A Framework for the Corporate Governance of ICT in Local Government

by

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Co-supervisor: Prof. Mariana Gerber

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Declaration

I, Petrus Marthinus Jacobus Delport, hereby declare that:

- The work in this dissertation is my own work.
- All sources used or referred to have been documented and recognised.
- This dissertation has not previously been submitted in full or partial fulfilment of the requirements for an equivalent or higher qualification at any other recognised educational institute.

Petrus Marthinus Jacobus Delport

Abstract

Information and Communication Technology (ICT) has become critical and pervasive in any well-run modern enterprise across all sectors, which include local government. As a result, ICT demands to be managed and governed in a sustainable manner. Therefore, local government should accept the responsibility of implementing good Corporate Governance of ICT (CGICT). Without sound CGICT, ICT is unable to support local government in the achievement of their strategic objectives. This will most likely result in local government not being able to serve the interests of the community. Even though local government is aware of their responsibility regarding CGICT, the Auditor-General reports that their attempts are unsatisfactory, in this regard. This is most probably due to the fact that ample information exists on guiding local government with *'what'* they should do towards good CGICT, but unfortunately a lack of guidance on *'how'* to achieve it. Thus, it is imperative for local government to adopt a CGICT framework which provides guidance not only on *what* they must do towards implementing good CGICT but also on *how* they should achieve it. In doing so, local government would most likely be able to properly manage and govern ICT and support the needs of the community. Therefore, the aim of this study is to report on research undertaken, in order to assist local government with a CGICT framework that is relevant to their unique environment. Accordingly, this CGICT framework aims to be usable and scalable to fit the needs of any sized local government entity. As a result, the CGICT framework aims to be simplistic in nature to promote self-implementation of sound CGICT in local government.

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Chapter 1

Introduction

Information and Communication Technology (ICT) has become critical and pervasive in enterprises across all sectors. As a result, typical government entities should accept the responsibility for implementing good Corporate Governance of ICT (CGICT). Without good CGICT, ICT is unable to support government entities with the achievement of their strategic goals. This chapter will therefore introduce the relationship between CGICT and a typical government entity, or in this case local government. Furthermore, this chapter will discuss the research objectives and identified problem so as to guide the research study within a certain research approach.

1.1 Corporate Governance of ICT and Local Government

Information and Communication Technology (ICT) has long been a core element to the success of any well-run modern enterprise (Von Solms & Von Solms, 2008). As a result, ICT has become pervasive in the sense that ICT is now *'built'* into the strategy of most enterprises (IoDSA, 2009; Van Grembergen & De Haes, 2009). This integration results in ICT demanding to be properly governed and managed. Therefore, the Corporate Governance of ICT (CGICT) is deemed critical to the success of any modern enterprise, as it allows ICT to be of greater value in achieving the strategic goals (ISO/IEC 38500, 2008). Thus, it is important that an understanding is gained regarding the concept of CGICT and how it relates to the South African government.

1.1.1 The Corporate Governance of ICT

Although various definitions exist for CGICT, CGICT is clearly defined as *"the system by which the current and future use of I[C]T is directed and controlled"* (ISO/IEC 38500, 2008). It is further added that CGICT involves not only evaluating the needs of ICT but also directing the use of ICT in order to support the enterprise. After direction has been provided, the use of ICT should then be monitored, which facilitates the achievement of set objectives. Furthermore, CGICT should also include the strategy and policies for using ICT within an enterprise (ISO/IEC 38500, 2008). It is clear from the definition that CGICT has three definite tasks which should be addressed.

First, the task of *'evaluating'* should be conducted by the governing body, in this case, the board of directors (hereafter referred to as the board). This involves the evaluation of the current and future use of ICT, by taking into consideration any internal or external pressures, such as technological change, that might influence the enterprise (ISO/IEC 38500, 2008).

Secondly, the task of *'direction'* enables the board to provide strategic direction in the use of ICT within the enterprise. Additionally, the task of direction also requires the board to *"assign responsibility for, and direct preparation and implementation of plans and policies"* (ISO/IEC 38500, 2008). Subsequently, the plans will give direction for any investment in ICT projects, while the policies will dictate acceptable ICT-related behaviour within the enterprise.

Lastly, the task of *'monitoring'* would enable the board to control what was initially directed - in other words, the performance in the context of the ICT plans (ISO/IEC 38500, 2008). An example is controlling the progress of any ICT projects, as well as how the ICT-related behaviour correlates with the established policies.

The aforementioned three tasks collectively provide the foundation of CGICT. The tasks are graphically represented in Figure 1.1, which is adapted from Coertze and Von Solms (2014).

