective application in practice.

### **8.5 Discussion pertaining to P3: *Top management support is positively related to IT governance use***

The success of IT governance adoption and use in state-owned entities depends on top management's active involvement in the decision-making processes that influence IT-related investments and continuous compliance with IT governance practices (Turedi and Zhu, 2019; Zhen, Xie and Dong, 2021). Top management support denotes the actions of top officials in harnessing IT to produce public value, and it is identifiable in practices such as the willingness to understand and articulate the business-related benefits of IT solutions; making IT investment decisions; training employees (Gangwar, Date and Ramaswamy, 2015); understanding the critical role IT plays in their organisation; having sufficient IT knowledge; and actively participating in key IT-related activities in their organisations (Zhen, Xie and Dong, 2021).

Top management support is identifiable as (Zhen, Xie and Dong, 2021) the CEO spearheading the setting up of the relevant organisational structures necessary to involve business and IT management in sharing the responsibility for making IT-related decisions, including the implementation of the CGICTPF; the CIO reporting directly to the CEO so as to be able to articulate IT-related matters in a language that business management understands (which facilitates greater alignment between business and IT as business is more inclined to buy into IT-related investments); collaboration between internal departments and structures to improve business and IT alignment at process-level and engender the transfer of knowledge among employees.

### **8.5.1 Key findings**

#### **8.5.1.1 Finding 8: *IT sourcing decisions are effective when there is collaboration between business and IT***

IT sourcing decisions are effective when there is collaboration between business and IT. Business management ownership of relevant IT governance processes is critical in order to avoid corruption related to IT investment and sourcing decisions.

#### **8.5.1.2 Finding 9: *Top management buy-in should precede top management support, and both are contingent on top management IT governance competencies***

Top management support provides the impetus for IT governance structures and lower management to implement the CGICTPF and operationalise IT policies. However, top management themselves must first be convinced of the value of IT governance in order to be able to articulate it and its demands to lower structures. This is dependent on the level of their IT governance understanding and competencies. It has been noted that top management IT governance competencies and IT savvy are not optimal, which has negative implications for CGICTPF adoption and use.

### **8.5.2 P3 summary**

While top management support takes place, the data shows that there are inconsistencies in how it is applied in practice. Therefore, whereas P3 is affirmed in terms of design, it is not consistent nor effective in practice. Recommendations for practice aim to address the issue of ineffective application in practice.

## **8.6 Discussion pertaining to P4: *Board-level IT governance competencies are positively related to IT governance adoption and use***

IT governance is a strategic issue and is the responsibility of the board of directors which delegates to executive management, therefore the members of the board of directors are compelled to cultivate the requisite IT governance competencies (ISACA, 2012; Caluwe et al., 2021). IT governance competencies at the level of the board of directors cover “skills, knowledge and experience to govern technology for strategic advantage and firm performance”; “making technology decisions and governing risk”; “using technology to achieve returns and demonstrate value” (Valentine and Stewart, 2015). To exploit IT competencies effectively and efficiently, the board must implement and participate meaningfully in board-level IT governance mechanisms (Caluwe et al., 2021)

### **8.6.1 Key finding**

#### **8.6.1.1 Finding 10: *IT governance competencies and training at the level of the board of directors remain deficient but are crucial for driving digital transformation and oversight***

The boards of directors are accountable for the organisations generating public value in the form of service delivery. In doing so, the boards must drive compliance with the CGICTPF and corporate governance, being mindful of the regulatory prescripts that stipulate their decision-making powers. Notwithstanding the notion that regulatory compliance and state bureaucracy limit the autonomy of the board in making decisions in a manner that responds expeditiously to changes in its operating environment, there is a need to undertake aggressive digital transformation to meet the needs of the citizenry. This highlights the innovation challenge as IT governance standards and practices are considered to stifle innovation. However, it is believed that these governance processes do not stifle but rather encourage innovation by safeguarding public assets from corruption and misappropriation. Therefore, the boards need to improve their competencies through ongoing training in order to skilfully navigate the perennial industry-neutral tension between corporate governance, business strategy and innovation.

Competent board-level committees (i.e. Operations and IT Committee, Risk and Audit committee) provide an accountability and oversight mechanism for such IT investments and sourcing decisions. Building the requisite skills and competencies carries the potential benefit

of board members asking the right questions of management, and thereby making accurate decisions that lead to accelerated digital transformation. IT governance competency levels are ranked low, and training levels are also poor in both case organisations, giving the impression of IT governance not being taken seriously enough at the board level. In addition, the IT governance frameworks, charter and standards had not been reviewed or updated in the preceding twelve months of this study, blunting the organisation's ability to set the appropriate tone at the top and enable a proactive governance environment.

All the IT governance structures from the level of the board of directors downwards were found to be beset by poor levels of IT governance competencies, hence the problems of operational rather than strategic focus and poor stewardship of IT resources and investments in state-owned entities. In an attempt to resolve this problem of poor levels of competencies, which is exacerbated by vacancies not being filled, organisations undertake skills audit initiatives – a concept that is, in itself, an admission of strategic failure by the board of directors (see section 8.6.1.1). These skill audit initiatives have not been effective, instead they have been used in the past to target and victimise those who were not favoured.

### **8.6.2 P4 summary**

There is recognition of the positive impact of adequate board-level IT governance competencies, but data shows that there were inadequate and low IT skills among board members and a high need for IT governance training to improve competencies. Therefore, whereas P4 is affirmed in terms of design, it is not consistent or effective in practice. Recommendations for practice aim to address the issue of ineffective application in practice.

## **8.7 Discussion pertaining to P5: *The organisation's strategic mode of IT dependence is positively related to IT governance use***

There are four modes that describe organisational IT dependency, which are spread across the two approaches: the support mode and factory mode (both under the defensive approach); and the turnaround mode and strategic mode (both under the offensive approach) (McFarlan and Nolan, 2005; Héroux and Fortin, 2014). Organisations in *support mode* are not strategically dependent on IT for business operations and can quickly revert to manual procedures, while those in *factory mode* are much more dependent on IT for business operations but are unambitious when it comes to its strategic use and do not proactively seek to gain competitive

advantage from IT use (McFarlan and Nolan, 2005; Héroux and Fortin, 2014). Organisations in *turnaround mode* are typically involved in a strategic transformative process through significant system(s) implementation and expect the new systems to change their business operations in ways that will cut costs and increase competitive gains (McFarlan and Nolan, 2005; Héroux and Fortin, 2014). The *strategic mode* is desirable for state-owned entities as it requires dependable systems as well as the pursuit of emerging technologies to hold or advance their competitive positions (McFarlan and Nolan, 2005; Héroux and Fortin, 2014).

Board members and management of state-owned entities need to recognise their organisation's IT dependency mode in order to be able to implement the appropriate IT governance structures, processes and relational mechanisms. Of the four modes of IT dependency (see section 5.2.5) the strategic mode was deemed desirable for state-owned entities as it requires dependable systems as well as the pursuit of emerging technologies to hold or advance their competitive positions.

### **8.7.1 Key findings**

#### **8.7.1.1 Finding 11: *IT should be regarded as a strategic enabler***

It was found that the more the organisation considers IT to be a strategic partner of business objectives, the more it was inclined to comply with the IT governance framework. It was further found that in state-owned entities this complements the notion that organisations implement IT governance to comply with the imposed CGICTPF regulation. Consequently, the CGICTPF is driven by both regulatory compliance and strategic alignment imperatives.

#### **8.7.1.2 Finding 12: *The maturity of strategic IT utilisation should be optimal in state-owned entities***

Compliance with the CGICTPF enhances the use of IT as a strategic enabler of business and improves service delivery through the appropriate and optimal use of IT resources. Both case organisations utilise IT for (1) digitised administrative processes that automate some administrative tasks and for transactional processing; (2) online public interfaces such as company websites and social media; and 3) public information dissemination channels through which the public can access pertinent information easily. However, the utilisation of IT needs to mature to include (1) public intelligence analytics tools to gather information from the public so as to analyse and derive knowledge and insights from it; (2) interorganisational

system integration and communication technologies that enable the exchange of information and intelligence with collaborating organisations; and (3) interactive public online interfaces to provide online interactive avenues and mobile channels to interact with citizens and other key stakeholders in real-time.

### **8.7.2 P5 summary**

The more the organisations considered IT as a strategic partner, the more they were inclined to implement adequate IT governance practices; however, the data shows that the maturity of strategic IT utilisation is not optimal. Therefore, whereas P5 is affirmed in terms of its design, it is not consistent or effective in practice. Recommendations for practice aim to address the issue of ineffective application in practice.

## **8.8 Discussion pertaining to P6: *Support from external stakeholders and consultancy services is positively related to IT governance use***

The CGICTPF is a product of a consultative process that included senior Department of Public Service and Administration (DPSA) officials and the Government Information Technology Officers Council (GITOC). At the very least, the DPSA and GITOC remain key external stakeholders of state-owned entities in relation to operationalising the CGICTPF. The involvement of these stakeholders should be one of the main drivers for the successful implementation of the CGICTPF (Alreemy et al., 2016).

The use of consultants was initially intended to improve capacity and skills in public service (Matsiliza, 2013; AGSA, 2021). However, this process has not been well managed and the use of consultants remains high and pervasive in the public sector across all spheres of government (Theletsane, 2015). The AGSA (2021) has consistently reported an over-reliance (sometimes termed “high dependency”) on consultants as a priority problem owing to the high fiscal expenditure and low returns associated with it. This reliance on consultancy services is largely a function of a lack of skills in the public sector, including IT-related skills (Theletsane, 2015; AGSA, 2021).

## 8.8.1 Key findings

### 8.8.1.1 **Finding 13:** *There should be adequate guidance and support from government stakeholders in embedding organisational IT governance practices*

The dearth of leadership and support from the DPSA and GITOC in relation to IT governance in state-owned entities is notable. There is a lack of formal, adequate and consistent communication emanating from these key stakeholders, and significantly poor levels of support. Another criticism is that it appears that the focus is more on technology officials in government departments, rather than state-owned entities and the municipal layers of government. This is also notable from the language used in official governance documents and the entities that require help do not access it as easily as should be the case.

There is a causal relationship between Finding 14 below and the issues articulated under this finding.

### 8.8.1.2 **Finding 14:** *The malposition of the government CIO (GCIO) role within the DPSA constrains its scope of authority and impact*

The issues discussed in Finding 10 above are indicative of a deeper problem, that of the malposition and poor configuration of the GCIO role within the DPSA. A new GCIO was appointed in 2018 following a prolonged period of vacancy of this position. This position is responsible for the Public Sector ICT Management (PSICTM) branch within the DPSA. The PSICTM is responsible for the “development, oversight and compliance monitoring of the Corporate Governance of and Governance of ICT in accordance with the CGICTPF” (DPSA, 2012, p.20). However, the incumbent GCIO is hamstrung by the structural malposition of this role within the DPSA owing to the role’s limited authority to drive compliance.

The placement of the GCIO role in the DPSA contributes to its ineffectiveness in that it does not communicate the seriousness and depth of the scope of this role, since other state-owned entities that this role must oversee lie outside the scope of the DPSA and report to a different ministry and political authority. Its equivalent placement in a private sector context would be akin to the role of the CIO not reporting to the group CEO, but to an executive responsible for a specific division; essentially weakening its strategic standing by making it an operational function without the requisite power and influence to drive government-wide CGICTPF adoption and use. In contrast, the Department of Performance, Monitoring and

Evaluation (DPME), which is responsible for enabling and improving the overall performance of all government spheres, is situated within the Presidency, and its scope of authority and impact is understood by all spheres of government as encompassing them. This affords it the ability to also support the spheres of government that lack adequate expertise to perform. Granted, the PSICTM is not a department and the role of GCIO is technocratic; however, there are learnings to be observed that can lead to the reimagining of the design of the role of the GCIO, especially since the DPME and AGSA are cited as key partners of the PSICTM in implementing the CGICTPF.

**8.8.1.3 Finding 15: *There is minimal use of consultants and unclear value derived from consultancy services for IT governance implementation initiatives***

No benefits were noted in relation to the use of consultancy services for, specifically, IT governance implementation. This affirms the finding that no consultancy services were retained for implementing IT governance in the case organisations. However, consultancy services have been used to augment IT skills and provide advisory services in IT operational areas. Even so, the data shows that consultants are considered to be less than useful in relation to advancing the agenda of the case organisations. This concurs with the claim made in this study that the lack of adequate skills and competencies on the part of organisational management, and the fluidity of leadership tenure, allows consultants to dictate direction to the organisations without being held accountable for it. The break in continuity of leadership brings about the level of instability that is necessary for consultants to use the public service for financial gain without adding demonstrable business value.

Looking at this from an IT management advisory point of view, Gartner is the foremost consultancy service providing advisory and coaching services to IT managers in the public sector. These engagements with Gartner were viewed positively by the respondents. The use of consultants is regulated by the Office of the Chief Procurement Officer located within the department of National Treasury as it involves supply chain management (SCM) processes; this office is itself a relatively new structure that is yet to fully establish its strategic objectives in the public service.

It is also clear that the lack of adequate leadership and support for state-owned entities from external government stakeholders is what provides a window of opportunity for the use of consultants.

#### **8.8.1.4 Finding 16: *Memoranda of understanding should regulate relationships with peer organisations***

Intergovernmental collaboration by public organisations was considered to be critical. This was achieved through peer review, benchmarking against local and international organisations, and memoranda of understanding (MOU) with other organisations in the public sector. A mature implementation of IT governance facilitated the collaboration efforts through clearly defined roles and responsibilities

#### **8.8.2 P6 summary**

The proposition is supported in relation to external stakeholder support, but is not supported in relation to consultancy services support. In addition, the data shows that external stakeholder support is inadequate. Therefore, whereas P6 is affirmed in terms of design for external stakeholder support, it is not consistent or effective in practice. Recommendations for practice aim to address the issue of ineffective application in practice.

### **8.9 Discussion pertaining to P7: *IT governance adoption and continuous use contributes positively to corporate governance***

The use of the CGICTPF as an IT governance framework precedes corporate governance and has the inherent characteristic of enhancing corporate governance (DPSA, 2012; IoDSA, 2016). The phased implementation of the CGICTPF commenced in 2012, and both case organisations are currently in Phase 3 which is intended for continuous improvement with regard to the adoption and use of framework imperatives

#### **8.9.1 Key finding**

##### **8.9.1.1 Finding 17: *The CGICTPF has not been updated since its inception in 2012***

There is recognition of the enormous benefits of continuously using and improving the implementation of the CGICTPF in the case organisations. Such benefits include improved collaboration and integration with all internal and external stakeholders, including collaborating organisations; the seamless integration of all organisational levels of governance; improvement in the IT control environment with the implementation of adequate IT controls, including cybersecurity controls; the realisation of business value benefits from

IT investments, thereby turning IT from a cost centre to a profit centre; and the routinely conducted self-assessment increases proactive compliance and reduces audit findings.

However, the mere recognition of these benefits does not translate into actual and effective use of the CGICTPF. The challenges that abound in this regard include the lack of update of IT governance frameworks, charter and standards; IT governance not taken seriously at the level of the board of directors; the dearth of technologically savvy executive managers and the propensity for governance structures to engage in an operational firefighting mode, leaving no time to execute their strategic functions of governance, planning, monitoring and oversight.

Many of these problems stem directly from the tone set by key government stakeholders such as the DPSA, GCIO and GITOC, as the CGICTPF itself has not been reviewed or updated since its inception, even though its component elements such as King III (new version King IV introduced in 2016), ISO38500 (new version introduced in 2015) and COBIT 5 (new version COBIT2019 introduced in 2019) have been revised since 2012. A review of the CGICTPF must take these into account, as well as the changing needs of the public service and the factors identified in this study.

This researcher is aware that a new version of the CGICTPF is being proposed, however it is not clear whether the radical departure in design (away from the established component elements) will have a positive influence on maturing IT governance practices through continued use in the public sector, or whether it will decrease the gains and degrade the modest progress that has been made in this regard.

### **8.9.2 P7 summary**

There is recognition that the adoption and continuous use of the CGICTPF has a positive impact on corporate governance; however, this recognition alone does not translate optimally into the actual and effective use of the CGICTPF as there are still weaknesses experienced. Therefore, whereas P7 is affirmed in terms of design, it is not consistent or effective in practice. Recommendations for practice aim to address the issue of ineffective application in practice.

## **8.10 Discussion pertaining to the emergent construct: organisational culture**

The data revealed the following key areas where organisational culture impedes the functions of IT governance structures in exercising and embedding IT governance practices: decision-making, IT alignment to business strategic objectives, regulating IT investment and demonstrating business value, and IT sourcing processes and decisions.

The undesirable culture in state-owned entities reveals itself in the taking of a tick-box exercise approach to IT governance; laziness, lack of discipline and defiance of the rules, which are associated with a lack of professional will to drive IT governance implementation; favouritism in how management receives the opinions of employees, which leads to a divided, demoralised and ineffective workforce; and not procuring what is actually needed by business.

This culture thrives in the public sector context where poor service delivery is endemic owing to a low drive to perform and frustration experienced with the bureaucracy; instruction-related confusion arising from the structural differences between government departments and state-owned entities; the poor quality of internal assurance mechanisms; and leadership instability and fluidity of tenure.

The goal is to make IT governance practices a part of organisational culture where the external government stakeholders play a key role in supporting the organisations, including through ongoing IT governance training and workshops.

## **8.11 Discussion pertaining to top-ranked codes**

### **8.11.1 Top-ranked overall codes**

The top-ranked codes signify the important factors that occupy the attention of the board of directors and executive management in the adoption and use of the CGICTPF in the case organisations. These factors can be generalised to other state-owned entities. The top two codes, unsurprisingly, relate to compliance with the CGICTPF and the tailored organisational framework. The framework has to be tailored to the organisational environment to be effective. A benefit of IT alignment to organisational strategic objectives ensues from the compliance. However, employees must be supported through continuous communication and awareness campaigns. Another key factor was the quality of information contained in the

board, EXCO and other management reports, as key decisions are made based on this information. Decisions must be accurate in order for maximum benefit to be accrued from IT-related investments.

It is crucial, however, that the right organisational structure be developed and clear roles identified to drive the implementation of IT governance through IT policies, processes and SOPs. Deriving from the IT policies, processes and procedures, compulsory workshops and IT governance training have to take place to ensure that employees in those roles build adequate competencies to drive IT governance implementation. Board-level IT governance competencies are also crucial, and continuous IT governance training must also extend to the level of the board of directors. Another critical governance structure is the IT steering committee, which prioritises IT investments to unlock business value. These must be consistently monitored and reported to the board of directors to improve service delivery by the state-owned entity.

Top management support needs to reach the relevant layers within the organisation in order to realise benefits such as improved cybersecurity controls to protect the information assets of the state-owned entities. This can be achieved through a partnership with internal auditors, who are also key stakeholders in adopting and using the CGICTPF. Enterprise architecture must guide the implementation of IT solutions such that only fit-for-purpose solutions result from IT sourcing decisions; this has the effect of curtailing corruption in IT sourcing decisions.