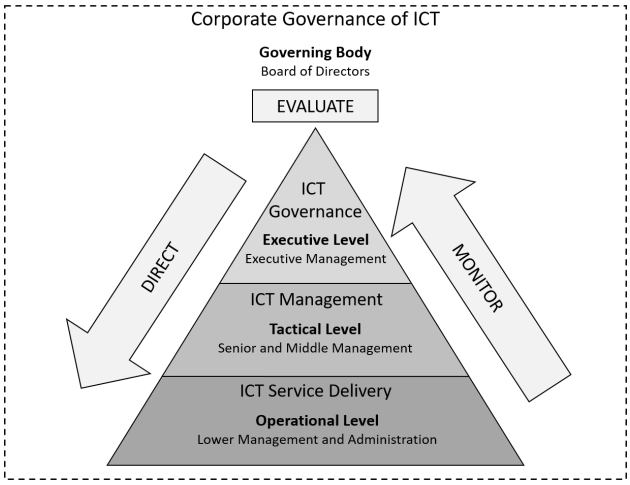


Figure 1.1: Corporate Governance of ICT Tasks. Adapted from Coertze and Von Solms (2014)

Notwithstanding the above, it is also essential to consider related best practices and standards that provide important principles for good CGICT.

1.1.2 Related Best Practices and Standards

One of the most prominent documents to consider, being a best practice, is the King III Report. The King III Report provides various principles that dictate behaviour towards CGICT. These principles dictate the responsibility of the board. It is important that the board consider the King III principles, as the essence of the principles states that the board remains ultimately accountable for CGICT (IoDSA, 2009).

Furthermore, the ISO/IEC 38500 (2008) should also be considered. The ISO/IEC 38500 (2008), which is a high-level standard, provides *"guiding principles for directors of organizations on the effective, efficient, and acceptable use of I[C]T within their organizations"*. This standard is predominantly a high-level document, providing only guiding principles and practices of what should be done in order to achieve good CGICT.

In combination with the first two aforementioned documents, COBIT 5 aims to enable ICT to be governed and managed in a holistic manner for the entire enterprise (ISACA, 2012). In contrast to the King III Report and the ISO/IEC 38500 (2008), COBIT 5 is technically very detailed. The detail is evident in the fact that it provides the board with ample information

and processes regarding not only CGICT and ICT governance but also ICT management.

Taking the foregoing into consideration, it is clear that various best practices and standards exist which guide enterprises in what should be done to implement good CGICT. These best practices and standards are applicable to all enterprises regardless of size. This is supported by the King III Report, which states that CGICT applies to all enterprises, including public enterprises and therefore all levels of government (IoDSA, 2009). This is due to the fact that ICT is also core to any form of service delivery in a typical government entity. Nonetheless, to gain insight into the relationship between CGICT and various government entities, it is imperative to discuss the various South African spheres of government.

1.1.3 South African Spheres of Government

South Africa is governed at three different interrelated spheres, namely, national government, provincial government, and local government (Constitution of South Africa, 1996). These spheres should not be seen as a hierarchy (Constitution of South Africa, 1996). In contrast, the spheres should be seen as distinctive, interrelated, and interdependent of one another. Nonetheless, this study focuses only on the sphere of local government.

The sphere of local government is divided into three different categories of municipalities. Each of the three municipalities differ in their roles and their size. The largest of the three is referred to as a metropolitan municipality, or *'Category A'* municipality. A metropolitan municipality is defined as a municipality that has exclusive municipal and legislative authority in its area (Constitution of South Africa, 1996). The second category of municipality is referred to as a district municipality, or *'Category C'* municipality. A district municipality can be defined as a municipality that has municipal executive and legislative authority in its area (Constitution of South Africa, 1996). Furthermore, within a district municipality, one will find a local municipality, typically the smallest of the three. A local municipality, or *'Category B'* municipality, can be defined as a municipality that shares municipal executive and legislative authority with a district municipality that is situated in the same area (Constitution of South Africa, 1996). Although the term *'local government'* includes the three categories of municipalities (metropoli-

tan, district and local municipalities), this study only focuses on district and local municipalities collectively. This is mainly due to limited resource capacity that exists within these two categories of municipalities. Nonetheless, Figure 1.2 represents the interrelated spheres of government and their interdependencies.

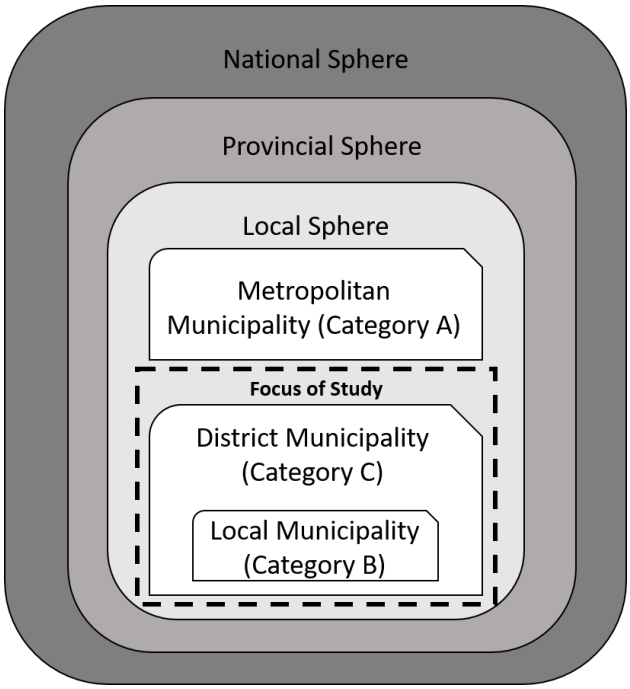


Figure 1.2: Interdependencies of Government Spheres

Taking into consideration the above, it is vital to understand the goals of local government. Generally, local government has various specific objectives which aim to serve the surrounding community. Table 1.1 that follows was extracted from section 152 (1) of the Constitution of South Africa (1996).

For local government to achieve the objectives highlighted in Table 1.1, it has to provide some series of functions to the public in its surrounding area. In terms of a district municipality, two of the main functions, as described in the Municipal Systems Act (2000), are as follows:

1. Building the capacity of local municipalities in their area to perform their functions and exercise their powers where such capacity is lacking

2. Promoting the equitable distribution of resources between the local municipalities in their area to ensure appropriate levels of municipal services within the area

Table 1.1: Overarching Local Government Objectives

The Objectives of Local Government are -
(a) To provide democratic and accountable government for local communities
(b) To ensure the provision of services to communities in a sustainable manner
(c) To promote social and economic development
(d) To promote a safe and healthy environment
(e) To encourage the involvement of communities and community organisations in the matters of local government

* Note: Adopted from Constitution of South Africa (1996)

These two functions place a district municipality as an overarching municipality over a local municipality. In turn, the local municipality also has specific functions, according to the Municipal Systems Act (2000). The main functions being, amongst others, water, electricity, and refuse removal services for the benefit of the community.

Both the functions from district and local municipalities are highly dependent on ICT to provide services effectively, as required by the Municipal Systems Act (2000). It is therefore of utmost importance that good CGICT be implemented within local government. The question at this stage is to what extent is local government implementing good CGICT? To address the stated question, the annual audit outcomes of the Auditor-General need to be discussed.

1.2 Current Challenges Faced by Local Government

In 1998, the Presidential Review Commission (PRC) report highlighted the importance of ICT with regard to effective service delivery to the community (Presidential Commissioners, 1998). Subsequently, it was realised that proper CGICT is of absolute importance. However, a little more than 10 years after the publication of the PRC report, not much has changed regarding the state of CGICT in local government (Department: Public Service and Administration, 2012). This is evident in the Auditor-General's audit report of 2008/2009 and again in the 2009/2010 audit report. In this 2009/2010

report, the Auditor-General recommended that a government-wide CGICT framework be put in place to implement a national ICT strategy based on defined processes and standards (The Auditor-General of South Africa, 2010). After this recommendation from the Auditor-General, the 2010/2011 report was released.

In this 2010/2011 report, the Auditor-General reported that little has been done regarding CGICT (The Auditor-General of South Africa, 2011). He also reported that only 21% of local government implemented governance controls; however, these controls were unsustainable due to not being formally rolled out by management (The Auditor-General of South Africa, 2011). The fact that so little municipalities in local government implemented governance controls supports the fact that there was an urgent need for a national CGICT framework. After the urgency of this need was realised, the Department of Public Service and Administration (DPSA) released the Corporate Governance of ICT Policy Framework (CGICTPF) in December 2012. This CGICTPF aims to be implemented on all governmental spheres; however, from a municipality's point of view, the implementation has proven to be too complex. As a result, the South African Local Government Association (SALGA) released a document called *"A Municipal Guide/Roadmap to Successful ICT Governance"* (SALGA, 2012), hereafter referred to as the SALGA document. The SALGA document contextualised the CGICTPF to the municipal environment. However, in 2013 the DPSA communicated in Circular 09 of 2014 the need for local government to implement the CGICTPF or SALGA document (Parker, 2015). Shortly after this communication, the Auditor-General's 2012/2013 audit report was released.

In the 2012/2013 audit report, the Auditor-General identified four predominant ICT areas that are not satisfactorily controlled. These four ICT areas are CGICT controls, security management controls, user access management controls, and lastly, ICT service continuity controls (The Auditor-General of South Africa, 2013). These four ICT areas are collectively critical in achieving good CGICT. Nonetheless, the state of these four ICT areas are concerning. Concerning these four controls, the Auditor-General found that 97% of local government struggles with the implementation of CGICT controls. Concerning the design of these controls in local government, 60% struggle with Security Management. Moreover, 68% struggle with User Access

Management and 62% with ICT Service Continuity (The Auditor-General of South Africa, 2013). These findings are concerning and further support the necessity of implementing a framework for good CGICT in local government.

Although the necessity for a CGICT framework was addressed with the release of the CGICTPF and SALGA document in 2012, there still exists a matter of complexity with implementing these frameworks (CGICTPF and SALGA document). While implementation might not pose as big a challenge to the bigger, better-equipped and wealthier departments of government at provincial and national level, the challenge to local government is harder to overcome. This is most probably because local government has limited resources in terms of both finances and related skills. The fact that local government finds the CGICTPF and SALGA document too complex to implement given their limited resources is evident in an extract from the Local Government Circular: C5 of 2015. This Circular stated the following: *"the Corporate Governance of ICT Policy Framework [CGICTPF] referred to municipalities by the DPSA was too complex for implementation in local government, as it did not consider the unique operating environment within local government"* (Parker, 2015). The same provincial Circular continued to state that a new Municipal Corporate Governance of ICT Policy (MCGICTP) has been adopted by the Department of Cooperative Governance. Furthermore, it added that the goal is for the MCGICTP to be adopted as a National Standard. This MCGICTP is supposedly not as complex as its predecessors. However, since the release of the MCGICTP, the 2013/2014 Auditor-General report was released with the findings on the state of CGICT in local government.