### **8.11.2 Top-ranked benefit codes**

In addition to the discussion above, the top benefits associated with CGICTPF adoption and use in state-owned entities include IT alignment to strategic objectives. This is based on accurate IT-related decision-making which flows from accurate monitoring and reporting based on superior quality information. When key decisions are accurate and there is IT alignment, business value ensues as service delivery improves through the optimal use of public resources, including IT resources. Security of the resources is crucial to ensure that information and technology assets are not abused or stolen. Considering the role that the internal auditors and the Auditor-General play in providing assurance that adequate IT governance controls are implemented, the adequate and proactive use of the tailored

CGICTPF, including adhering to an enterprise risk management framework, results in a reduction in audit findings.

IT governance regulates the relationship with all key stakeholders through the identification of roles and functions; this leads to a common understanding of IT governance practices and business and IT stakeholders, both internal and external to the organisation, speaking the same language. The frequent self-assessments and IT governance maturity assessments enable the embedding of efficient business processes, and stabilise and standardise the IT environment. Taking this into account, IT governance can be used in ways that support, instead of inhibit, necessary innovation to meet performance targets.

As noted in the discussion pertaining to the propositions P1–P7 above, the benefits are not consistently achieved and the IT governance factors are not effectively implemented owing to the material challenges that are experienced by state-owned entities. The discussion below elaborates on these challenges.

### **8.11.3 Top-ranked challenge codes**

The top challenge identified is that data intelligence was not adequately explored by state-owned entities. This challenge emanates from the silo approach and poor levels of integration intra-organisationally and inter-governmentally, with duplicated data collection and storage. As a consequence, the sharing of information remains manual, and this further inhibits the efficiency of service delivery as it is impossible to have a single view of the citizen or client of a state-owned entity. This top challenge is associated with other challenges such as the lack of tools, poor leadership, key vacancies, dearth of properly qualified and experienced staff in key roles, and poor staff attitudes and morale.

The challenges discussed below are interlinked, that is to say they have a domino effect such that the poorer the performance as a result of one challenge, the greater the failures of the organisation in other key operational areas. Therefore, it is not surprising that where poor business process ownership and worse IT governance process ownership exist, IT is considered an afterthought and not included in key decision-making, resulting in poor service delivery and corrupt activities when IT sourcing decisions are made. The lack of technologically savvy executives and poor professional will to drive IT governance implementation exacerbate the problem, creating a tension in terms of which IT governance practices are perceived to be stifling innovation and operational excellence.

In an environment that is as highly regulated and bureaucratic as the public sector, it is imperative to ensure that the CGICTPF is updated and adequate support is offered to all entities by the DPSA. By contrast, if the CGICTPF is not updated, the organisational IT governance framework, charter and standards will also be neglected. This makes it difficult to hold boards of directors and management accountable. IT governance roles and responsibilities may become unclear, and even those governance structures that are functional will be ineffective as they become consumed with operational matters to the exclusion of discharging their oversight function.

The data shows that the design of the CGICTPF and its intent is understood and there are pockets of effective adoption and use within the case organisations; however, it is not consistently applied nor is it scalable across all layers of the organisation. These challenges affirm the deeper issues of poor board-level IT governance competencies and lack of support from external stakeholders such as the DPSA and GCIO.

**8.12 Conclusion**

This chapter presented a synthesis of the empirical and theoretical analyses through a discussion of the results. The discussion was structured on the basis of the research propositions, as this was an effective way of ensuring that the key findings were thematically linked to the research questions through the propositions. The underlying theme across all the propositions is that whereas their design is affirmed, in practice there were weaknesses that resulted in inconsistent and ineffective application of the factors of this study. These weaknesses support the disjuncture between policy design and implementation; the design of the CGICTPF does not comport equitably with the effectiveness of its implementation in practice.

The weaknesses in practice are confirmed by the 17 findings of this study, which are summarised in Table 8–2 below:

Table 8–2: Summary of constructs, propositions and findings

<b>CONSTRUCTS, PROPOSITIONS AND FINDINGS</b>			
<b>#</b>	<b>Construct</b>	<b>Proposition</b>	<b>Finding</b>
1	Information quality	P1: The quality of management	<ul style="list-style-type: none"> <li>• <i>Finding 1</i> – Business intelligence and data analytics capabilities should be</li> </ul>

**CONSTRUCTS, PROPOSITIONS AND FINDINGS**

#	<i>Construct</i>	<i>Proposition</i>	<i>Finding</i>
		information is positively related to IT governance use	<p>adequately exploited to improve strategic decision-making based on accurate, timely, relevant and complete information.</p> <ul style="list-style-type: none"> <li>• <i>Finding 2</i> – Adherence to IT policies, processes and SOPs embeds information quality.</li> <li>• <i>Finding 3</i> – Poor business process integration at organisational and sector levels compromises quality of information.</li> </ul>
2	Governance mechanisms	P2: Formalised governance mechanisms in the organisation positively influence IT governance use.	<ul style="list-style-type: none"> <li>• <i>Finding 4</i> – Key organisational IT governance structures require a strategic outlook to be effective.</li> <li>• <i>Finding 5</i> – The role of the CIO needs to be dynamic, multifaceted and fluent in business strategy.</li> <li>• <i>Finding 6</i> – A dedicated role for the IT governance officer is crucial to drive IT governance practices.</li> <li>• <i>Finding 7</i> – The practice of benefit realisation should ensue from the underpinning application of business cases, the prioritisation of IT investments and enterprise architecture.</li> </ul>
3	Top management support	P3: Top management support is positively related to IT governance use.	<ul style="list-style-type: none"> <li>• <i>Finding 8</i> – IT sourcing decisions are effective when there is collaboration between business and IT</li> <li>• <i>Finding 9</i> – Top management buy-in should precede top management support, and both are contingent on top management IT governance competencies.</li> </ul>
4	IT governance competencies	P4: Board-level IT governance competencies are positively related to IT governance adoption and use.	<ul style="list-style-type: none"> <li>• <i>Finding 10</i> – IT governance competencies and training at the level of the board of directors remain deficient but are crucial to drive digital transformation and oversight.</li> </ul>
5	IT dependency mode	P5: The organisation's strategic mode of IT dependence is	<ul style="list-style-type: none"> <li>• <i>Finding 11</i> – IT should be regarded as a strategic enabler.</li> </ul>

CONSTRUCTS, PROPOSITIONS AND FINDINGS			
#	Construct	Proposition	Finding
		positively related to IT governance use.	<ul style="list-style-type: none"> <li>• <i>Finding 12</i> – The maturity of strategic IT utilisation should be optimal in state-owned entities.</li> </ul>
6	External stakeholder and consultancy services support	P6: Support from external stakeholders and consultancy services is positively related to IT governance use.	<ul style="list-style-type: none"> <li>• <i>Finding 13</i> – There should be adequate guidance and support from government stakeholders in embedding organisational IT governance practices.</li> <li>• <i>Finding 14</i> – The malposition of the government CIO (GCIO) role within the DPSA constrains its scope of authority and impact.</li> <li>• <i>Finding 15</i> – There is minimal use of consultants and unclear value derived from consultancy services for IT governance implementation initiatives.</li> <li>• <i>Finding 16</i> – Memoranda of understanding should regulate relationships with peer organisations</li> </ul>
7	IT governance adoption and use	P7: IT governance adoption and continuous use contributes positively to corporate governance.	<ul style="list-style-type: none"> <li>• <i>Finding 17</i> – The CGICTPF has not been updated since its inception in 2012.</li> </ul>

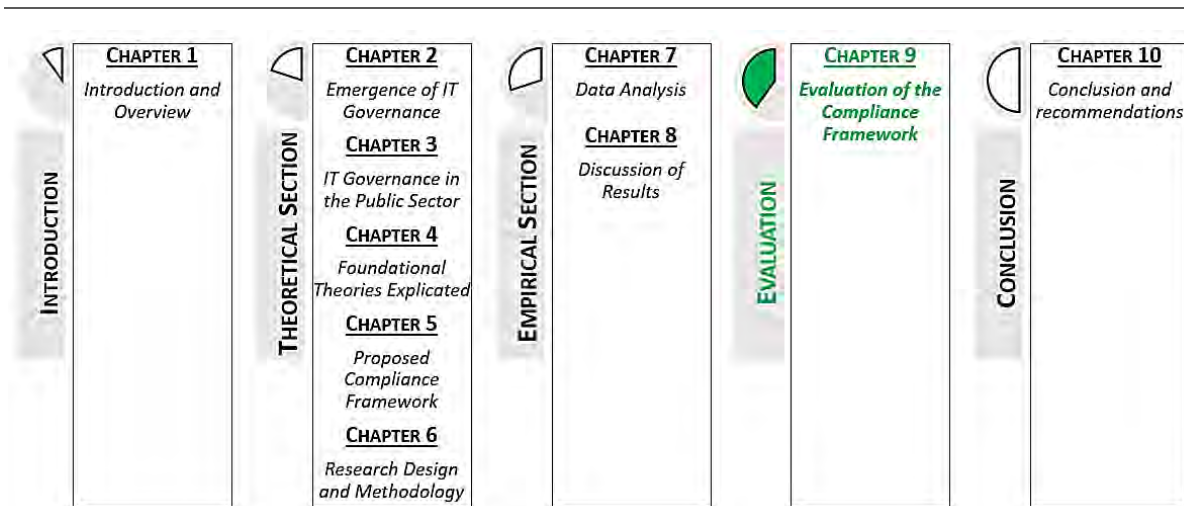
Finally, detailed insights into the interpretation and meaning of the top-ranked codes of this study for practice were given. This discussion covered top-ranked overall codes, top-ranked benefits codes and top-ranked challenge codes.

# EVALUATION

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# 9

## Evaluation of the Compliance Framework



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## **9.1 Introduction**

This chapter presents the evaluation of the preliminary compliance framework through expert reviews. A total of ten experts evaluated the framework; these experts were drawn from academia and industry – six from academia and four from industry.

The expert reviews were based on a questionnaire with seven questions and a long-form open-ended text field for answers. The questionnaire was designed using GoogleForms and was administered online using a URL sent to the experts via email. A replica of the form developed in MS Word was also attached to the email in case any respondents experienced issues with the online form. The questionnaire was based on Weber's (2012) framework and criteria for theory evaluation.

## **9.2 Data cleaning and preparation**

A pilot process was undertaken to determine the lucidity of the expert review questions. The pilot process involved lecturer colleagues and master's students reviewing the design of the questionnaire to ensure it was clear, complete, used accessible language and covered the scope of the compliance framework, and accounted for all the key aspects of Weber's framework and criteria for theory evaluation. The resulting feedback led to the refinement of the evaluation questions, simplifying the background information and explanations of Weber's framework concepts, the inclusion of the exposition of how Weber's framework applies to this study, and clear communication of the evaluation objectives and expectations from the evaluation process. This enriched the overall quality of the form that was sent out to the participants and the responses obtained.

## **9.3 Expert reviewers' profile**

The first two sections of the questionnaire invited the participants to provide demographic details in relation to their titles and experience with IT governance. Of the ten experts, six experts were from academia. As shown in Figure 9–1 and Table 9–1 below, respectively,

- all the experts from academia held PhDs
- five were at a professor level with many years of experience
- two were based internationally, the rest were based locally in South Africa, and
- four had published research papers in the area of IT governance.

Of the ten experts,

- four were drawn from industry
- all had over 18 years of experience
- all were practitioners who held senior positions both in the public and private sectors in South Africa (i.e. Managing Director – Advisory Services of the South African subsidiary of an international advisory and auditing firm; Head of Business Systems and Projects Audit in the South African Reserve Bank; Head of Department – Applications Development in the State IT Agency of South Africa; and Manager – ICT Governance and Administration in a key municipality in South Africa and one of two authors of the first draft of the CGICTPF), and
- one had published research papers in the area of IT governance.

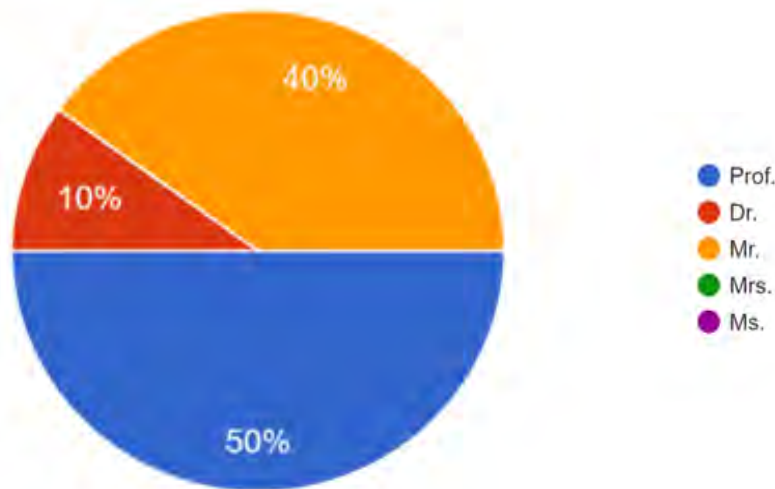


Figure 9–1: Respondents' demographic information

In addition, as shown below, 30% of the experts work or have worked in the public sector, and 50% have experience (or some level of involvement) in implementing IT governance.

Table 9–1: Respondents' experience

RESPONDENTS' EXPERIENCE						
#	Expert Name	<i>I work (or have worked) in the public sector</i>	<i>I have experience (or some level of involvement) in implementing IT governance</i>	<i>I work (or have worked) in academia (PhD)</i>	<i>I have published research articles on IT governance</i>	<b>Other</b> <i>(I have worked for AngloGold in the area of IT governance...)</i>
1	Participant 1	✓	✓		✓	
2	Participant 2			✓	✓	

<b>RESPONDENTS' EXPERIENCE</b>						
#	Expert Name	<i>I work (or have worked) in the public sector</i>	<i>I have experience (or some level of involvement) in implementing IT governance</i>	<i>I work (or have worked) in academia (PhD)</i>	<i>I have published research articles on IT governance</i>	<b>Other</b> <i>(I have worked for AngloGold in the area of IT governance...)</i>
3	Participant 3		✓			
4	Participant 4			✓	✓	
5	Participant 5		✓	✓	✓	
6	Participant 6	✓	✓			
7	Participant 7	✓	✓			
8	Participant 8			✓	✓	
9	Participant 9			✓		
10	Participant 10			✓		✓
<b>Totals</b>		<b>3 (30 %)</b>	<b>5 (50%)</b>	<b>6 (60%)</b>	<b>5 (50%)</b>	<b>1 (10%)</b>

#### **9.4 Weber's framework and criteria for theory evaluation**

Weber's (2012) framework and criteria for theory evaluation are widely used in the IS literature (Venkatesh, Thong and Xu, 2016) and propose that a theory should be evaluated from two perspectives:

- PARTS – focus is on the quality of the individual components of the proposed compliance framework.
- WHOLE – focus is on the quality of the proposed compliance framework considered in toto.

As depicted in Figure 9–2 below, there are four Parts (i.e. Constructs, Associations, States and Events) and five Whole properties (i.e. Importance, Novelty, Parsimony, Level and Falsifiability). The criteria for high-quality parts and a high-quality whole must be satisfied.

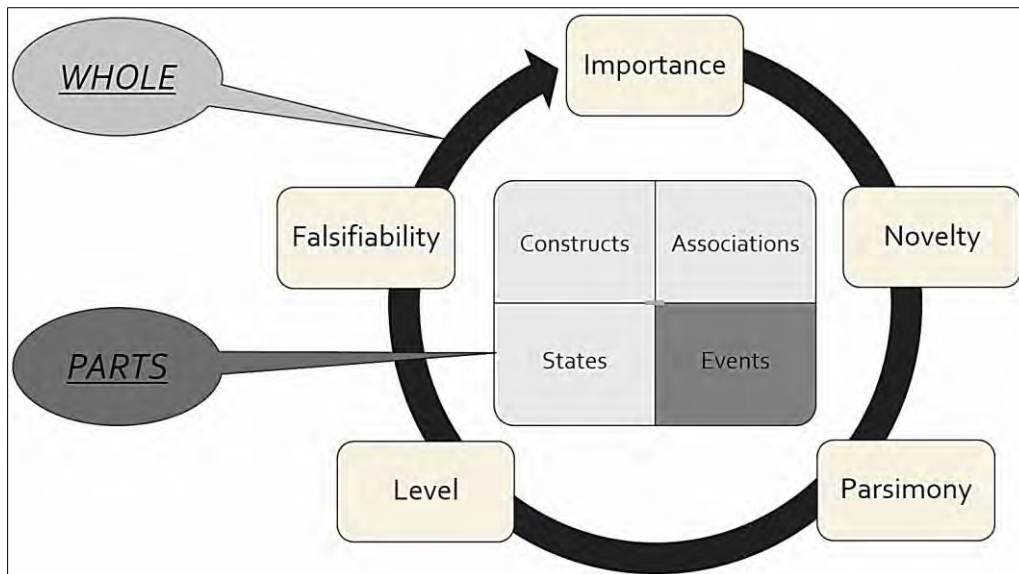


Figure 9–2: Weber's framework for theory evaluation (adapted from Weber, 2012)

### 9.4.1 Parts

Weber (2012) explicates the Parts as follows:

- **Constructs.** Represent an attribute in general of some class of things in its domain (as opposed to a particular attribute of a specific thing).
- **Associations.** Show that the values of one construct are somehow related to the values of another construct.
- **States.** Stipulate states that might arise for things in the class or classes of things that fall within its domain and for which it is intended to have explanatory and predictive power.
- **Event.** Combination of inside-boundary states.

### 9.4.2 Whole

Weber (2012) explicates the Whole properties as follows:

- **Importance.** Assessed via judgments made about the importance of the focal phenomena from the viewpoint of practice (improving effectiveness and efficiency) and research (science).
- **Novelty.** Originality and contributions to knowledge.
- **Parsimony.** Achieving good levels of predictive and explanatory power in relation to the focal phenomena using a small number of constructs and associations.

- **Level.** Precise, predictive and/or explanatory powers covering a narrow, constrained set of phenomena (micro-level). General, predictive and/or explanatory powers covering a broad range of phenomena (macro-level).
- **Falsifiability.** Researchers must be capable of generating precise predictions about the focal phenomena so they can undertake reasonably exact empirical tests.

### 9.4.3 Compliance framework evaluation approach

Based on the above discussion, this study adopted the approach explicated below for the evaluation of the compliance framework, as depicted in Figure 9–3. The Parts were applied to the compliance framework of this study,<sup>12</sup> and experts from industry and academia were invited to provide their expert inputs to evaluate the compliance framework based on its Whole properties of Importance, Novelty, Parsimony, Level and Falsifiability.