In the 2013/2014 audit report, once again four ICT areas were identified by the Auditor-General, namely, CGICT controls, security management controls, user access management controls, and lastly, ICT service continuity controls (The Auditor-General of South Africa, 2014). Regarding the first control area, interestingly 99% of local government is struggling with the implementation of CGICT controls. This is very concerning, as it increased with 2% from the previous report (2012/2013 audit report). Concerning the design of the last three controls, 50% struggle with security management controls (10% less). Further, 62% struggle with user access management controls (6% less) and 55% with ICT service continuity controls (7% less)

(The Auditor-General of South Africa, 2014). Although the last three controls show little improvement, the first control is very concerning and once again supports the necessity of implementing a tailor-made framework for good CGICT in local government.

Notwithstanding the above, it can be argued that local government is facing various challenges regarding the implementation of good CGICT. With this in mind, the problem addressed in this study can be stated as follows:

> *Currently, the CGICT in local government is unsatisfactory as highlighted by the Auditor-General. Without good CGICT, local government is unable to effectively achieve its strategic goals, due to processes depending on ICT, and therefore not adding satisfactory value.*

1.3 Thesis Statement

Supporting the stated problem, the thesis statement addressed in this study can be phrased as follows:

> *ICT is a critical enabler for service delivery within local government. Consequently, local government requires good CGICT to ensure that ICT delivers value in achieving its strategic objectives. Aiding municipal councils with implementing good CGICT in local government will capacitate leadership, which, in turn, will cater for the needs of the community.*

1.4 Scope and Delineation

With the thesis statement in mind, it is essential to state the scope of this study. Therefore, it should be noted that this study is within the South African context of local government. Although the term *'local government'* includes metropolitan municipalities, district municipalities, and local municipalities, this study primarily focuses on district and local municipalities. This is due to the fact that these municipalities are typically smaller in size. Subsequently, these municipalities often lack in terms of adequately skilled

staff, and they might have limited financial resources to implement good CGICT.

Even though this study is aimed at local government within the South African context, the research contribution can be extrapolated to other similar instances in the rest of the world. This is the case because it is based on international best practices and standards.

Taking into consideration the foregoing, it is important to consider the objectives of this study.

1.5 Research Objectives

The primary objective of this study is to produce a framework towards CGICT (termed F-CGICT) to aid local government, in particular district or local municipalities, with implementing good CGICT in a logical, structured manner. The framework aims to empower Municipal Councils in effectively governing, clearly directing, and controlling ICT within their respective local government.

To achieve the primary objective, various secondary objectives have been identified. The secondary objectives of this study are the following:

- *To investigate recognised best practices with regard to good CGICT*
- *To identify related government policy documents regarding good CGICT*
- *To critically analyse the best practices and standards, and related government policy documents so as to formulate criteria on which good CGICT is built, after which a framework will be developed*

This study aims to address a real-world problem that exists within local government. Therefore, the above-mentioned secondary objectives aim to collectively address this real-world problem.

Nonetheless, to achieve the primary objective of this study, a suitable research approach must be devised.

1.6 Research Approach

At this stage, it is clear that the identified real-world problem is situated within a practical environment of local government. To address this real-world problem, this study will compose an artefact. This artefact will be in the form of a framework towards good CGICT. Therefore, design-oriented information systems (IS) research was selected as the logical research paradigm. An extensive and detailed discussion on design-oriented IS research, the research process and methods followed will be espoused in Chapter 4.

Notwithstanding the above, it is important to discuss the layout of the remainder of this study.

1.7 Layout of the Study

With the objectives of this study in mind, this study will continue by discussing the concept of contemporary Corporate Governance and how ICT forms part of the greater Corporate Governance realm. Furthermore, various best practices and standards are investigated (discussed in Chapter 2). As a result, this discussion will provide a basis of understanding, which is necessary to fully comprehend the research contribution.

After gaining an understanding of the link between Corporate Governance and ICT, it is important to discuss the relationship between CGICT and local government (discussed in Chapter 3). As stated previously, it is of utmost importance that local government invest in the implementation of good CGICT. After realising the importance of CGICT, various frameworks for CGICT in local government (CGICTPF, SALGA document, and MCGICTP) were released. These frameworks will also be discussed and critically analysed. After this analysis, various criteria will be extracted that will guide this study (the criteria are introduced in Chapter 5).

Even though various CGICT frameworks exist for local government (CGICTPF, SALGA document, and MCGICTP), local government is still facing challenges with implementing good CGICT. This is evident from the Auditor-General's annual audit reports. Nonetheless, in order to address this problem at hand, the research approach is discussed (in Chapter 4). This research approach aims to produce an artefact in the form of a framework, which is

the research contribution, called F-CGICT (discussed in Chapter 5).

F-CGICT aims to aid local government with the implementation of good CGICT. This is done by using what was learnt from best practices and standards and the associated CGICT frameworks (CGICTPF, SALGA document, and MCGICTP) to develop a tailor-made framework for good CGICT in local government. After discussing F-CGICT, the validation process is discussed. This validation process validates F-CGICT in order to adhere to the research approach used (discussed in Chapter 6). Having produced and validated F-CGICT, this study is concluded in Chapter 7.

Providing additional information on various discussions throughout this study are the appendices attached at the end of this dissertation. The appendices and their explanation are highlighted in Table 1.2. Furthermore, various academic publications stemmed from this study. A total of two international conference papers were published, and a journal paper was submitted for review, as highlighted in Table 1.2.

1.8 Conclusion

ICT is critical for local government to provide sustainable services to the community. It is therefore of absolute importance that sound corporate governance of ICT is implemented, in order to provide value to local government in achieving its goals. This is also supported by best practices and standards, dictating that ICT has to be properly governed in all enterprises, which includes local government.

In the consolidated reports of the Auditor-General, however, it is reported that this is not the case. Without good CGICT, local government is unable to effectively achieve its strategic goals, due to processes depending on ICT, and therefore not adding satisfactory value. After realising that this problem is a real-world problem, this study identified the primary objective as a means to produce F-CGICT to aid local government, in particular district or local municipalities, with implementing good CGICT in a logical, structured manner. Additionally, F-CGICT aims to empower municipal councils in effectively directing and controlling ICT within their local government. To develop F-CGICT, a unique integrated research approach was developed to guide the researcher in completing this study. Nonetheless, in order to

proceed with the study, the chapter that follows will discuss the concept of ICT and Governance.

Table 1.2: List of Appendices and Explanation

Appendix	**Sub-Appendix**	**Explanation**
Academic Publications	A.1 International Conference Paper 2015	In 2015, the first international conference paper was published in the proceedings of the IST-Africa conference. Lilongwe, Malawi (ISBN:978-1-905824-50-2)
	A.2 International Conference Paper 2016	In 2016, the second international conference paper was published in the proceedings of the IST-Africa conference. Durban, South Africa (ISBN:978-1-905824-54-0)
	A.3 Journal Paper 2016	In 2016, a paper was submitted to the South African Journal of Public Administration (currently submitted for review)
Questionnaires	B.1 Semi-structured Interview Topics	The semi-structured interview topics used in Phase 1 of the unique integrated research approach (see Section 5.2)
	B.2 Workshop Questionnaire	The questionnaire used during the two-day workshop in order to validate F-CGICT (see Section 6.2)
Framework for Corporate Governance of ICT	C.1 Process-Goal Exercise	The Process-Goal Exercise which provides a list of COBIT 5 Processes (see Section 5.5.6)
	C.2 Guidance Document for Supporting Tool-set	Guidance document on how to use supporting tool-set (see Section 5.5.6)
	C.3 CGICT Charter Document	The generic CGICT Charter document that can be modified (see Section 5.5.6)
	C.4 ICT Plan Document	The generic ICT Plan document that can be modified (see Section 5.5.6)

Chapter 2

ICT and Governance

The aim of this chapter is to position ICT within the realm of governance. Contemporary Corporate Governance will be described briefly, followed by its relation to ICT. The Corporate Governance of ICT will be positioned within the greater Corporate Governance environment.

2.1 Introduction

Corporate Governance is an important part of any well-run modern enterprise (Bosch, 2002). Therefore, it is important that an understanding is gained regarding contemporary Corporate Governance and how Information and Communication Technology (ICT) forms part of the greater Corporate Governance realm.

To address ICT in the realm of governance, this chapter will first begin by sketching the scene from a general Corporate Governance point of view. Secondly, the chapter will continue by discussing a definite component of the contemporary Corporate Governance, namely, Corporate Governance of ICT. Lastly, ICT Governance will be discussed and how it relates to Corporate Governance of ICT.

2.2 Corporate Governance

The concept of Corporate Governance has been around for quite some time; however, the term *'Corporate Governance'* was rarely used before the 1980s (Tricker, 2015). Nevertheless, the importance of Corporate Governance to

a large extent stemmed from business disasters, such as Enron (McLean & Elkind, 2013; Gordon, 2002), WorldCom (Sidak, 2003), Tyco (Giroux, 2008), and The Health and Racquet Club, in the South African Context (Horn, 2005). The gross mismanagement of these enterprises contributed to the necessity for Corporate Governance (Elizabeth Abraham, 2012). The need for Corporate Governance was realised as the enterprises suffered due to management being untrustworthy, negligent and not acting in the best interest of the enterprise. As stated by Gordon (2002), in the case of Enron, for example, a self-interested management team manipulated the financial accounts for self-gain, consequently, leading to tremendous loss for shareholders and/or stakeholders.

The excess of power in the hands of self-interested or incompetent management led to the fact that a more balanced governing body, typically a board, be established in order to govern an enterprise (Gordon, 2002). The word *'governance'* originates from the Greek word *'kubernáo'*, which means *'to steer'* (Campbell & Carayannis, 2012). The steering of the enterprise is based on the basic principle that the board must represent the interests of all shareholders and/or stakeholders by reducing excess power in the hands of management, whereby self-gain is minimised or eliminated. To minimise self-gain, the board will steer the enterprise through directives which state *'what'* must be done. Management, on the other hand, will be responsible for implementing or applying these directives, thus aiming to benefit the enterprise as a whole. These two tiers, of first the board and secondly of management, allow the enterprise to be steered in such a way that provides value to the enterprise's shareholders and/or stakeholders.