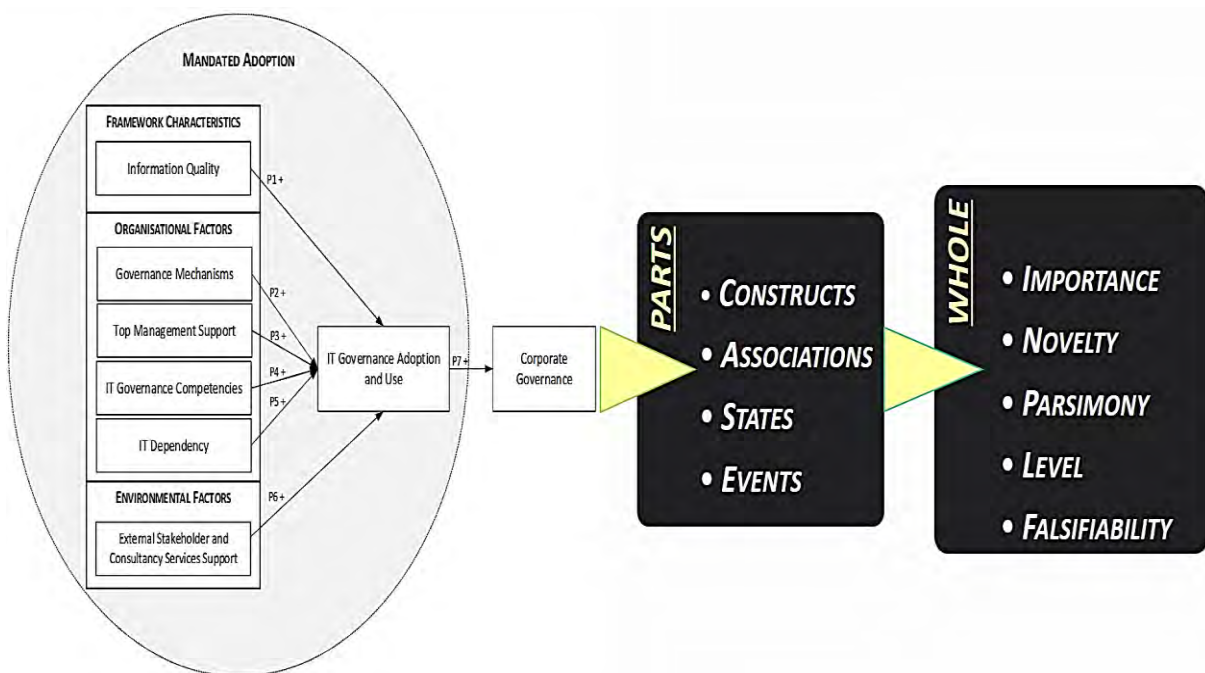


Figure 9–3: Compliance framework evaluation approach

<sup>12</sup> See Appendix F for a detailed view of the application of the Parts to this study’s compliance framework.

## 9.5 Discussion pertaining to the expert review questions

### 9.5.1 Question 1

- **Question text**

*Are the propositions of the compliance framework clear and do they contribute to the stated objective of the framework? Would you suggest rewording or removing any of the propositions? Please provide any additional comments.*

- **Findings**

The participants significantly affirmed that the propositions were clear and aligned to the objectives of the framework. Some notable responses include the following:

- *“Because they are based on accepted and proven models in the literature, they are sufficient and contribute to the stated objective of the framework.”*
- *“These seem adequate – they are clear and logical – I would not move any.”*
- *“The constructs are clear and will be a good guide for state-owned entities.”*
- *“The propositions appear adequate to contribute to the stated objectives. They include both technology and information, which is key. I wouldn’t at this stage reword or remove anything.”*

While agreeing, some participants made remarks and posed questions that enriched the understanding of the compliance framework:

- *“I hope you have a section in the document where the link between the findings and constructs is explained.”*
  - In addressing the above remark, the link between the research questions, framework constructs and propositions, and research findings is discussed in detail in Chapter 7. The discussion of findings in that chapter is structured around the propositions, which are linked to the framework constructs, which in turn are related to the research questions.
- *Have you considered other key IT governance compliance aspects such as value delivery, strategic alignment, performance management, resource management and risk management?*

- Certainly, these aspects are covered in interviews and the survey questions as they were based on COBIT, from which these aspects derive. Consequently, the analysis of data and discussion of results in Chapters 7<sup>13</sup> and 8, respectively, delve into these aspects within the public sector context.
- *“The framework makes no distinction between the two governance layers of ICT. Corporate governance of ICT is what it seems the focus area of the framework is. But it is called IT governance which is generally accepted, but not descriptive enough.”*
  - It should be noted that sections 3.3.3 and 3.4.2 provide a detailed discussion of the relationship between corporate governance of ICT and the governance of ICT. The TOE framework guides the focus on organisational factors, some of which are the responsibility of executive and operational management and not necessarily the board of directors. Therefore, considering that the organisation is the unit of analysis for this study, it became necessary to highlight the exchange of responsibilities between the board of directors, executive and IT operational management, in keeping with the IT governance definition adopted in this study (see section 1.2). The factor “IT governance competencies” makes reference to the board of directors, while the factor “Top management support” makes reference to executive and senior management.
- *“I was told that in most studies the hypotheses are generally trivial and do not require a study to confirm or prove them. In my case it was a hypothesis that states something like the following – a high level of information security awareness will lead to a high level of an information security culture in an organisation. This is a valid hypothesis – however, if you think about it, it is actually trivial. It is almost impossible to have the one at a low level and the other one at a high level – the one is a prerequisite for the other. So, does this statement warrant a study to prove it? Is the same true for example for a statement that says top management support is necessary for IT governance*

---

<sup>13</sup> See sections 7.5.7; 7.6.1; 7.6.5; 7.6.10 and 7.7.1

*adoption – will a company really adopt an IT governance framework (or any framework) if top management does not support it?”*

- This insight is aligned to promptings for the inclusion of *continuous use* in the framework constructs as it emphasises the criticality of the adoption and *continuous use* aspect of this study, as shown in the final compliance framework in Figure 9–4 below, and discussed in sections 4.3 and 4.5.2. The premise that adoption cannot be undertaken without top management support is accepted as factual. However, the decision to adopt the CGICTPF does not inevitably lead to its optimal use. Top management support for the adoption of the CGICTPF must also extend to its *continuous use* for the CGICTPF to be effective in contributing towards the organisations’ strategic objectives. The effectiveness of the CGICTPF in the state-owned entities is influenced by the extent of its use, and not merely the decision to adopt the framework. Accordingly, continued use denotes the action to implement and derive benefit from the framework following the adoption decision. In the context of this study, top management support is considered both in relation to the adoption decision and the continued effective use of the CGICTPF.

Considering that the propositions are deemed clear by the participants, triangulation between the interviews, survey questionnaire and expert reviews is established.

### **9.5.2 Question 2**

- ***Question text***

*Are the constructs of the compliance framework clear and do they contribute to the objective of the framework? Would you suggest rewording or removing any of the constructs, or adding new ones? Please provide any additional comments.*

- ***Findings***

The participants significantly affirmed that the constructs were clear and aligned to the objectives of the framework. Some notable responses include:

- *“The constructs are clear; however, I am not certain if I & T is used offensively in the public sector. My experience has been that in the public sector management tries to fit technology in tired, outdated processes. Therefore, IT*

*is more defensive rather than offensive. There is however an intention to become more innovative.”*

- *“The propositions align with the constructs of the framework.”*

While agreeing, three participants made remarks and posed questions that enrich the understanding of the compliance framework:

- *“By top management, do you mean board support? If not, how does the board fit in?”*
  - o It should be noted that top management refers to executive managers, depending on the case organisation’s structure. The board of directors delegates to executive management; however, the board of directors should have adequate IT governance expertise to carry out this function well and provide the requisite support, guidance and effective oversight (see section 5.2.3).
- *“Seems as if you should include metrics in this framework, which feed into information quality ... The quality of the information will be determined by the chosen metrics, the way they are measured and the extent to which they align with organisational values”*
  - o Four measures were in scope for this study: accuracy, currency, relevancy and completeness. These measures were adapted from the “Information Reference Model: Quality Criteria for Information” as outlined in ISACA’s COBIT 2019 Framework Introduction and Methodology; and are aligned to section 16 of the Protection of Personal Information Act 4 of 2013(PoPIA). The *accuracy* (i.e. “the extent to which information is correct and reliable”) measure was adapted from the intrinsic dimension. The *currency* (i.e. “the extent to which information is sufficiently up to date for the task at hand”), *relevancy* (i.e. “the extent to which information is applicable and helpful for the task at hand”) and *completeness* (i.e. “the extent to which information is not missing and is of sufficient depth and breadth for the task at hand”) measures are adapted from the contextual dimension.
- *“I think P7 should incorporate 'the organisation's attitude toward/status of compliance to corporate governance influences the adoption and implementation of IT governance'. You could add this as a new proposition.”*

- This was also taken into consideration in identifying an emergent construct, *organisational culture*, which was included in the framework, as shown in the final compliance framework in Figure 9–4 below, and as presented in section 7.5.9 and discussed in section 8.10.

The discussion points above, including the emergent construct, were also supported by the data analysis and survey results, and therefore triangulate the interview data, survey results and expert reviews.

### 9.5.3 Question 3

- **Question text**

*Is the focal phenomenon of the compliance framework (i.e. IT governance/CGICTPF) an important area of research? Does the compliance framework address a relevant problem? Please provide any additional comments.*

- **Findings**

The participants significantly affirmed that research into the CGICTPF is crucial and the proposed compliance framework addresses the problem of non-compliance. Notable inputs include:

- *“There is no doubt that the compliance framework is needed and an important area of research. Most IT governance frameworks are developed from the industry point of view with less academic involvement. The proposed compliance framework provides a solution and is based on well-researched frameworks and benchmarked against tried and tested frameworks. Within the South African government, where billions have been lost under the name IT, a comprehensive compliance framework is critical.”*
- *“The framework addresses an important element within the public sector which is related to governance and compliance thereof. It outlines clearly what needs to be done to be compliant. Provides clear guidance to management and board.”*
- *“It is definitely an important area of research given just how many multi-million rand projects have collapsed because of poor governance practices.*

*Research can definitely shed light on this and support improvement of governance going forward.”*

- *“The compliance framework is important and valuable as non-compliance leads to loss of data or valuable information and it also affects trust in organisations. The framework does address the problem.”*
- *“Yes it is important. And there are many institutions in government that are still afraid of the compliance side of corporate governance and that are vague on whether they are doing the right thing. Such a framework will not only create context, but also peace of mind.”*
- *“Yes, the area is very relevant and important. It is well known that government departments do not really comply with the CGICTPF, so any support like the framework will add value.”*

While agreeing, two participants made remarks that enrich the understanding of the compliance framework:

- *“A universal compliance framework would be good but not sure if possible to apply.”*
  - o This is an important intervention as it helps to underscore an important aspect of the scope of this study – state-owned entities, as opposed to state-owned enterprises. In addition, this study takes into account that there are various layers of government, such as provincial and local government, that have different governance mechanisms – this forms part of the delimitation of this study.
- *“I think your research should focus on practical implementation and compliance. Added to this, you must be clear in terms of what is new that your study will deliver in addition to existing guidelines and codes such as King, CGICTPF, ISO, etc.”*
  - o This contribution influenced the discussion of results, emphasising the practical aspects of the constructs of the compliance framework. This study complements the AGSA reports by using that content as a catalyst for a broader and deeper analysis of what state-owned entities must do to address compliance deficiencies. The AGSA reports are useful for providing patterns of inadequacies and

quantifying the problem of poor IT governance controls. However, this compliance framework elucidates organisational factors that are crucial for assisting with the implementation of IT governance controls – thereby complying with the CGICTPF.

There is concurrence between the preceding discussion points and the analysis of interview and survey data (see chapter 7) and the discussion of results (see chapter 8); and therefore interview data, survey results and the expert reviews are triangulated.

#### **9.5.4 Question 4**

- ***Question text***

*Does the compliance framework contribute to knowledge in relation to IT governance? Please provide any additional comments.*

- ***Findings***

The participants significantly affirmed that the proposed compliance framework contributes to knowledge in relation to IT governance. Notable inputs include:

- *“Yes, the primary area of knowledge that I found interesting is the fit of different other frameworks and how they relate to each other. And I appreciate that it is built around value creation with an emphasis on the role of the governing body. There is a lot of knowledge around this but not enough. Each bit added makes the total picture clearer.”*
- *“I believe it does. I think it touches on very critical elements including competences, quality of management information, and leveraging the capability of external consultants.”*
- *“The presented framework does contribute to the knowledge in line with IT governance. However, to fully conclude the knowledge, the proposed compliance should have to be implemented, monitored and evaluated while in operation in selected government department.”*
- *“It does contribute to knowledge. It will make it easier to understand the practice of IT governance and also support its improvement.”*

- *“Yes, I think it does as all constructs add value and have to be in place to support IT governance.”*

The participants’ comments affirmed the significance of this study. One participant proposed that “to fully conclude the knowledge the proposed compliance framework should have to be implemented, monitored and evaluated while in operation...”; this resonates with future aspirations for this research. With the professional and academic significance established, this researcher hopes for an opportunity to apply the framework in practice.

### **9.5.5 Question 5**

- ***Question text***

*Does the compliance framework offer predictive or explanatory insights in relation to IT governance adoption and use in the public sector? Please provide any additional comments.*

- ***Findings***

The participants significantly affirmed that the proposed compliance framework compliance framework offers predictive or explanatory insights in relation to IT governance adoption and use in the public sector. Notable inputs include:

- *“It covers the full spectrum of governance tasks, practices and its relation to and function in combined assurance. I like the notion that the governing body and executive are inherently all part of combined assurance.”*
- *“I think it offers explanatory insights; however, this could be used in predicting whether higher levels of compliance or implementation could be achieved.”*
- *“The outlined factors – mainly the organisational factors – contain valuable information that leads to good governance. The quality and consideration of the environmental factors also contribute to the strength of the presented compliance framework. The aspects and IT governance security and inclusiveness are also critical and could assist to improve ITG adoption.”*
- *“The framework outlines what needs to be done to be compliant and highlights the risks that will occur should there be no compliance.”*

- *“Yes, it does provide explanatory insight as it explains what each construct entails and can be useful for public sector to apply as it covers in my view all the necessary constructs to support IT governance. I think the external stakeholder construct is very valuable to ensure compliance.”*

One participant provided a contrary response, stating that:

- *“I am not sure that it predicts or explains – to me itemises the issues that need to be considered.”*
  - o This researcher disagrees that the “itemisation” of the factors does not justify, at the very least, the inherent explanatory power of the compliance framework. As suggested by previous comments, the insights of these factors can help explain the morass of non-compliance in public service. In addition, the focus of this study on implementation inclines the compliance framework towards predicting the form and extent of compliance.

### 9.5.6 Question 6

- **Question text**

*Do you agree that the compliance framework is positioned at the correct level (i.e. focusing on the board of directors, executive and middle management)? Please provide any additional comments.*

- **Findings**

The participants significantly affirmed that the proposed compliance framework is positioned at the correct level (i.e. focusing on the board of directors, executive and middle management).

Notable inputs include:

- *“Yes, this is where the weakest practice in public administration is with regards to the use of ICT in service delivery.”*
- *“Yes – you need top management buy-in or else no-one will use it.”*
- *“Those are the right levels, particularly the board as it carries the overall responsibility for IT governance.”*

- *“Yes I agree with the focus on these levels as they need to ensure that people at lower levels comply and if they do not support compliance then IT governance will not be successful.”*

While agreeing, two participants further suggested the need for adequate training to improve the IT governance competencies of management and all employees:

- *“Yes, but experience has taught me that very often the indicated levels of management do not really understand and grasp the value of IT governance.”*
- *“I agree that focusing of the key levels of management is important. However, there is need for training and education of the lower managers and employees to have understanding of the whole IT governance. It is important to include all the employees within an organisation so that the IT governance framework is understood by all within the organisation. Issues of good governance must be for every employee and all within the organisation.”*

This aspect of training concurs with the preceding discussion of the analysis of interview and survey data (see relevant section in chapter 7) and discussion of results (see relevant sections in Chapter 8), and therefore triangulates the interview data, survey results and the expert reviews.

### **9.5.7 Question 7**

- ***Question text***

*Is it reasonable to expect that the compliance framework is capable of being tested empirically without generating false positive results in relation to its propositions? Please provide any additional comments.*

- ***Findings***

The participants significantly affirmed that it is reasonable to expect that the compliance framework is capable of being tested empirically without generating false positive results in relation to its propositions. Notable inputs include:

- *“Yes, it is reasonable. Governance practice (wilful or not) is well established in well-designed practices and processes. These can quickly and consistently*

*be identified and measured in an empirical assessment with little customisation. It flows into what is presented nearly seamlessly.”*

- *“The compliance framework has accommodated key IT governance framework terms as outlined by the propositions ... Of course, this framework has potential to improve IT governance in the public sector. It will however require to be fully implemented and monitored.”*
- *“Yes, I think one can test it empirically by ensuring that all levels of an organisation or various types of organisations are targeted and asking them to rank the importance of the constructs can also be valuable to ascertain where the current focus is in SA’s organisations based on the coronavirus aftermath.”*
- *“It may be reasonable if proper research and measurement methodologies with appropriate safeguards are being used.”*
- *“Yes, but I think you need to be very sure that people understand what you mean by each of the terms to make sure you get the maximum amount of input from the people that participate in your study.”*

The participant responses here affirm the positive association of the compliance framework with IT policies, processes and procedures as a foundation for measuring the effectiveness of the framework. As noted in Chapters 7 and 8, IT policies, processes and procedures are instrumental in driving IT governance implementation.

## **9.6 Final compliance framework**

The preceding discussion of the evaluation of the compliance framework by industry and academic experts provided inputs for the final compliance framework, as presented in Figure 9–4. Based on the triangulation of the interview data, survey data and expert reviews the following improvements to the preliminary framework were introduced to produce the final compliance framework:

- Inclusion of an emergent construct: Organisational Culture
- The “IT Dependency” construct is amended to “Strategic IT Dependency” to illustrate the strategic nature of IT dependency in state-owned entities as affirmed by data, owing to the consideration of IT as a strategic enabler

- The “External Stakeholder and Consultancy Services Support” construct is amended to “External Stakeholder Support”. The amendment shows the exclusion of “Consultancy Services” as a factor so as to accommodate *Finding 15* in section 8.8.1.3, where it was found that there was minimal use of consultancy services for IT governance implementation owing to the unclear value derived from such consultancy services.
- The “IT Governance Adoption and Use” construct is amended to “IT Governance Adoption and Continuous Use” to emphasise the dependence of effective adoption of the CGICTPF on its continuous use.