Some of the early attempts to establish the concept of Corporate Governance came from the United Kingdom's Cadbury Report (Cadbury, 1992) and the King Report (IoDSA, 1994). Both these reports described Corporate Governance as being *the system by which companies are directed and controlled*. For the board to steer an enterprise, it is clear from the foregoing that it would have to direct *what* must be done in the enterprise. After management has implemented the directives, the board must also control or monitor that the directives have been implemented. Supporting this is Organisation for Economic Co-operation and Development (1999), which was the the first to devise principles for Corporate Governance (Du Plessis, Har-

govan, & Bagaric, 2011). Du Plessis et al. (2011) clearly summarise these principles in that Corporate Governance

- is the system of regulating and overseeing corporate conduct;
- takes into consideration the interests of internal stakeholders and other parties who are affected by decisions;
- aims at ensuring responsible behaviour by enterprises; and
- has the ultimate goal of increasing efficiency and profitability of the enterprise.

It is clear from the above-mentioned summary that Corporate Governance, fulfilled by the board, acts on behalf of the shareholders and/or stakeholders. Furthermore, the board's main responsibility is clear, which involves looking after the well-being of the enterprise. For this reason, it is important for the board to consider ICT whilst looking after the well-being of an enterprise.

ICT is a core element to the success of any enterprise (Von Solms & Von Solms, 2008). Carr (2003) contends that IT, or in this case ICT, has become a critical part of the normal operation of an enterprise; consequently, ICT is not deemed as a competitive advantage in itself anymore, but rather a necessity. The infrastructure of ICT does not provide an enterprise with a competitive advantage, and this is due to ICT becoming readily available, like a typical commodity (Carr, 2003). The fact that ICT is nowadays seen as a commodity leads to ICT being pervasive, in the sense that ICT is now built into the strategy of the enterprise (IoDSA, 2009; Van Grembergen & De Haes, 2009). Therefore, ICT demands that it should be properly governed by the highest authority in the enterprise (Von Solms & Von Solms, 2008). On that account, ICT has also become a board responsibility and consequently needs to be governed on the same level as all other underlying aspects of Corporate Governance. Figure 2.1, as adopted from Von Solms and Von Solms (2008), represents the board's accountability towards the various underlying aspects of Corporate Governance.

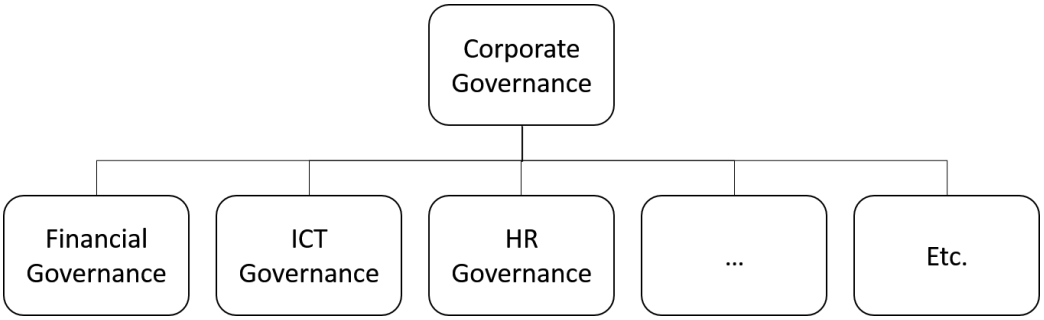


Figure 2.1: Contemporary Corporate Governance (Von Solms & Von Solms, 2008)

As depicted in Figure 2.1, ICT Governance should form part of Corporate Governance, which is the board's responsibility. This is supported by the King III Report, which is a best practice that aims to guide enterprises on principles of good governance. It states that the board of an enterprise remains ultimately accountable for good Corporate Governance, essentially implying the implementation of sound Corporate Governance of ICT, which addresses the very important link between Corporate Governance and its focus on ICT (IoDSA, 2009). Moreover, the King III Report provides seven principles that are aimed at guiding the board of an enterprise in this regard (IoDSA, 2009). These principles are as follows:

- **Principle 1:** The board should be responsible for ICT Governance.
- **Principle 2:** ICT should be aligned with the performance and sustainability objectives of the organisation.
- **Principle 3:** The board should delegate to management the responsibility for the implementation of an ICT governance framework.
- **Principle 4:** The board should monitor and evaluate significant ICT investments and expenditure.
- **Principle 5:** ICT should form an integral part of the company's risk management.
- **Principle 6:** The board should ensure that information assets are managed effectively.

- **Principle 7:** A risk and audit committee should assist the board in carrying out its ICT responsibilities.

It is essential that enterprises consider these principles. As mentioned in the very first principle, the board is ultimately accountable for the ICT Governance of an organisation, further implying the Corporate Governance of ICT.

Thus, it is important that the board's Corporate Governance mandate extend from a general point of view to include ICT, which is nowadays generally termed the Corporate Governance of ICT. *"In today's corporate environment, where the value and importance of information assets are significant, boards must be seen to extend the core governance principles to information and I[C]T"* (Board Briefing on IT Governance, 2005). The next section will therefore discuss Corporate Governance of ICT, which the board is ultimately accountable for.

2.3 The Corporate Governance of ICT

Considering the fact that the board should ensure that due care is applied with respect to the success of the enterprise, they should assume Corporate Governance of ICT (CGICT) as part of its responsibility (IoDSA, 2009). With this in mind, the board can refer to an international standard, called the ISO/IEC 38500 (2008), which was developed to promote effective and efficient use of ICT in all enterprises through guiding boards with principles on CGICT (ISO/IEC 38500, 2008).

CGICT is clearly defined as *"the system by which the current and future use of I[C]T is directed and controlled"* (ISO/IEC 38500, 2008). It is further added that CGICT involves not only evaluating the ICT needs but also directing the use of ICT in order to support the organisation. After direction is provided, the use of ICT must then be monitored, which facilitates the achievement of objectives. CGICT should also include the strategy and policies for using ICT within an organisation (ISO/IEC 38500, 2008). From the definition, it is clear that CGICT has three main high-level tasks that should be focused on by the board, namely, *'evaluate'*, *'direct'*, and *'monitor'*.

The first task of *'evaluate'* can be defined as examining and judging the current and future use of ICT in an enterprise (ISO/IEC 38500, 2008). Essentially, it is to consider the role that ICT should play within the enterprise by taking into consideration any internal or external pressures, such as technological change, economic and social trends, and political influences, that could influence the enterprise (ISO/IEC 38500, 2008). Evaluation should be undertaken continually, to ensure the board is fully updated on the current stance of ICT in the enterprise (ISO/IEC 38500, 2008).

The second important task is the *'direct'* task. This task enables the board to provide strategic direction to the use of ICT within the enterprise. The task of direction also requires the board to provide a strategic plan on where the enterprise must head (ISO/IEC 38500, 2008). The plan will give direction for any investment in ICT projects within the enterprise, consequently ensuring business and ICT alignment as well as that ICT delivers value to the enterprise.

After direction has been given by the board, it is critical to make sure that the directives are being followed. This is done through the final task, *'monitor'*, or sometimes referred to as control. This third and final task enables the board to follow up on what was initially directed, in other words, the performance against the ICT plans (ISO/IEC 38500, 2008). This would, for instance, include follow-up on the progress of any ICT projects that received an initial investment.

The aforementioned three tasks form the basis of the board's responsibility towards CGICT. These three tasks enable the board to act in the best interest of the enterprise by steering it in the right direction and controlling the direction given. For the board to do these three tasks, the ISO/IEC 38500 (2008) standard provides six high-level principles which can guide them towards sound CGICT. These six principles, followed by a brief description, are represented in Table 2.1, as adapted from the ISO/IEC 38500 (2008).

Table 2.1: ISO/IEC 38500 Principles

Principles	**Description**
Responsibility	*The board has a responsibility towards the enterprise, by ensuring that management implements sound CGICT*
Strategy	*A strategy needs to be in place that takes into consideration the current and future use of ICT within the enterprise*
Acquisition	*The board must ensure that investments in ICT are made for valid reasons whereby acquisition of ICT is balanced with the amount invested*
Performance	*The board must ensure that ICT delivers its intended value, continually checking ICT's performance*
Conformance	*The board must check for conformance with the direction that was given regarding ICT*
Human Behaviour	*The board must ensure that acceptable ICT behaviour exists within the enterprise*

* Note: Adapted from ISO/IEC 38500 (2008)

By adhering to the six ISO/IEC 38500 (2008) principles in Table 2.1, oversight is provided, which is required from the board in order for ICT to provide value to the enterprise. In addition, this enables the board to strive towards the goals of sound CGICT, as deemed important by COBIT 4.1 (IT Governance Institute, 2007), and represented as the Penta Bottom Line (Posthumus, Von Solms, & King, 2010). The Penta Bottom Line, which was adapted from Posthumus et al. (2010) and represented in Table 2.2, states that CGICT has the following goals: strategic alignment, value delivery, risk management, resource management, and lastly, performance measurement.

Table 2.2: The Penta Bottom Line

Goals	Description
Strategic Alignment	*Makes sure that business and ICT are striving to achieve the same objectives; in essence, ICT must assist the enterprise to achieve strategic objectives*
Value Delivery	*ICT must deliver the promised benefits to the enterprise*
Risk Management	*Risk must be managed inside the enterprise, ensuring a clear understanding of the enterprise's risk appetite*
Resource Management	*Making sure that ICT investments are made for valid reasons, and that this would benefit the entire enterprise*
Performance Measurement	*Monitoring the progress of ICT projects from the current state in comparison with the desired state*

* Note: Adapted from Posthumus et al. (2010)

For the board to achieve the goals of sound CGICT, as represented by the Penta Bottom Line, the King III Report states in Principle 3 that the board should delegate to management the responsibility of implementing a CGICT plan through an ICT Governance framework (IoDSA, 2009). In essence, what was directed by the board must now be delegated to management to implement. Figure 2.2 depicts the delegation of responsibility from the board towards management in order for the directives to be implemented, thereby facilitating the achievement of the Penta Bottom Line.