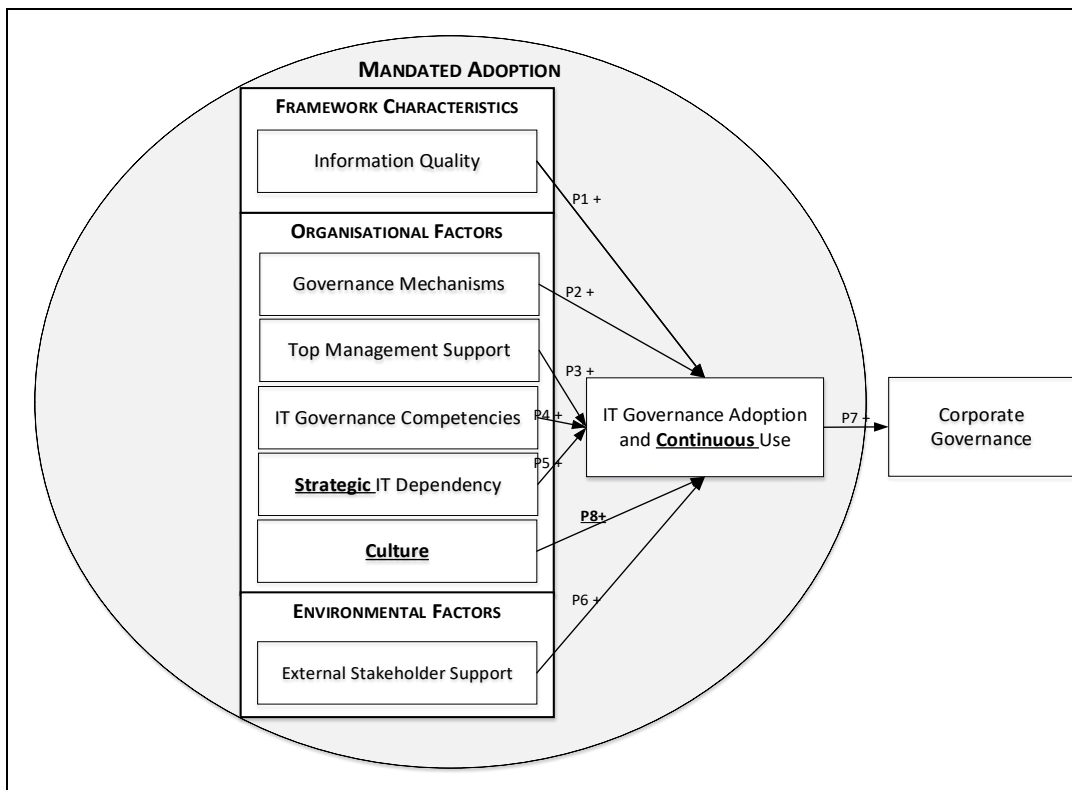


Figure 9–4: Final compliance framework for IT governance adoption and use by state-owned entities in South Africa

## 9.7 Conclusion

This chapter presented the evaluation of the preliminary compliance framework by ten industry and academic experts. The data from the expert reviews was presented so as to triangulate it with that obtained from interviews and the survey. Further, the evaluation culminated in a final compliance framework, which is the main contribution of this study. The evaluation questionnaire comprised seven questions which were based on Weber’s (2012) framework and theory evaluation criteria which are widely used in the IS literature. Weber’s

(2012) framework proposes that a theory should be evaluated from two perspectives: *Parts* (which focus on the quality of the individual components of the proposed compliance framework) and *Whole* (which focuses on the quality of the proposed compliance framework considered in its totality).

Based on the analysis of the expert reviews, improvements made to the preliminary framework were substantiated, culminating in the final compliance framework. The following key changes were introduced in the final compliance framework:

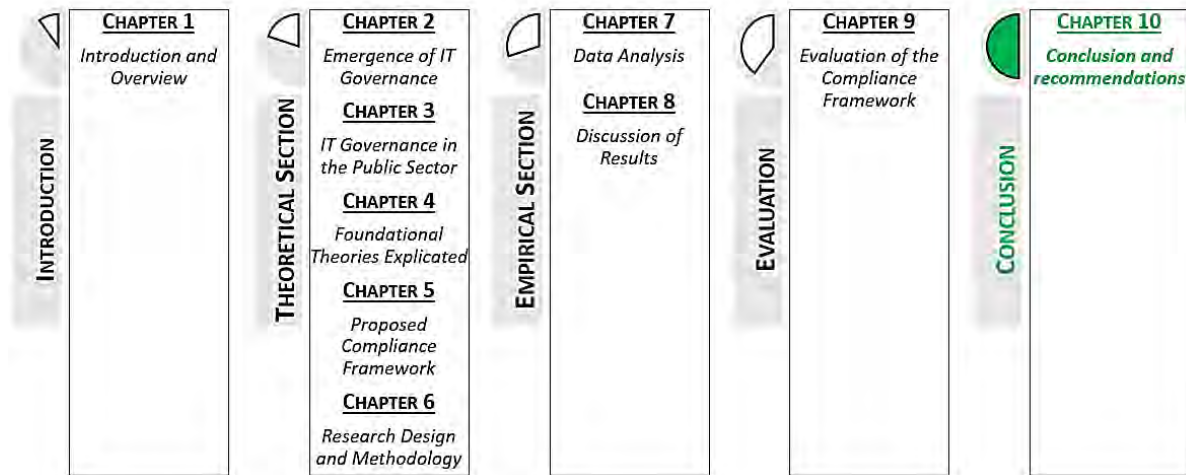
- Inclusion of an emergent construct: Organisational Culture
- The “IT Dependency” construct was amended to “Strategic IT Dependency”
- The “External Stakeholder and Consultancy Services Support” construct was amended to just “External Stakeholder Support”. The exclusion of “Consultancy Services” from the construct followed the data showing minimal use of consultancy services, specifically for IT governance implementation
- The “IT Governance Adoption and Use” construct was amended to “IT Governance Adoption and Continuous Use”.

# CONCLUSION

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# 10

## Conclusion and Recommendations



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## **10.1 Introduction**

This chapter provides an overview of the research objectives, aims, problem, questions and methodology and the contribution of this study. The main contribution of this study is the compliance framework for IT governance adoption and use by state-owned entities in South Africa. The contribution section below also discusses the key findings of the research and makes recommendations for both practice and the case organisations. These emanate from the findings under each of the seven propositions of this study. Further, suggestions for future research are presented. The objective to influence practice through the recommendations is consistent with the pragmatist paradigm adopted for this study which holds that the utility of the solutions stemming from this study must address real-life conditions.

## **10.2 Research objective and aims**

The objective of this study was to develop a compliance framework for IT governance adoption and use in state-owned entities in South Africa. This objective was met as explicated in section 10.7 below. In addition, the aims of this study were to: (1) identify the factors that influence IT governance use in state-owned entities; (2) determine how public sector characteristics affect IT governance use; and (3) rationalise and optimise the influence of IT governance adoption and use on corporate governance in state-owned entities in South Africa. The aims are closely associated and derive from the research questions which are discussed below. Further, these aims found expression in the research sub-questions and compliance framework constructs – the compliance framework is the main contribution of this study.

## **10.3 Research problem and questions**

The Auditor General of South Africa (AGSA) has previously noted that IT governance controls are poor, as is accountability and oversight of IT governance in state-owned entities (Valentine and Stewart, 2015; AGSA, 2021). The lack of accountability and oversight is attributable to poor IT governance competencies among members of the board of directors (Valentine and Stewart, 2015; AGSA, 2021). Therefore, the problem statement for this study was as follows:

*IT governance in South African state-owned entities is inadequate.  
Appropriate controls have not been implemented as expected following the*

*publication of the CGICTPF – which all state-owned entities are mandated to implement. This has led to poor levels of compliance and IT investments not supporting organisational objectives.*

The main question that this research answered is:

*How should IT governance adoption and use be enhanced in state-owned entities in South Africa?*

The sub-questions that were considered were the following:

- (a) What are the factors that influence IT governance adoption and use in state-owned entities?
- (b) How do public sector characteristics affect IT governance adoption and use?
- (c) How does IT governance adoption and use influence corporate governance in state-owned entities?

In Table 10–1 below, the link between the research questions, framework constructs and propositions is presented. It should be noted that the research sub-questions are linked to the aims of this study.

Table 10–1: Research questions, framework constructs and propositions

<b>RESEARCH QUESTIONS, PRELIMINARY FRAMEWORK CONSTRUCTS AND PROPOSITIONS</b>			
<i>Title</i>	<i>Research Question</i>	<i>Construct</i>	<i>Proposition</i>
<b>Main Research Question</b>	<i>How should IT governance adoption and use be enhanced in state-owned entities in South Africa?</i>		
Sub-Research Question (SRQ) 1	What are the factors that influence IT governance adoption and use in state-owned entities?	1. Information quality	P1: The quality of management information is positively related to IT governance use.
		2. Governance mechanisms	P2: Formalised governance mechanisms in the organisation positively influence IT governance use.
		3. Top management support	P3: Top management support is positively related to IT governance use.
Sub-Research Question (SRQ) 2	How do public sector characteristics affect IT	4. IT governance competencies	P4: Board-level IT governance competencies are positively related to IT governance adoption and use.
		5. IT dependency	P5: The organisation’s strategic mode of IT dependence is

RESEARCH QUESTIONS, PRELIMINARY FRAMEWORK CONSTRUCTS AND PROPOSITIONS			
Title	Research Question	Construct	Proposition
	governance adoption and use?		positively related to IT governance use.
		6. External stakeholder and consultancy services support	P6: Support from external stakeholders and consultancy services is positively related to IT governance use.
Sub-Research Question (SRQ) 3	How does IT governance adoption and use influence corporate governance in state-owned entities?	7. IT governance adoption and use	P7: IT governance adoption and continuous use contribute positively to corporate governance.

## 10.4 Overview of research methodology

The research design of this study was based on the research onion proposed by Saunders, Lewis and Thornhill (2016). The layers were applied in this study as follows: paradigm (i.e. pragmatism); reasoning approach (i.e. abductive reasoning); methodological approach (i.e. mixed methods approach); and methodological strategy (i.e. multi-case study method). The data collection was undertaken based on the following process:

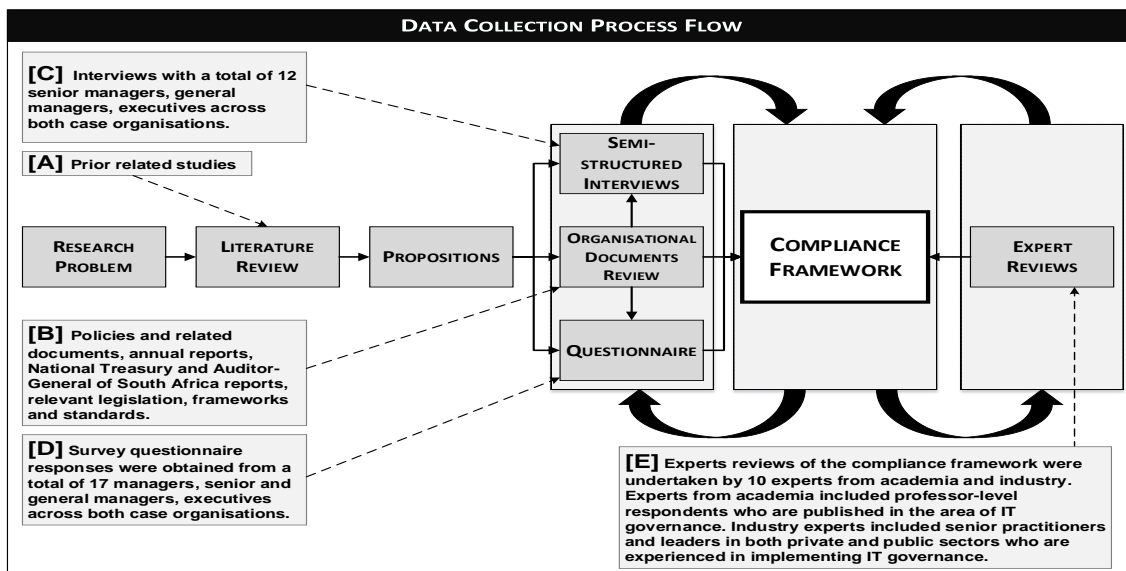


Figure 10-1: Data collection process

The two case organisations for this study were the Road Accident Fund (RAF) and the Financial Services Conduct Authority (FSCA), both organisations are categorised according to Schedule 3A of the PFMA as non-profit-making public organisations.

The sample for interviews, the survey questionnaire and the expert reviews are indicated in Figure 10–1 above in [C], [D] and [E], respectively. The target population for this study was all the top management, senior management and IT managers in both case organisations. The total target population from the RAF was 39, consisting of 23 members of senior management (i.e. executive management, IT general managers and IT senior managers) and 16 IT managers. The FSCA total target population was 18, consisting of 11 members of top management (i.e. CEO and divisional executives) and seven members of senior management (i.e. departmental heads and functional leads). In the RAF semi-structured interviews were conducted with a sample of seven respondents (i.e. 18% of the target population) and the number of survey responses received was 11 (i.e. 28% of the target population). In the FSCA, semi-structured interviews were conducted with a sample of five respondents (i.e. 28% of the target population) and the number of survey responses received was six (i.e. 33% of the target population).

Triangulation in this study was based on data from the interviews, survey questionnaire and expert reviews, as depicted in Figure 10–2 below. Data triangulation further served as a strategy to ensure the validity of the qualitative data and enhance the interpretability of the data (Creswell and Clark, 2017).

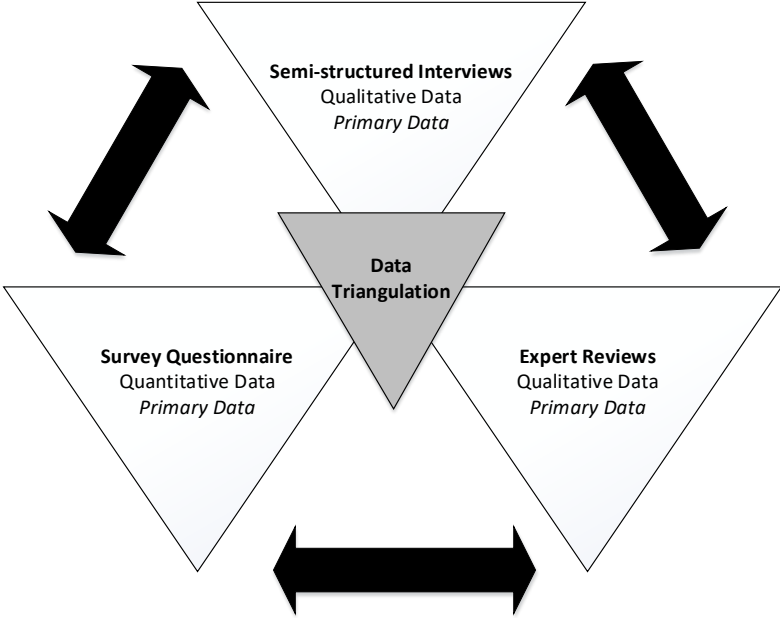


Figure 10–2: Triangulation method (adapted from Teddlie and Tashakkori, 2009)

This study applied Yin’s (2018) four tests to assess case study research quality: *construct validity, internal validity, external validity and reliability*. Construct validity is associated with the use of multiple sources of evidence and having key stakeholders such as experts review

the preliminary compliance framework of this study (Yin, 2018). Internal validity was not in scope for this study as it relates to explanatory case studies, whereas this study assumed an exploratory design. External validity is concerned with the generalisability of the findings of the study beyond the selected case organisations (Creswell and Creswell, 2018; Yin, 2018). The form of the main research for this study provides a rich groundwork to generalise its outcome through the use of theoretical propositions and replication logic (Yin, 2018). Reliability is concerned with whether another researcher, using the same research methods, could generate the same results as this study given similar working circumstances (Dudovskiy, 2018; Yin, 2018). The procedures undertaken in conducting this research are documented in this thesis, and the extensive use of software tools to assist the data collection and the analysis of the data provides an additional chain of evidence that can be replicated (Yin, 2018).

## **10.5 Evaluation**

The evaluation of the preliminary compliance framework was based on Weber's (2012) framework and theory evaluation criteria which is widely used in the IS literature (Venkatesh, Thong and Xu, 2016). This study adopted the approach discussed below in Figure 10–3 for the evaluation of the compliance framework, as depicted in Figure 10–3: Preliminary . The Parts were applied to the compliance framework for this study;<sup>14</sup> and industry and academic experts were invited to provide their expert inputs in the evaluation of the compliance framework based on its Whole properties of Importance, Novelty, Parsimony, Level and Falsifiability.

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<sup>14</sup> See Appendix F for a detailed view of the application of the Parts to the compliance framework in this study.

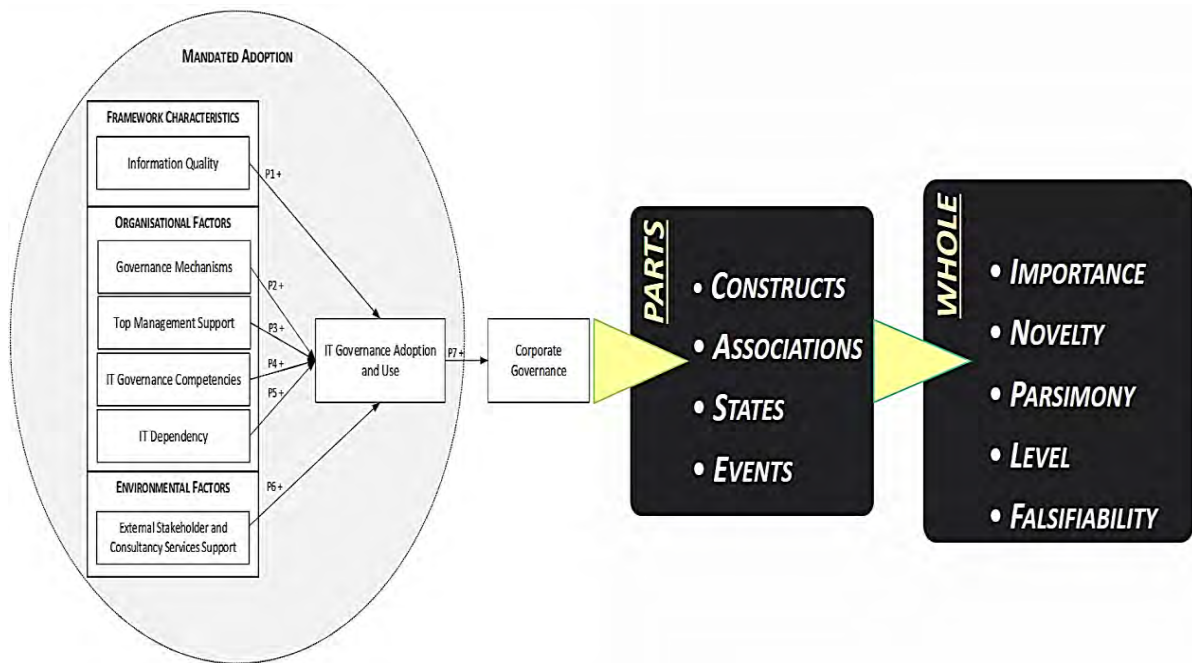


Figure 10–3: Preliminary compliance framework evaluation approach

## 10.6 Research contribution

### 10.6.1 The compliance framework

The key contribution of this study is the compliance framework for IT governance adoption by state-owned entities in South Africa. The final compliance framework, as depicted in Figure 10–4, is based on the triangulation of interview data, survey data and expert reviews. Improvements were made to the preliminary framework following the triangulation process. These improvements entailed the following:

- The inclusion of an emergent construct: Organisational Culture
- The “IT Dependency” construct was amended to “Strategic IT Dependency” to illustrate the strategic nature of IT dependency in state-owned entities as affirmed by data, due to the recognition of IT as a strategic enabler
- The “External Stakeholder and Consultancy Services Support” construct was amended to just “External Stakeholder Support”. The amendment shows the exclusion of “Consultancy Services” as a factor so as to accommodate the finding (i.e. *Finding 15* in section 8.8.1.3) where it was found that there was minimal use of consultancy services for IT governance implementation due to the unclear value derived from such consultancy services

- The “IT Governance Adoption and Use” construct was amended to “IT Governance Adoption and Continuous Use” to emphasise the dependence on effective adoption of the CGICTPF for its continuous use.

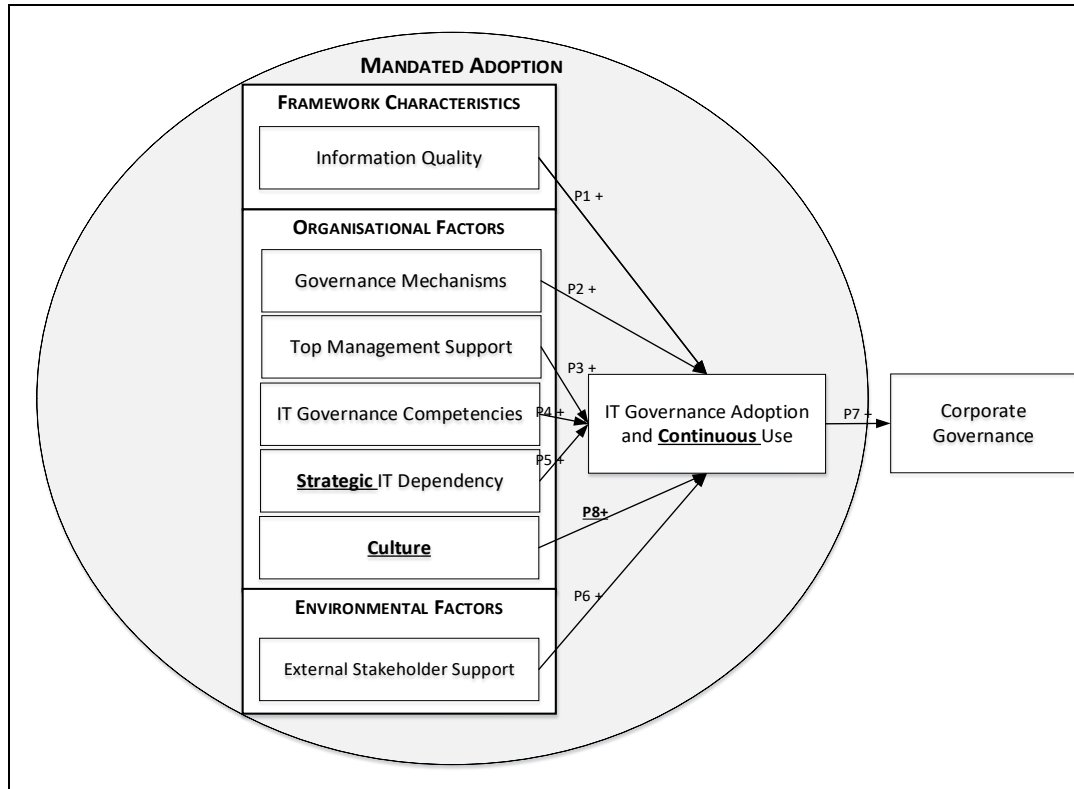


Figure 10–4: Final compliance framework

### 10.6.2 Key research findings

The key findings of this study were presented based on their related research constructs and propositions, as shown in Table 10–2. This was an effective way of ensuring that the key findings were thematically linked to the research questions through the propositions. The underlying theme across all the propositions is that whereas their design was affirmed, the data showed that in practice there were weaknesses that resulted in inconsistent and ineffective application of the factors of this study. These weaknesses support the disjuncture between policy design and implementation – the design of the CGICTPF does not comport equitably with the effectiveness of its implementation in practice.

Table 10–2: Framework constructs, propositions and research findings

**CONSTRUCTS, PROPOSITIONS AND FINDINGS**

#	Construct	Proposition	Finding
1	Information quality	P1: The quality of management information is positively related to IT governance use	<ul style="list-style-type: none"> <li>• <i>Finding 1</i> – Business intelligence and data analytics capabilities should be adequately exploited to improve strategic decision-making based on accurate, timely, relevant and complete information.</li> <li>• <i>Finding 2</i> – Adherence to IT policies, processes and SOPs embed information quality.</li> <li>• <i>Finding 3</i> – Poor business process integration at organisational and sector levels compromises the quality of information.</li> </ul>
2	Governance mechanisms	P2: Formalised governance mechanisms in the organisation positively influence IT governance use.	<ul style="list-style-type: none"> <li>• <i>Finding 4</i> – Key organisational IT governance structures require a strategic outlook to be effective.</li> <li>• <i>Finding 5</i> – The role of the CIO needs to be dynamic, multifaceted and fluent in business strategy.</li> <li>• <i>Finding 6</i> – A dedicated role for the IT governance officer is crucial to drive IT governance practices.</li> <li>• <i>Finding 7</i> – The practice of benefit realisation should ensue from the underpinning application of business cases, prioritisation of IT investments and enterprise architecture.</li> </ul>
3	Top management support	P3: Top management support is positively related to IT governance use.	<ul style="list-style-type: none"> <li>• <i>Finding 8</i> – IT sourcing decisions are effective when there is collaboration between business and IT</li> <li>• <i>Finding 9</i> – Top management buy-in should precede top management support, and both are contingent on top management IT governance competencies.</li> </ul>
4	IT governance competencies	P4: Board-level IT governance competencies are positively related to IT governance adoption and use.	<ul style="list-style-type: none"> <li>• <i>Finding 10</i> – IT governance competencies and training at the level of the board of directors remain deficient but are crucial for driving digital transformation and oversight.</li> </ul>

CONSTRUCTS, PROPOSITIONS AND FINDINGS			
#	Construct	Proposition	Finding
5	IT dependency mode	P5: The organisation's strategic mode of IT dependence is positively related to IT governance use.	<ul style="list-style-type: none"> <li>• <i>Finding 11</i> – IT should be regarded as a strategic enabler.</li> <li>• <i>Finding 12</i> – The maturity of strategic IT utilisation should be optimal in state-owned entities.</li> </ul>
6	External stakeholder and consultancy services support	P6: Support from external stakeholders and consultancy services is positively related to IT governance use.	<ul style="list-style-type: none"> <li>• <i>Finding 13</i> – There should be adequate guidance and support from government stakeholders in embedding organisational IT governance practices.</li> <li>• <i>Finding 14</i> – The malposition of the government CIO (GCIO) role within the DPSA constrains its scope of authority and impact.</li> <li>• <i>Finding 15</i> – There is minimal use of consultants and unclear value derived from consultancy services for IT governance implementation initiatives.</li> <li>• <i>Finding 16</i> – Memoranda of understanding should regulate relationships with peer organisations</li> </ul>
7	IT governance adoption and use	P7: IT governance adoption and continuous use contribute positively to corporate governance.	<ul style="list-style-type: none"> <li>• <i>Finding 17</i> – The CGICTPF has not been updated since its inception in 2012.</li> </ul>

## 10.6.3 Recommendations for practice

### 10.6.3.1 *Update the Corporate Governance of ICT Policy Framework*

The landscape has changed considerably since the publication of the CGICTPF in 2012; new tools such as Cloud are a key feature in public sector IT leaders' decision-making and the PoPIA was promulgated in 2020. Further, CGICTPF component elements such as King III (the new version King IV was introduced in 2016), ISO38500 (the new version was introduced in 2015) and COBIT 5 (the new version COBIT2019 was introduced in 2019) have been revised since 2012. Therefore, it is important to ensure its continued relevance to the changing landscape by updating the CGICTPF accordingly.

However, whether or not a new version of the CGICTPF is eventually introduced, it will meet the same challenges as the current version of limited or inadequate external support, possibly even more resistance, and require the massive training and upskilling of current staff to understand and drive the new version. It is for this reason that this recommendation goes outside the organisation – which is the unit of analysis for this study – to the external authorising environment as follows: The government must review the design of its institutional capacity to support the implementation and continued use of IT governance in a manner that is sustainable – that the success is not circumstantial (dependent on the isolated instances of favourable appointments with the fortunate combination of high competencies and the professional will to perform) but intentional and driven from the highest level possible in government. Therefore, the introduction of a new Government Chief Information Officer (GCIO) agency, as discussed below, is recommended.

#### **10.6.3.2 *Establish the GCIO office as an agency of government***

Considering the nomothetic nature of the public sector environment, the underlying weaknesses in the implementation of IT governance include the inadequate external direction and support from government, which is the key stakeholder in public sector organisations. This calls for a reimagining of the GCIO role and its malposition to make it more effective. Therefore, the recommendations of this study are as follows:

- The GCIO should be conceived of appropriately as an agency of government, attached to the DPME in the Office of the President. The new GCIO agency should be given wider powers and appropriate resources to fulfil its mandate. The close collaboration between the new GCIO agency and the AGSA, SITA and other key structures should be formalised to drive the implementation and oversight of the CGICTPF, taking into account all layers of government – national and provincial departments, state-owned entities and enterprises and local municipalities, some of which remain out of the reach of the GCIO in terms of IT governance.
- The new GCIO as an agency of government should be the centre of research and development in relation to IT governance for the public sector, with enough resources to carry out this mandate by developing internal capacity and not outsourcing its functions. It should also develop material to be used to induct all boards of directors and senior

management, and this could be done in collaboration with internal Learning and Development departments in state-owned institutions.

- Further, it should be a centre of excellence where ongoing training and support for employees are offered. It should be capacitated to train and support “in-house” tailored governance training for all government institutions. It is not enough to leave it to the boards without a coordinated effort to support the processes that can bring change. The problems here relate to structural ineffectiveness. While the AGSA can point out the flaws and make recommendations, with no demonstrable and sustainable will from the top to support the AGSA’s work it will never be enough. Therefore, this new GCIO agency with adequate powers should be established to ensure that it makes available the role of an IT governance officer to support the CIOs in all organisational structures. It should be involved in the standardisation, recruitment and appraisal of the IT governance officer role, and ensure that it works according to the same standards, and that it is buttressed with enough support. This is important because the CIOs of some government organisations may not have the competency, will or support to include this role in their organisational structures. In cases where this may be necessary, it is important for the new GCIO agency to second skilled IT governance resources to government organisations to ensure a seamless implementation of IT governance practices, including the creation of adequate IT governance structures and related charters; and offer ongoing support and training to the boards, tailored to the public sector and the level of the organisation – national, provincial or local. This distinction is important because, as has been discovered, the governance framework is not tailored to fit organisational needs. In addition, the use of consultants is not ideal as the skills transfer process does not take place as imagined and the value derived from consultancy service in relation to IT governance is minimal.

Unlike functions such as the AGSA, which must maintain independence by not being involved in implementation, since they are involved in providing assurance on the implemented controls, this new GCIO agency should design the training and support, provide advisory services and play an active supportive role in IT governance implementation within the organisations. This will accelerate the adoption and use, and improve the maturity of, IT governance.

The ideal situation is one where this function is professionalised to a similar degree as the AGSA and is less politicised! The collaboration and partnership between the AGSA

and the GCIO need to be formalised in the form of an MOU and an engagement model across all spheres of government.

#### **10.6.3.3 *IT governance officer (ITGO) role should be strengthened***

The IT governance officer role needs to be empowered with sufficient authority to enforce IT governance practices. In the context of this study this means that the IT governance officer role should also have a dual but less absolute reporting line to the CEO (or an appropriate external structure such as a well-structured and capacitated GCIO agency), instead of having the CIO filter all reporting from this role, especially in instances where the CIO may be prone to contributing to or exploiting control weaknesses for corrupt purposes. This will further improve the effectiveness and accountability mechanisms associated with this role.

#### **10.6.3.4 *Establish a universal public sector-wide IT risk universe***

The office of the GCIO, whether in its current or proposed configuration, should establish a standardised public sector-wide IT risk universe based on public sector IT assets. This can be used as a supplement to the updated CGICTPF and all organisations should tailor it to their environment. This will ensure a standardised environment and support for ITGOs across all spheres of government.

The value of an IT risk universe will expedite the process of proactively identifying risks faced by public sector institutions and implementing mitigating controls.

#### **10.6.3.5 *Implement the Skills Framework for the Information Age (SFIA)***

The problem of inadequate IT governance competencies was noted as a key hindrance to a properly constituted board of directors with the requisite skills to fulfil its oversight and monitoring functions. In addition, competent board-level committees (i.e. Operations and IT Committee, Risk and Audit Committee) provide an accountability and oversight mechanism for IT investments and sourcing decisions.

Therefore, the board of directors should approve the adoption of the Skills Framework for the Information Age (SFIA) as a competency framework to define the requisite IT governance competencies at each level of the organisation. No competency framework has been adopted to complement the CGICTPF in the same way as there have been enterprise architecture and project management frameworks that are aligned to the CGICTPF. The SFIA defines the

requisite IT governance competencies at each level of the organisation. It is strongly recommended that the SFIA be adopted and job specifications and performance contracts be aligned to this framework.

#### **10.6.3.6 *Board composition and board-level IT governance competencies***

IT governance competencies at the level of the board of directors need to be systematically addressed. The board of directors should invest in ongoing and formal IT governance training and coaching to improve IT and IT governance competencies to effectively perform their oversight and monitoring function. A mix of board members with strong IT knowledge should be a standing requirement and consistently applied for all board appointments so that board oversight of the realisation of benefits may also extend beyond the challenges of executive leadership fluidity.

IT governance training and workshops should be consistently and periodically offered to all employees, including the board of directors. A collaboration with the Learning and Development department can offer excellent opportunities for driving IT governance awareness initiatives, including having IT governance as a permanent agenda item for onboarding new employees – from IT and business.

#### **10.6.3.7 *Establish interoperability principles, standards and architecture***

Interoperability among public institutions is one of the key issues hindering efficient service delivery, as information sharing does not take place or information is shared manually. The intended process for streamlining and digitising business processes should include automated and seamless integration with external collaborating partners. IT governance practices should be applied to ensure that in addition to monitoring the IT investments and business value, adequate IT controls are incorporated in the architecture of the integration interfaces. The architecture should be based on established interoperability requirements, principles, standards and enterprise architecture.

### **10.6.4 Recommendations for case organisations**

In the case organisations there were IT governance practices, intended to improve organisational performance, that were in the process of implementation. It is important, as is done here, to acknowledge these as a step towards the eventual maturity of IT governance adoption and use in state-owned entities. As noted in Chapter 8, the underlying challenge was

ineffective implementation of what were otherwise adequately designed IT governance practices. It is recommended that the practices discussed below continue and be applied consistently across the organisations in order to improve their effectiveness:

- The case organisations need to continue the trajectory of investment in building organisational capabilities by acquiring the necessary skills, tools and infrastructure to mature the business intelligence and data analytics functions, including the use of relevant cloud services. However, these IT investments must be strictly and consistently monitored by the board of directors through periodic reports from lower IT governance structures to ensure that they yield the intended business value.
- Information quality should be explicitly set as one of the key performance indicators (KPIs) for IT governance for all IT and business roles and embedded in daily operations through appropriate IT policies, processes and SOPs. This will further enhance information quality in the case organisations.
- Benefit realisation is a practice that is linked to IT governance competencies at the level of the board. It is a key outcome of the board of directors playing a critical oversight role in relation to IT governance investments. See section 8.6.2 for the board-level IT governance recommendations for practice.
- Revive governance structures and fill vacancies to ensure that IT is not considered an afterthought but a strategic partner to business. Collaboration between business and IT should be improved when making sourcing decisions in order to avoid corrupt activities. IT sourcing decisions are effective when there is collaboration between business and IT. Improved business management ownership of relevant IT governance processes is critical to avoiding corruption related to IT investment and sourcing decisions.
- One of the key benefits associated with top management support is that it facilitates consequence management – the holding of employees accountable for their actions and rewarding them accordingly for their performance to improve morale, which tends to be low in the public sector. This must be applied consistently throughout the organisation.
- The board and management should actively support IT governance awareness initiatives and set the tone by leading awareness initiatives and bridging the information gap between governance structures and the rest of the organisation/employees. Similarly, support for

periodic IT governance self-assessments should be seen to emanate from the top management structures. It is not enough for this to be driven by the ITGO who has limited influence and powers.

- Digital transformation programmes are underway to improve the maturity of IT utilisation in the case organisations through the respective Integrated Claims Management System (ICMS) and Data Driven Digital (DDD) strategies. These strategies form part of the respective organisational IT strategies that are intended to support the respective business strategies. However, the implementation of these IT strategies is not complete so it is impossible to determine either the actual (instead of planned) related benefit realisation or the business value associated with these innovations. It is also concerning that a high number of respondents disagreed that their organisation's IT strategy had been updated in the last 12 months.

### **10.6.5 Recommendations for research**

### **10.6.6 Research limitations**

The following limitations of this research were identified:

- One of the key limitations in the research process was the impact of Covid-19 as discussed in section 6.8.
- Another limitation was the instability of leadership in one case organisation, as is the case in the public sector in general. This affected the research in that when the time came to interview the CIO of the case organisation he had already been suspended indefinitely and the general manager was acting in the CIO position. The general manager had already been interviewed in his original role as general manager, and at the time of his interview he had also taken on the responsibilities of Senior Manager: IT Security, Risk and Governance, since that position was critical but vacant. Therefore, it would not have yielded any further value for this study to have interviewed the general manager as acting CIO.
- This study focused on public sector organisations that form part of Schedule 3 Part A of the PFMA (i.e. non-profit-making agencies, board(s), commission(s), authorities, fund(s)).

### **10.6.7 Suggestions for future research**

The following suggestions for future research are made:

- In future, it would be worth investigating the adoption and use of the CGICTPF across government departments, state-owned enterprises and other spheres of government such as provincial and local governments.
- A replication of this study in another developing country (emerging economy) could be done in order to ascertain whether it would yield similar experiences and whether further learnings could be drawn from it.
- The use of incentives to influence staff motivation and morale in the context of CGICTPF adoption and use is worth investigating in the future.
- The fluidity of leadership tenure in the public sector generally, and pertaining to IT leadership in particular, was beyond the scope of this study. It would be worth investigating this aspect in future, including its antecedents and impact on IT projects and IT-related investments.
- Budgeting cycles and financial resource constraints and their impact on the implementation of the CGICTPF would be an interesting angle for future research.
- The application of this framework in practice would be a great opportunity to help bridge the gap between theory and practice and would have implications for future research.

### **10.7 Personal reflection**

This research has been a deeply rewarding experience, and the timing of undertaking it intersected with major personal changes. The research process itself was challenging and laden with uncertainties and personal doubts. I experienced first-hand the difficulties of conducting research in the public sector where the bureaucracy often frustrated approval processes and access to respondents. The Covid-19 pandemic exacerbated these difficulties. However, my persistence and success in getting this done is a reflection of the passion I have for public service, and the yearning for a different calibre of public professional who exercises care and duty towards the citizenry they serve. I am grateful to the organisations that approved the access I needed to complete this important work, which contributes to improving corporate

governance and how citizens experience public service delivery. During the course of the research process, I built professional relationships with some of the consummate public sector professionals who seek to contribute meaningfully to public service, and I am grateful to them for their time and insights.

I have also experienced personal growth during the process of conducting this research. My insights improved and I am now in a better position to provide meaningful guidance to the boards of directors and management of state-owned entities about IT governance, should such a need for collaboration be expressed. The other aspect of personal growth has been in relation to transitioning into academia following 18 years of industry work. In this regard, my colleagues in the Department of Information Systems at Rhodes University have been phenomenally welcoming, making the transition a little less daunting. I am also indebted to my supervisor who played a pivotal role in this regard.

It would be remiss of me if I did not reflect on how my three minor children have influenced my journey. Living with three minor children as a single father while undergoing the transition noted above, and also completing this research, was challenging. Partly, the motivation to undertake and complete this work was to set a good example for my children to challenge themselves and work hard. I was also acutely aware of and motivated by the prospect of being the first person in my entire bloodline to obtain a PhD. The support of my mother and two sisters has made a considerable difference, and has made our bond even stronger. My mother lost five infant children and I was the first of three to survive; considering the effect on my life of all my siblings (living and late), I come as eight.

Emerging from depression to complete this important work is the highlight of my life, and a product of my faith, which has grown over the period of conducting this research. Therefore, my desire now is to give to others any support I can offer to their ambitions to make our world a better place, in the same way as I have been supported.

## **10.8 Conclusion**

In this chapter an overview of the design of this study was reiterated; specifically, the research objectives, aims, problem, questions and methodology and the contribution of this study were discussed. The objective of the study was to develop a compliance framework for IT governance adoption and use in South Africa. The compliance framework constructs were

based on theory, literature and empirical evaluation. The aims of this study were to (1) identify the factors that influence IT governance use in state-owned entities; (2) determine how public sector characteristics affect IT governance use; and (3) rationalise and optimise the influence of IT governance adoption and use on corporate governance in state-owned entities in South Africa. These aims were achieved by answering the related research sub-questions.

Further, the key findings, conclusions and recommendations of this study were discussed. The recommendations were categorised according to their applicability to practice, the case organisations themselves and future research.

The most fundamental recommendation of this study is the reimagining of a new GCIO agency of government with a wide scope of authority in order to provide adequate support and oversight for a mature implementation of the CGICTPF. Overall, the key recommendations for practice in this study are the establishment of a GCIO office appropriately as an agency of government, updating the CGICTPF, strengthening the IT governance officer (ITGO) role, establishing a universal public sector-wide IT risk universe, adopting and implementing the SFIA, improving board composition and board-level IT governance competencies, and establishing interoperability requirements, principles, standards and architecture.

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# Appendices

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## Appendix A – Semi-Structured Interview Questions

### **A compliance framework for IT governance adoption and use in state-owned entities in South Africa**

**Objectives for this research are to:**

1. Identify the factors that influence IT governance adoption and use in state-owned entities,
2. Determine how public sector characteristics affect IT governance adoption and use, and
3. Develop a compliance framework for optimising IT governance adoption and use in state-owned entities in South Africa.

**Estimated time:**

- 30 minutes for the entire duration of the interview session

**Definition of terms used in interview:**

- *Formal IT governance practices*  
Standards and frameworks that facilitate effective IT governance
- *Standard*  
A set of pre-defined methods, processes or practice set by a standard setting entity OR organisation, usually adopted and implemented to enable organisations to attain certification
- *Framework*  
A set of practices, usually adopted and implemented according to the needs of the organisation to achieve a specific or desired goal or objective.
- *CGICTPF*  
The Corporate Governance of ICT (CGICTPF) which was adopted in 2012. It is a policy framework that combines elements of ISO38500, COBIT 5 and King IV.

**The following structured interview questions are divided into 4 sections:**

- Section 1: Demographic Information (2 questions)
- Section 2: CGICTPF Implementation (4 question)
- Section 3: IT Governance Framework Characteristics (3 questions)
- Section 4: General Information (1 question)

**BACKGROUND INFORMATION:**

*(in case this information is not obtainable from publicly available Annual Reports and Organisational Structure)*

1. Are you part of the senior management team?
2. Please describe briefly the organisational structure and how your role fits in.

3. How many full-time employees are currently employed in this organisation?
4. How much is the organisation's annual turnover?
5. How many departments OR divisions are there in this organisation?
6. Is your organisation a subsidiary within a parent organisation?

**SECTION 1: DEMOGRAPHIC INFORMATION:**

1. Please describe your role within the organisation.
2. What is your background, experience and knowledge in relation to IT Governance?

**SECTION 2: CGICTPF IMPLEMENTATION**

3. At which phase of implementation of the CGICTPF is your organisation?
4. In your view what are the factors that need to be considered for the successful adoption and use of IT governance frameworks in the public sector?
5. What do you think are the significant benefits of IT governance adoption and use in the public sector?
6. What do you think are the top challenges and issues that influence the adoption and use of IT governance in the public sector?

**SECTION 3: IT GOVERNANCE FRAMEWORK CHARACTERISTICS**

7. What is the influence of the following IT governance framework characteristics on the adoption and use of IT governance? How? (Please explain):
  - INFORMATION QUALITY
8. What is the influence of the following organisational context factors on the adoption and use of IT governance? How? (Please explain):
  - GOVERNANCE MECHANISMS
  - TOP MANAGEMENT SUPPORT
  - IT GOVERNANCE COMPETENCIES
  - IT DEPENDENCY
9. What is the influence of the following environmental context factors on the adoption and use of IT governance? How? (Please explain):
  - EXTERNAL STAKEHOLDER AND CONSULTANCY SERVICES SUPPORT

**SECTION 4: GENERAL INFORMATION**

10. Please provide any additional comments that you deem appropriate concerning IT Governance in state-owned.

## Appendix B – Survey Questionnaire

Based on your experience and understanding of IT governance adoption and use in your organisation, please indicate to what extent you agree or disagree (1 – Strongly disagree; 2 – Disagree; 3 – Undecided; 4 – Agree; 5 – Strongly Agree) with the following statements:

<b>A. INFORMATION QUALITY (adapted from COBIT 5) (Accuracy, Current, Relevant, Complete)</b>					
1. Performance reports are easy to read and understand.	1	2	3	4	5
2. Business and IT executives are satisfied with the quality and content of performance reports produced for decision making.	1	2	3	4	5
3. Business users are satisfied with quality and timeliness (or availability) of management information.	1	2	3	4	5
4. Management information is produced according to defined levels in the Service Level Agreements (SLAs) or Operational Level Agreements (OLAs).	1	2	3	4	5
5. The IT strategic plan was last updated within the last 12 months.	1	2	3	4	5
6. IT-related goals are translated into potential IT-enabled investment programmes.	1	2	3	4	5
7. Business cases for IT-enabled investments have clear and agreed-on business expectations/requirements.	1	2	3	4	5
8. Business process owners are satisfied with IT service delivery meeting agreed-on service levels.	1	2	3	4	5
9. IT-related non-compliance issues are reported to the board of directors.	1	2	3	4	5
<b>B. IT DEPENDENCY MODE – IT GOVERNANCE STRUCTURES (27 QUESTIONS)</b>					
<b>MANAGEMENT LEVEL</b>					
<i>An officer or manager responsible for IT Governance:</i>					
10. is responsible for developing and implementing an IT governance strategy.	1	2	3	4	5
11. is responsible for assessing IT risks (e.g. impact on the business continuity, IT service continuity).	1	2	3	4	5
12. has sufficient authority to enforce IT governance processes.	1	2	3	4	5
<i>An IT steering committee at an executive (or senior management) level:</i>					
13. formulates/approves IT strategies/policies of the organisation.	1	2	3	4	5
14. is responsible for determining business priorities in IT investments.	1	2	3	4	5
15. provides strategic direction to IT projects.	1	2	3	4	5
16. provides leadership in deriving benefits from IT.	1	2	3	4	5
17. actively participates in the organisation's IT decision-making processes.	1	2	3	4	5
18. makes IT investment decisions based on business needs.	1	2	3	4	5
19. promotes IT strategic flexibility to meet the changing needs of the organisation's internal and external environment.	1	2	3	4	5
20. has business representatives with extensive IT knowledge.	1	2	3	4	5
21. has IT representatives with extensive business knowledge.	1	2	3	4	5
<i>An IT architecture steering committee:</i>					
22. is composed of business and IT people.	1	2	3	4	5
23. provides architecture guidelines and advice on their applications.	1	2	3	4	5
<i>An IT project steering committee:</i>					
24. is composed of business and IT people.	1	2	3	4	5
25. focuses on prioritizing and managing IT projects.	1	2	3	4	5
<i>An IT security steering committee:</i>					
26. is composed of business and IT people.	1	2	3	4	5
27. focuses on IT related risks and security issues.	1	2	3	4	5
<b>BOARD OF DIRECTORS LEVEL</b>					

28. Members of the board of directors have expertise and experience regarding IT value and risk.	1	2	3	4	5
29. The board of directors is committed to an ongoing IT training program.	1	2	3	4	5
30. The board of directors has a thorough understanding of IT governance based on discussions with the IT executive and/or the audit committee.	1	2	3	4	5
<b><i>An IT strategy committee at the board of directors' level:</i></b>					
31. ensures IT is a regular agenda item and reporting issue for the board.	1	2	3	4	5
32. provides strategic direction and the alignment of IT and business issues.	1	2	3	4	5
33. provides direction for sourcing and use of IT resources, skills and infrastructure to meet the strategic objectives.	1	2	3	4	5
34. provides direction to management relative to IT strategy.	1	2	3	4	5
<b><i>A committee at the board of directors' level (other than an IT strategy committee) that overviews IT assurance activities:</i></b>					
35. is comprised of independent members (from outside the organisation).	1	2	3	4	5
36. addresses IT governance requirements.	1	2	3	4	5
<b>C. IT DEPENDENCY MODE – IT GOVERNANCE PROCESSES (23 QUESTIONS):</b>					
<b>GENERAL</b>					
37. A formal planning process is used to define and update the IT strategy.	1	2	3	4	5
38. IT budgets are used to control and report on IT activities or investments.	1	2	3	4	5
39. There are IT performance measures (e.g. organisational contribution, user orientation, operational excellence or future orientation).	1	2	3	4	5
40. Methodologies are used to charge back IT costs to business units.	1	2	3	4	5
41. There are formal agreements between business and IT departments about IT development projects or IT operations.	1	2	3	4	5
42. An Enterprise Risk Management (ERM) framework for internal control is used to govern IT.	1	2	3	4	5
43. There are regular self-assessments or independent assurance activities on IT governance and control.	1	2	3	4	5
44. The organisation regularly engages outside agencies to test its security systems or to conduct security audits.	1	2	3	4	5
<b>EVALUATION, SELECTION, AND MANAGEMENT OF IT PROJECTS</b>					
45. There is a prioritisation process for IT investments and projects in which business and IT are involved (e.g. business cases, return on investment).	1	2	3	4	5
46. Explicit criteria are used to help evaluate IT projects.	1	2	3	4	5
47. Both qualitative and quantitative criteria are used to evaluate IT projects.	1	2	3	4	5
48. A cost/benefit analysis is used to evaluate IT projects.	1	2	3	4	5
49. Project cost data are fully identified (direct, indirect and ongoing).	1	2	3	4	5
50. IT investment benefits are identified using quantitative and/or qualitative data that relate directly to business strategies and performance improvement (tracking IT business value).	1	2	3	4	5
51. The expected timeframes for development and implementation are explicitly specified.	1	2	3	4	5
52. All foreseeable IT risks are identified.	1	2	3	4	5
53. The organisational impacts of IT projects are evaluated.	1	2	3	4	5
54. The availability of personnel resources relative to IT projects is assessed.	1	2	3	4	5
55. Project management methodology is used to manage IT projects.	1	2	3	4	5
56. Processes are used to monitor the planned business benefits during and after implementation of the IT investments/projects.	1	2	3	4	5
<b>IT POLICIES:</b>					
57. are clearly written so that employees can understand them.	1	2	3	4	5
58. define objectives and expectations, such as accountability and responsibility.	1	2	3	4	5

59. are communicated and are accessible to all employees.	1	2	3	4	5
<b>D. IT DEPENDENCY MODE – IT GOVERNANCE RELATIONAL CAPABILITIES (9 QUESTIONS)</b>					
60. The senior executive/officer in charge of IT articulates a vision for IT’s role in the organisation.	1	2	3	4	5
61. The senior executive/officer in charge of IT ensures that the vision for IT’s role is clearly understood by managers throughout the organisation.	1	2	3	4	5
62. There is job rotation (IT staff working in the business units and business people working in IT).	1	2	3	4	5
63. Business people are trained about IT or IT people are trained about business.	1	2	3	4	5
64. Systems such as Intranet are used to share and distribute knowledge about the IT governance framework, responsibilities and tasks.	1	2	3	4	5
65. Senior business and IT management act as “partners.”	1	2	3	4	5
66. Senior business and IT management informally discuss the organisation’s activities and IT’s role.	1	2	3	4	5
67. Internal corporate communication regularly addresses general IT issues.	1	2	3	4	5
68. There are campaigns explaining the need for IT governance to business and IT people.	1	2	3	4	5
<b>E. TOP MANAGEMENT SUPPORT (5 QUESTIONS)</b>					
69. There is top management resource allocation for formal IT governance practice.	1	2	3	4	5
70. There is top management vision sharing, articulation and promotion of formal IT governance practices.	1	2	3	4	5
71. There is top management involvement in formulating a strategy for formal IT governance practice.	1	2	3	4	5
72. There is top management involvement in key decision making activities regarding formal IT governance practice.	1	2	3	4	5
73. There is top management risk taking towards formal IT governance practice.	1	2	3	4	5
<b>F. EXTERNAL SUPPORT (EXTERNAL STAKEHOLDER SUPPORT) (5 QUESTIONS)</b>					
74. There is on-hand incentives from community agencies (i.e. GITOC) towards formal IT governance practice.	1	2	3	4	5
75. There is on-hand training from community agencies towards formal IT governance practice.	1	2	3	4	5
76. Government provides leadership in formal IT governance practice initiatives.	1	2	3	4	5
77. It is easy to get outside help in resolving unexpected formal IT governance practice problems.	1	2	3	4	5
78. Government provides subsidies/budget for formal IT governance practice.	1	2	3	4	5
<b>G. CONSULTANT EFFECTIVENESS (CONSULTANCY SERVICES SUPPORT) (5 QUESTIONS)</b>					
79. Consultants have prior experience in providing quality service for formal IT governance practice.	1	2	3	4	5
80. Consultants have the capability to provide relevant solutions for formal IT governance practice.	1	2	3	4	5
81. Consultants have prior experience in providing quality training for formal IT governance practice.	1	2	3	4	5
82. Consultants have good relationship with all relevant parties in our organisation.	1	2	3	4	5
83. Consultants are effective in recommending suitable solutions for formal IT governance practice.	1	2	3	4	5

## Appendix C – Panel of Experts Questionnaire

This questionnaire is based on Weber’s (2012) Framework and Criteria for Theory Evaluation, the below questions are addressed to IT governance experts to evaluate the *Compliance Framework for IT Governance Adoption and Use by State-Owned Entities in South Africa*:

**11. Title of Participant:**

*Click to choose an item:*

**12. Name & Surname of Participant:**

Type here

**13. Please select the appropriate:**

- I work (or have worked) in the public sector
- I have experience (or some level of involvement) in implementing IT governance
- I work (or have worked) in academia (PhD)
- I have published research articles on IT governance
- Other

**14. Are the propositions of the compliance framework clear and do they contribute to the stated objective of the framework? Would you suggest rewording or removing any of the propositions? Please provide any additional comments:**

Type here

**15. Are the constructs of the compliance framework clear and do they contribute to the objective of the framework? Would you suggest rewording or removing any of the constructs, or adding new ones? Please provide any additional comments:**

Type here

**Is the focal phenomena of the compliance framework (i.e. IT governance/CGICTPF) an important area of research? Does the compliance framework address a relevant problem? Please provide any additional comments:**

Type here

**16. Does the compliance framework contribute to knowledge in relation to IT governance? Please provide any additional comments:**

Type here

**17. Does the compliance framework offer predictive or explanatory insights in relation to IT governance adoption and use in the public sector? Please provide any additional comments:**

Type here

**18. Do you agree that the compliance framework is positioned at the correct level (i.e. focusing on the board of directors, executive and middle management)? Please provide any additional comments:**

Type here

**Is it reasonable to expect that the compliance framework is capable of being tested empirically without generating false positive results in relation to its propositions? Please provide any additional comments:**

Type here

## Appendix D – Participant Informed Consent

### INFORMED CONSENT DECLARATION

(Participant)

Project Title: **A compliance framework for IT governance adoption and use by state-owned entities in South Africa**

Mr. Monelo Nxozu from the Department of Information Systems, Rhodes University has requested my permission to participate in the above-mentioned research project.

The nature and the purpose of the research project and of this informed consent declaration have been explained to me in a language that I understand.

I am aware that:

1. The purpose of the research project is to develop a compliance framework for IT governance adoption and use by state-owned entities in South Africa.
2. The Rhodes University has given ethical clearance to this research project and I have seen or may request to see the clearance certificate.
3. By participating in this research project I will be contributing towards the improvement of compliance to corporate governance requirements in state-owned entities.
4. I will participate in the project by completing a questionnaire and/or taking part in an interview session.
5. My participation is entirely voluntary and should I at any stage wish to withdraw from participating further, I may do so without any negative consequences.
6. I will not be compensated for participating in the research, but my out-of-pocket expenses will be reimbursed.
7. There may be risks associated with my participation in the project. I am aware that:
  - a. the following risk is associated with my participation: the nature of this research is such that the data could be put to use that is not intended by the research project.
  - b. the following steps have been taken to prevent the risks:
    - i. The researcher will keep the research data secure and the research data will be only accessible by himself;
    - ii. When the research findings are made public this will be done under terms agreed with the participants, and complete anonymity of participants will be maintained;
  - c. there is a low chance of any risk materialising.
8. The researcher intends publishing the research results in the form of a PhD thesis and academic journal articles. However, confidentiality and anonymity of records will be maintained and that

my name and identity will not be revealed to anyone who has not been involved in the conduct of the research.

9. I will receive feedback in the form of a summarised report regarding the results obtained during the study.
10. Any further questions that I might have concerning the research or my participation will be answered by Monelo Nxosi (email: [m.nxosi@ru.ac.za](mailto:m.nxosi@ru.ac.za); mobile: 0727470166).
11. By signing this informed consent declaration I am not waiving any legal claims, rights or remedies.
12. A copy of this informed consent declaration will be given to me, and the original will be kept on record.

I, ..... have read the above information/confirm that the above information has been explained to me in a language that I understand and I am aware of this document's contents. I have asked all questions that I wished to ask and these have been answered to my satisfaction. I fully understand what is expected of me during the research.

I have not been pressurised in any way and I voluntarily agree to participate in the above-mentioned project.

.....  
**Participants signature      Witness      Date**

Rhodes University, Research Office, Ethics  
Ethics Coordinator: [ethics-committee@ru.ac.za](mailto:ethics-committee@ru.ac.za)  
t: +27 (0) 46 603 7727 f: +27 (0) 86 616 7707  
Room 220, Main Admin Building, Drostdy Road, Makhanda, 6139

# Appendix E – Ethics Approval



Rhodes University Human Ethics Committee  
PO Box 94, Makhanda, 6140, South Africa  
t: +27 (0) 46 603 7727  
f: +27 (0) 46 603 8822  
e: [s.marqele@ru.ac.za](mailto:s.marqele@ru.ac.za)  
NHREC Registration number: RC-241114-045

<https://www.ru.ac.za/researchgateway/ethics/>

24/06/2021

MR Monelo Nxosi

Email: [M.Nxosi@ru.ac.za](mailto:M.Nxosi@ru.ac.za)

Review Reference: 2020-0810-3207

Dear Prof Stephen Flowerday

Title: A compliance framework for IT governance adoption and use by state-owned entities in South Africa

Principal Investigator: Prof Stephen Flowerday

Collaborators: Mr. Monelo Nxosi.

This letter confirms that the above research proposal has been reviewed and **APPROVED** by the Rhodes University Human Ethics Committee (RU-HEC). Your Approval number is: 2020-0810-3207

Approval has been granted for 1 year. An annual progress report will be required in order to renew approval for an additional period. You will receive an email notifying when the annual report is due.

Please ensure that the ethical standards committee is notified should any substantive change(s) be made, for whatever reason, during the research process. This includes changes in investigators. Please also ensure that a brief report is submitted to the ethics committee on the completion of the research. The purpose of this report is to indicate whether the research was conducted successfully, if any aspects could not be completed, or if any problems arose that the ethical standards committee should be aware of. If a thesis or dissertation arising from this research is submitted to the library's electronic theses and dissertations (ETD) repository, please notify the committee of the date of submission and/or any reference or cataloging number allocated.

Sincerely,

Prof Arthur Webb

Chair: Rhodes University Human Ethics Committee, RU-HEC

cc: Mr. Siyanda Manqele - Ethics Coordinator



**RHODES UNIVERSITY**  
*Where leaders learn*

**Rhodes University Human Research Ethics Committee**

PO Box 94, Makhanda, 6140, South Africa

t: +27 (0) 46 603 7727

f: +27 (0) 46 603 8822

e: [ethics-committee@ru.ac.za](mailto:ethics-committee@ru.ac.za)

**NHREC Registration number: RC-241114-045**

<https://www.ru.ac.za/researchgateway/ethics/>

6 July 2022

MR Monelo Nxosi

Email: [MNxosi@ru.ac.za](mailto:MNxosi@ru.ac.za)

Review Reference: 2022-0810-6863

Dear MR Monelo Nxosi

**Re: Human ethics renewal application:** A compliance framework for IT governance adoption and use by state-owned entities in South Africa

Researcher: MR Monelo Nxosi

Supervisors: .

This letter confirms that the above Annual Report has been reviewed and **APPROVED** by the Rhodes University Human Research Ethics Committee (RU-HREC). Your Approval number is: 2022-0810-6863

Approval has been granted for 1 year. An annual progress report will be required in order to renew approval for an additional period.

Please ensure that the Human Research Ethics Committee is notified should any substantive change(s) be made, for whatever reason, during the research process. This includes changes in investigators. Please also ensure that a brief report is submitted to the ethics committee on the completion of the research. The purpose of this report is to indicate whether the research was conducted successfully, if any aspects could not be completed, or if any problems arose that the Human Research Ethics Committee should be aware of. If a thesis or dissertation arising from this research is submitted to the library's electronic theses and dissertations (ETD) repository, please notify the committee of the date of submission and/or any reference or cataloguing number allocated.

Sincerely,

**Dr Janet Hayward**

**Chair: Rhodes University Human Research Ethics Committee, RU-HREC**

cc: Ethics Coordinator

## Appendix F – Application of Weber’s Framework and Criteria for Theory Evaluation

In relation to Parts, Weber’s (2012) Framework and Criteria for Theory Evaluation is applied to the compliance framework as follows:

- Constructs and Propositions (i.e. Associations) as presented in Table F–1 below:

Table F–1: Constructs and associations

CONSTRUCTS AND ASSOCIATIONS		
#	<i>Constructs</i>	<i>Associations</i>
1	Information quality	P1: The quality of management information is positively related to IT governance use
2	Governance mechanisms	P2: Formalised governance mechanisms in the organisation positively influence IT governance use.
3	Top management support	P3: Top management support is positively related to IT governance use.
4	IT governance competencies	P4: Board-level IT governance competencies are positively related to IT governance adoption and use.
5	IT dependency mode	P5: The organisation’s strategic mode of IT dependence is positively related to IT governance use.
6	External stakeholder and Consultancy services support	P6: Support from external stakeholders and consultancy services is positively related to IT governance use.
7	IT governance adoption and use	P7: IT governance adoption and continuous use contributes positively to corporate governance

- States are represented by the Process Capability Maturity Levels derived from COBIT, as depicted in Table F–2 below.

COBIT is a key component of the CGICTPF and uses Capability Maturity Model Integration (CMMI) for processes. It is premised on a widely used and accepted model in industry and academia. CMMI is also considered favourably in IS literature for IT governance maturity assessment (Rogers, 2009). In this study it is used as the instrument to define the states of the constructs’ capabilities.

Table F–2: Process Capability Maturity Levels as States adapted from (ISACA, 2019)

CAPABILITY MATURITY LEVELS FOR PROCESSES	
Level	Definition
0	<ul style="list-style-type: none"> <li>Lack of any basic capability</li> <li>Incomplete approach to address governance and management purpose</li> <li>May or may not be meeting the intent of any process practices</li> </ul>
1	<ul style="list-style-type: none"> <li>The process more or less achieves its purpose through the application of an incomplete set of activities that can be characterized as initial or intuitive – not very organized.</li> </ul>
2	<ul style="list-style-type: none"> <li>The process achieves its purpose through the application of a basic, yet complete, set of activities that can be characterized as performed.</li> </ul>
3	<ul style="list-style-type: none"> <li>The process achieves its purpose in a much more organized way using organizational assets. Processes typically are well defined.</li> </ul>
4	<ul style="list-style-type: none"> <li>The process achieves its purpose, is well defined, and its performance is (quantitatively) measured.</li> </ul>
5	<ul style="list-style-type: none"> <li>The process achieves its purpose, is well defined, its performance is measured to improve performance and continuous improvement is pursued.</li> </ul>

An example of how an assessment of constructs based on the states presented above could be developed for a state-owned entity is shown in Figure F–1 below. The capability maturity levels can be assessed for any state-owned entity and plotted to demonstrate the states, events and boundaries for each construct of the compliance framework.

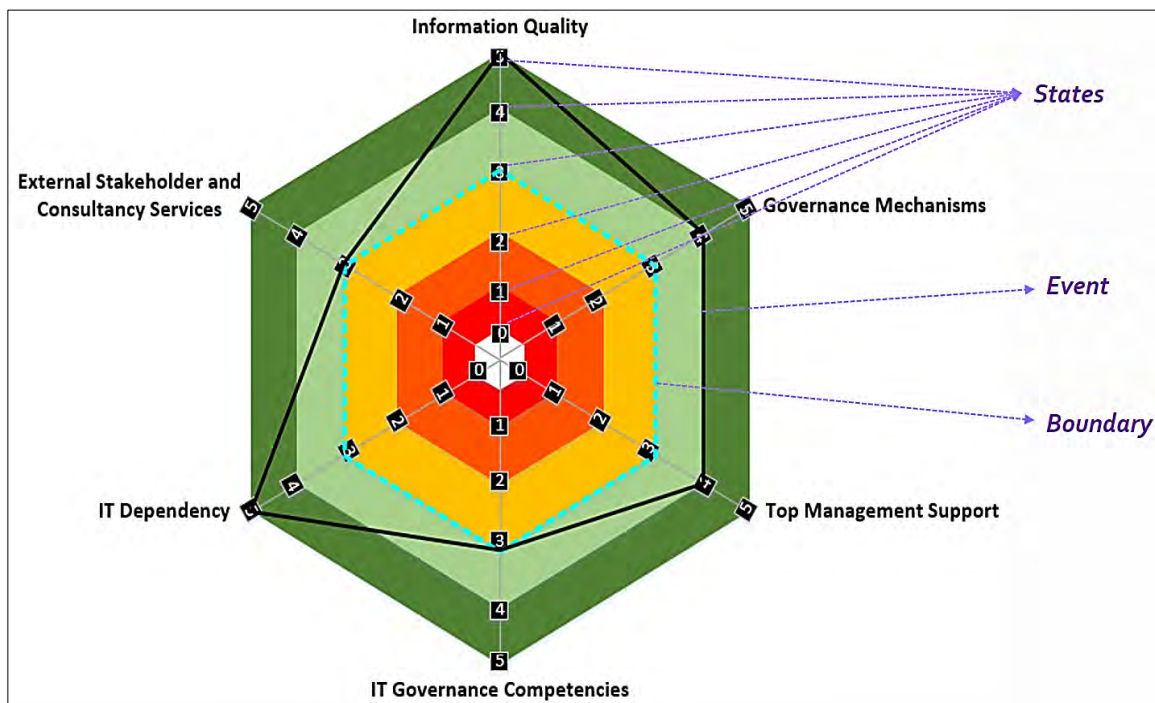
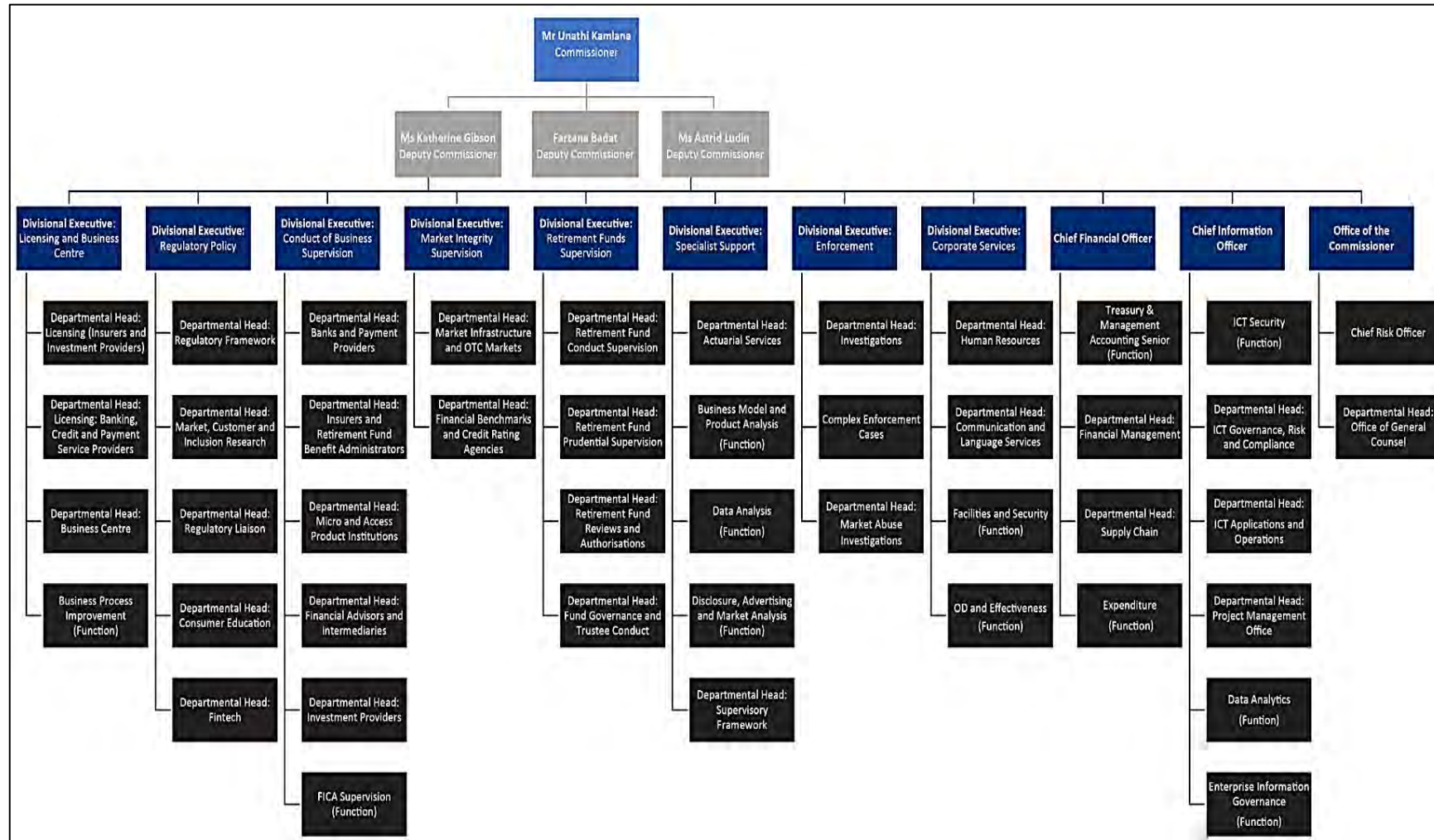


Figure F–1: Example assessment of constructs, states and boundary

In the above example, the states are denoted by levels 0 – 5 for each construct. The boundary is denoted by the magenta dotted line around level 3. The objective of the

compliance framework is to enhance IT governance in state-owned by maintaining a capability maturity level of 3 and above. Therefore, the boundary of the framework is capability maturity level 3. The event is denoted by the black line across all constructs that joins the states that are achieved for each construct.

# Appendix G – FSCA organogram



## **Appendix H – List of applicable regulations and codes**

### **A. List of regulations applicable specifically to the RAF**

- Apportionment of Damages Act, 1956 (Act No. 34 of 1956)
- Compensation for Occupational Injuries and Diseases Act, 1993 (Act No. 130 of 1993)
- Contingency Fees Act, 1977 (Act No. 66 of 1977)
- Control of Access to Public Premises and Vehicle Act, 1985 (Act No. 53 of 1985)
- Customs and Excise Act, 1964 (Act No. 91 of 1964)
- Prescribed Rate of Interest Act, 1975 (Act No. 55 of 1975)
- Prescription Act, 1969 (Act No. 68 of 1969)
- Road Accident Fund Act, 1996 (Act No. 56 of 1996)
- Road Accident Fund (Transitional Provisions) Act, 2012 (Act No. 15 of 2012)
- Road Accident Fund Amendment Act, 2005 (Act No. 19 of 2005)

### **B. List of regulations applicable specifically to the FSCA**

- Collective Investment Schemes Control Act 45 of 2002
- Credit Rating Services Act 24 of 2012
- Financial Advisory and Intermediary Services Act 37 of 2002 (FAIS Act)
- Financial Markets Act 19 of 2012
- Friendly Societies Act 25 of 1956
- Pension Funds Act 24 of 1956
- Long-term Insurance Act 52 of 1998 (for matters within the objectives of the FSCA); and  
Short-term Insurance Act 53 of 1998 (for matters within the objectives of the FSCA)
- Financial Institutions (Protection of Funds) Act (Act 28 of 2001)

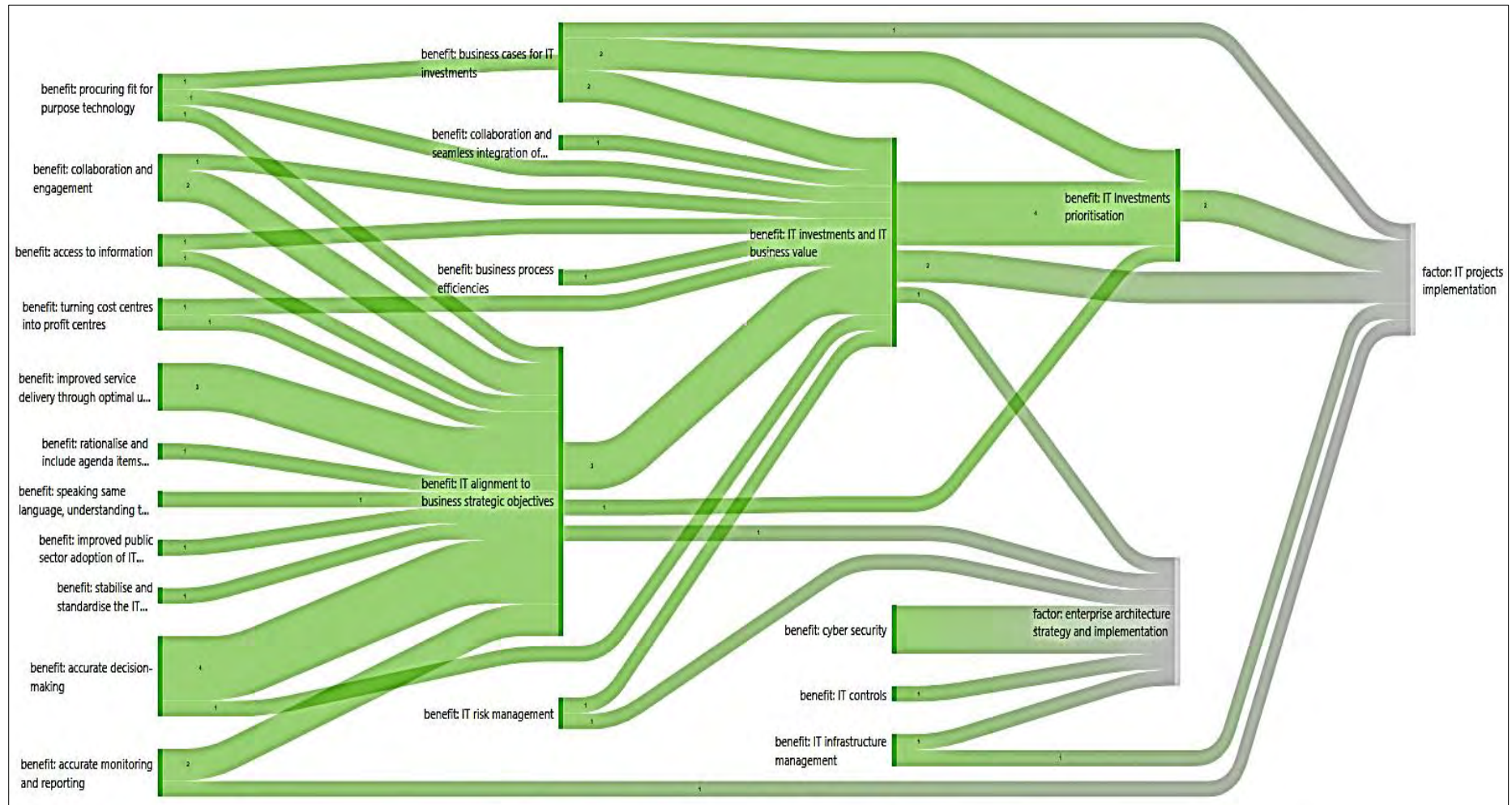
- Financial Intelligence Centre Act (Act 38 of 2001)
- Financial Sector Regulation Act (Act 9 of 2017)
- Financial Services Board Act (Act 97 of 1990)
- Financial Services Ombud Schemes Act (Act 37 of 2004)
- Financial Supervision of the Road Accident Fund Act (Act 8 of 1993)
- Friendly Societies Act (Act 25 of 1956)
- Insurance Act (Act 18 of 2017)

**C. List of regulations and codes applicable both entities**

- Basic Conditions of Employment Act, 1997 (Act No. 75 of 1997)
- Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003)
- Constitution of the Republic of South Africa, (Act No. 108 of 1996)
- Corporate Governance of Information Communication Technology Policy Framework (CGICTPF), 2012
- Disaster Management Act, 2002 (Act No. 57 of 2002)
- Electronic Communications and Transaction Act, 2002 (Act No. 25 of 2002)
- Employment Equity Act, 1998 (Act No. 55 of 1998)
- Income Tax Act, 1962 (Act No. 58 of 1962)
- King Report on Corporate Governance for South Africa, 2016 (King IV 2016)
- Labour Relations Act, 1995 (Act No. 66 of 1995)
- Magistrate Court Act, 1944 (Act No. 32 of 1944);
- Minimum Information Security Standards, 1996
- National Archives and Records Service of South Africa Act, 1996 (Act No. 43 of 1996)

- National Environmental Management Waste Act, 2008 (Act No. 59 of 2008)
- Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)
- Pension Funds Act, 1956 (Act No. 24 of 1956)
- Public Finance Management Act, 1999 (Act No. 1 of 1999)
- Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000)
- Prevention and Combating of Corrupt Activities Act, 2004 (Act No. 12 of 2004)
- Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)
- Promotion of Administrative Justice Act, 2000 (Act No. 3 of 2000)
- Promotion of Equality and Prevention of Unfair Discrimination Act, 2000 (Act No. 4 of 2000)
- Protected Disclosures Act, 2000 (Act No. 26 of 2000)
- Protection of Personal Information Act, 2013 (Act No. 4 of 2013)
- Public Audit Act, 2004 (Act No. 25 of 2004)
- Skills Development Act, 1998 (Act No. 97 of 1998)
- Supreme Court Act, 1959 (Act No. 59 of 1959)
- Use of Official Languages Act, 2012 (Act No. 12 of 2012)

## Appendix I – Sankey diagram of co-occurring benefit codes associated with Processes



## Appendix J – IT governance practices

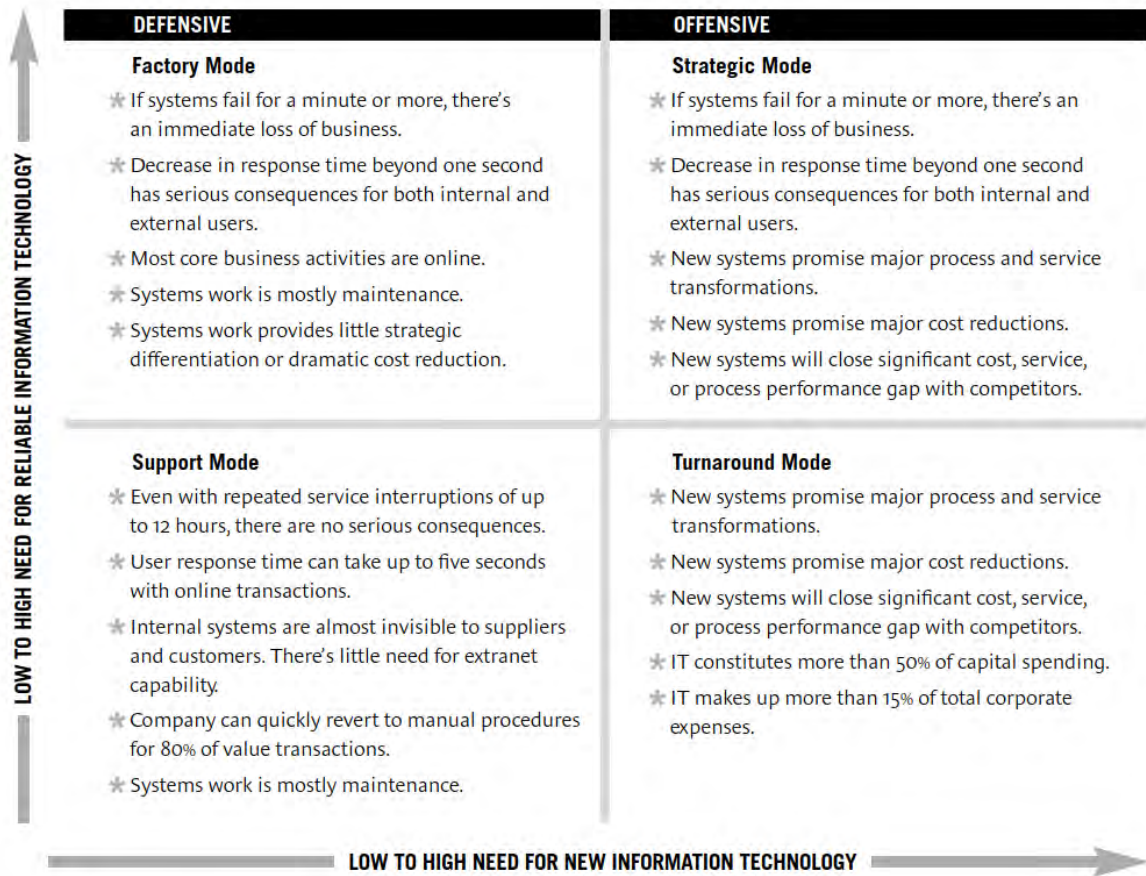
IT GOVERNANCE PRACTICES			
	#	<i>IT Governance Practice</i>	<i>Definition</i>
IT Governance Structures	S1	IT strategy committee at level of board of directors	Committee at level of board of directors to ensure IT is regular agenda item and reporting issue for the board of directors
	S2	IT expertise at level of board of directors	Members of the board of directors have expertise and experience regarding the value and risk of IT
	S3	(IT) audit committee at level of board of directors	Independent committee at level of board of directors overseeing (IT) assurance activities
	S4	CIO on executive committee	CIO is a full member of the executive committee
	S5	CIO (Chief Information Officer) reporting to CEO (Chief Executive Officer) and/or COO (Chief Operational Officer)	CIO has a direct reporting line to the CEO and/or COO
	S5	CIO (Chief Information Officer) reporting to CEO (Chief Executive Officer) and/or COO (Chief Operational Officer)	CIO has a direct reporting line to the CEO and/or COO
	S6	IT steering committee (IT investment evaluation/prioritisation at executive/senior management level)	Steering committee at executive or senior management level responsible for determining business priorities in IT investments.
	S7	IT governance function/officer	Function in the organisation responsible for promoting, driving and managing IT governance processes
	S8	Security/compliance/risk officer	Function responsible for security, compliance and/or risk, which possibly impacts IT
	S9	IT project steering committee	Steering committee composed of business and IT people focusing on prioritising and managing IT projects
	S10	IT security steering committee	Steering committee composed of business and IT people focusing on IT related risks and security issues
S11	Architecture steering committee	Committee composed of business and IT people providing architecture guidelines and advise on their applications.	

IT GOVERNANCE PRACTICES			
	#	<i>IT Governance Practice</i>	<i>Definition</i>
	S12	Integration of governance/alignment tasks in roles & responsibilities	Documented roles & responsibilities include governance/alignment tasks for business and IT people (cf. Weill)
IT Governance Processes	P1	Strategic information systems planning	Formal process to define and update the IT strategy
	P2	IT performance measurement (e.g. IT balanced scorecard)	IT performance measurement in domains of corporate contribution, user orientation, operational excellence and future orientation
	P3	Portfolio management (incl. business cases, information economics, ROI, payback)	Prioritisation process for IT investments and projects in which business and IT is involved (incl. business cases)
	P4	Charge back arrangements - total cost of ownership (e.g. activity based costing)	Methodology to charge back IT costs to business units, to enable an understanding of the total cost of ownership
	P5	Service level agreements	Formal agreements between business and IT about IT development projects or IT operations
	P6	IT governance framework	COBIT Process based IT governance and control framework
	P7	IT governance assurance and self-assessment	Regular self-assessments or independent assurance activities on the governance and control over IT
	P8	Project governance/management methodologies	Processes and methodologies to govern and manage IT projects
	P9	IT budget control and reporting	Processes to control and report upon budgets of IT investments and projects
	P10	Benefits management and reporting	Processes to monitor the planned business benefits during and after implementation of the IT investments/projects.
	P11	COSO/ERM	Framework for internal control
IT Governance Relational Mechanisms	R1	Job-rotation	IT staff working in the business units and business people working in IT
	R2	Co-location	Physically locating business and IT people close to each other
	R3	Cross-training	Training business people about IT and/or training IT people about business

## IT GOVERNANCE PRACTICES

	#	<i>IT Governance Practice</i>	<i>Definition</i>
	R4	Knowledge management (on IT governance)	Systems (intranet, ...) to share and distribute knowledge about IT governance framework, responsibilities, tasks, etc.
	R5	Business/IT account management	Bridging the gap between business and IT by means of account managers who act as in-between
	R6	Executive/senior management giving the good example	Senior business and IT management acting as "partners"
	R7	Informal meetings between business and IT executive/senior management	Informal meetings, with no agenda, where business and IT senior management talk about general activities, directions, etc. (e.g. during informal lunches)
	R8	IT leadership	Ability of CIO or similar role to articulate a vision for IT's role in the company and ensure that this vision is clearly understood by managers throughout the organisation
	R9	Corporate internal communication addressing IT on a regular basis	Internal corporate communication regularly addresses general IT issues.
	R10	IT governance awareness campaigns	Campaigns to explain to business and IT people the need for IT governance

## Appendix K – McFarlan and Nolan Strategic Impact Grid



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## Appendix L – Publications and awards

- Nxosi, M. and Flowerday, S. V., 2021. **IT Governance Adoption and Use by State-owned Entities in South Africa: A Public Administration Perspective**. In: S. Chakrabarti, R. Nath, P.K. Banerji, S. Datta, S. Poddar and M. Gangopadhyaya, eds. *International Conference on “Interdisciplinary Research in Technology & Management” (IRTM 2021)*. Kolkata, India: Taylor and Francis, pp.181–187.
- I was awarded Best Presenter for IRTM2021 for the above-mentioned paper.



## Appendix M – A review of Annexure 1 of the Consolidated General Report on the National and Provincial Audit Outcomes for 2018-19

A review of Annexure 1: Auditees' audit outcomes; areas qualified; and findings on predetermined objectives, non-compliance, specific risk areas and unauthorised, irregular as well as fruitless and wasteful expenditure (AGSA, 2019a):

### Applied Filters:

- Filter 1 => Audits conducted by the Auditor-General of South Africa
- Filter 2 => Auditee type = DP
- Filter 3 => Portfolio = Ntnl  
= 179 audited state-owned entities (see Auditee ID) below:

5	133	241	321	451	504	1224	1313	1335
14	136	246	327	452	506	1292	1314	1336
18	137	250	329	453	518	1293	1315	1337
23	138	260	341	454	522	1294	1316	1338
31	143	266	345	455	539	1295	1317	1339
33	149	269	404	468	548	1296	1318	1340
34	174	270	406	470	558	1297	1319	1341
36	184	272	415	471	1011	1298	1320	1342
40	194	275	419	472	1026	1299	1321	1344
41	199	277	422	474	1036	1300	1322	1347
44	200	280	423	475	1063	1301	1323	1368
45	202	281	427	476	1067	1302	1324	1402
51	204	282	429	478	1071	1303	1325	1405
53	205	284	430	487	1122	1304	1326	1415
55	206	286	432	488	1159	1305	1327	1431
60	211	287	433	493	1169	1306	1328	1474
61	221	288	435	494	1177	1308	1329	1475
98	222	306	436	495	1183	1310	1330	1498
121	237	308	439	499	1194	1311	1332	1512
126	240	319	441	502	1223	1312	1333	

### Total amounts for state-owned entities:

<i>Irregular expenditure amount</i>	<i>Fruitless and wasteful expenditure amount</i>
R4910,3m	R197,672m

## Appendix N – Access Letter Requesting Permission to Conduct Research

Rhodes University  
Drostdy Road,  
Makhanda,  
6139

Dear,

### REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a registered PhD student in the Department of Information Systems at Rhodes University. My supervisor is Professor Stephen Flowerday.

The proposed topic of my research is: *A compliance framework for IT governance adoption and use by state-owned entities in South Africa*. The objective of the study is:

- (a) To develop a compliance framework for enhancing IT governance adoption and use in state-owned entities in South Africa.

I hereby seek your consent to conduct research in your organisation. The research will be undertaken through interviews, a survey questionnaire and publicly accessible documents. The intended participants for this research include managers, senior managers, general managers, executives and board members. No names of participants will be used in any part of the research.

A maximum of 30 minutes will be required from each participant to complete the interviews. The interviews will be conducted at the participants' convenience in relation to venue, date and time. A further 15 minutes will be required to complete an online questionnaire.

I undertake to keep the research data confidential, secure and only accessible to myself.

To assist you in reaching a decision, I have attached to this letter:

- (a) A copy of an ethical clearance certificate issued by the University
- (b) A copy of the research instruments which I intend using in my research

Should you require any further information, please do not hesitate to contact me or my supervisor. Our contact details are as follows:

**Mr. Monelo Nxosi**  
**Email:** [m.nxosi@ru.ac.za](mailto:m.nxosi@ru.ac.za)  
**Cell:**

**Prof. Stephen Flowerday**  
**Email:**  
**Telephone:**

Upon completion of the study, I undertake to provide you with feedback of the results.

Your permission to conduct this study will be greatly appreciated.

Yours sincerely,  
**Monelo Nxosi (Mr.)**

## **Appendix O – 12 public sector strategic outcomes**

- Outcome 1: Basic Education;
- Outcome 2: A long and healthy life for all South Africans;
- Outcome 3: All people in SA are and feel safe;
- Outcome 4: Decent employment through inclusive economic growth;
- Outcome 5: Skills and capable workforce to support an inclusive growth path;
- Outcome 6: An efficient, competitive and responsive economic infrastructure network;
- Outcome 7: Vibrant, equitable, sustainable rural communities contributing towards food security for all;
- Outcome 8: Sustainable human settlement and improved quality household life;
- Outcome 9: Responsive, accountable, effective and efficient local government system;
- Outcome 10: Protect and enhance our environmental assets and natural resources;
- Outcome 11: Create a better SA, a better Africa and a better world; and
- Outcome 12: An efficient, effective and development-oriented Public Service and empowered, fair and inclusive citizenship

## Appendix P – Systems theory and systems thinking

General systems theory (GST) was proposed by Ludwig von Bertalanffy in 1937 at the University of Chicago, and is premised on the definition of a system as a set of complex but interrelated elements that have a defined boundary, and that work together to achieve a common set of objective (Marakas and O’Brien, 2013; Hammond, 2019). GST has been criticised for having ambiguous meanings which, remarkably, emanate from Von Bertalanffy’s different works over the years (Rousseau, 2015): a foundational theory about universal systems principles (1956), a discipline aiming to formulate that theory (1969), and a disciplinary field encompassing the sciences, applications and worldviews informed by that foundational theory (1969). This study has adopted the original interpretation of a foundational theory about universal systems principles as it “represents principles underlying systemic structures and behaviours that recur isomorphically across different specialized disciplines” (Rousseau, 2015, p.523), including the IS discipline. In later years, GST received a wider audience and is now applied across a multiplicity of disciplines such as natural and ecological sciences, chemical and biological disciplines, sociology and psychology and IT (Mele, Pels and Polese, 2010). For example, Kenneth Boulding (1956), an economist, applied GST to social science; Kast and Rosenzweig (1972), management scholars, applied it to business organisations; and Katz and Kahn (1978), social psychologists, applied it to organisations. To be sure, systems exist in many contexts such as nature, science, society, and economic and information systems (Mele, Pels and Polese, 2010). Von Bertalanffy (1972) argued that technology and society had become so complex that a holistic/system and interdisciplinary approach to their understanding is a necessity. His conceptualisation of GST philosophy encompassed system ontology (i.e. what is meant by “system” and what are its layers), system epistemology (i.e. what is understood in relation to material systems, informational systems, conceptual systems etc.) and values (i.e. how humans relate to their world) (Von Bertalanffy, 1972). The key concepts of GST are displayed in Table P–1:

Table P–1: Key Concepts of the General Systems Theory adapted from (Kast and Rosenzweig, 1972; Chatterjee et al., 2021)

<b>KEY GST CONCEPTS</b>		
<b>#</b>	<b>Concept</b>	<b>Definition (Kast and Rosenzweig, 1972, p.450)</b>
1	Subsystem, components	“A system by definition is composed of interrelated parts or elements. This is true for all systems-mechanical, biological, and social. Every system has at least two elements, and these elements are interconnected.”

KEY GST CONCEPTS		
2	Holism, synergism	“The whole is not just the sum of the parts; the system itself can be explained only as a totality.”
3	Open systems	“Systems can be considered to be closed or open. Open systems exchange information, energy, or material with their environments.”
4	Input–Transformation–Output Model	“In a dynamic relationship with its environment, an open system receives various inputs, transforms these inputs in some way, and exports outputs.”
5	System boundaries	“Systems have boundaries which separate them from their environments. Boundaries could be difficult to delineate in social systems, such as organizations.”
6	Negative entropy	“Closed, physical systems are subject to the force of entropy which increases until eventually the entire system fails. In a closed system, the change in entropy must always be positive; however, in open biological or social systems, entropy can be arrested and may even be transformed into negative entropy – a process of more complete organization and ability to transform resources.”
7	Steady state, dynamic equilibrium, and homeostasis	“... related to that of negative entropy. A closed system eventually must attain an equilibrium state with maximum entropy-death or disorganization. However, an open system may attain a state where the system remains in dynamic equilibrium through the continuous inflow of materials, energy, and information.”
8	Feedback	“Information concerning the outputs or the process of the system is fed back as an input into the system, leading to changes in the transformation process and/or future outputs. Feedback can be both positive and negative.”
9	Hierarchy	“A basic concept in systems thinking is that of hierarchical relationships between systems. A system is composed of subsystems of a lower order and is also part of a supra system.”
10	Internal elaboration	“Closed systems move toward entropy and disorganization. In contrast open systems appear to move in the direction of greater differentiation, elaboration, and a higher level of organization.”
11	Multiple goal-seeking (multifinality)	“Biological and social systems appear to have multiple goals or purposes. Social organizations seek multiple goals, if for no other reason than that they are composed of individuals and subunits with different values and objectives.”
12	Equifinality	“In mechanistic systems there is a direct cause and effect relationship between the initial conditions and the final state ... Equifinality suggests that certain results may be achieved with different initial conditions and in different ways. This view suggests that social organizations can accomplish their objectives with diverse inputs and with varying internal activities (conversion process).”