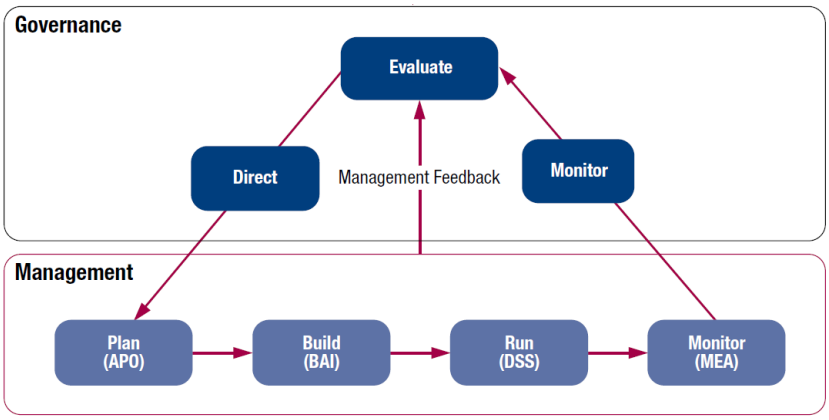


Figure 2.2: COBIT 5 - Governance and Management (ISACA, 2012)

Management implements the directives from the board, as espoused in the CGICT, through ICT Governance. ICT Governance will facilitate an environment in which management can implement the board's directives. Although the board remains ultimately accountable, management has the responsibility of implementing ICT Governance, as stated by King III Principle 3 (IoDSA, 2009).

2.4 ICT Governance

ICT governance forms the essential implementation part of CGICT. There are many definitions regarding ICT governance (Van Grembergen, 2004; Tricker, 2015). However, the following definition represents the view of this study: *"ICT Governance is the set of responsibilities and practices exercised by management with the goal of ensuring that objectives are achieved"* (IT Governance Institute, 2003). This is supported by Ribbers, Peterson, and Parker (2002); however, it is added that ICT Governance is *"the mechanism that enable business and I[C]T executives to integrate business and I[C]T decisions, implement and monitor decision implementation, and learn from their effectiveness"*.

Considering the foregoing definitions, ICT governance is very similar to CGICT, however, remains a subset of CGICT and might in some cases overlap with CGICT (Van Grembergen & De Haes, 2009; Coertze & Von Solms, 2014). The difference exists in that CGICT refers to governance-related tasks in a collective view (Coertze & Von Solms, 2014), spanning across the whole of the enterprise which stemmed from the organisation's objectives, whereas ICT governance enables the execution of the strategic direction that flows from CGICT, including individual responsibilities. In essence, CGICT represents the board's responsibilities or actions. This is typically high level, where the board dictates *what* must be done. After dictating, management, normally led by the Chief Information Officer (CIO), should then implement the directives; therefore, ICT Governance represents *'how'* management should implement the directives. Figure 2.3, as adapted from Coertze and Von Solms (2014), depicts what has been mentioned above.

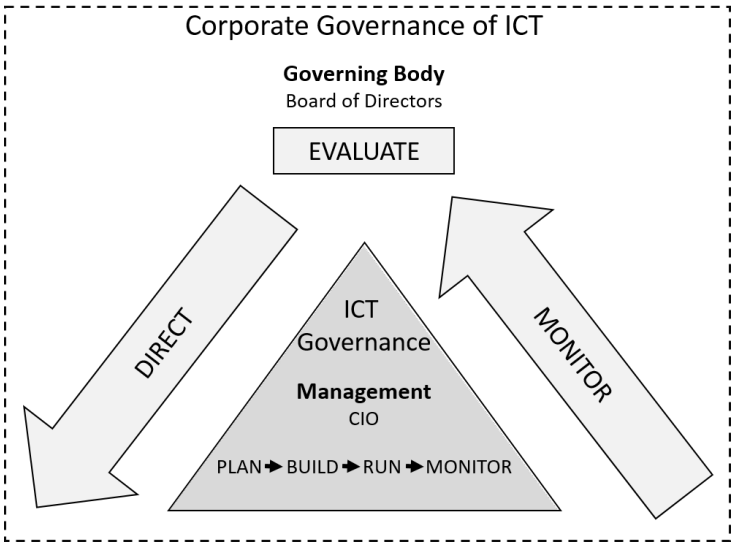


Figure 2.3: Corporate Governance of ICT and ICT Governance. Adapted from Coertze and Von Solms (2014)

At this stage, it is clear that management has various functions and associated responsibilities. COBIT 5 describes these functions and associated responsibilities in its best practice framework for the governance and management of enterprise ICT, which aims to guide role players on enablers for the governance and management of enterprise ICT (ISACA, 2012). Furthermore, these various responsibilities are stated in that management *"plans, builds, runs and monitors activities in alignment with the direction set by the board to achieve the enterprise objectives"* (ISACA, 2012). In essence, management should ensure that the directives from the board are *planned* for, the correct environment is *built*, after which the responsibility to *run* enables management to implement the directives. Finally, management should *monitor* to see if the implementation conforms to the direction from the board, after which it would report back to the board. This represents the basic principle on which ICT Governance is built, as depicted in Figure 2.3.

For management to ensure and/or accomplish the above, COBIT 5 provides various processes that guide management on *'how'* to implement ICT Governance. COBIT 5 provides 37 high-level processes. Within these processes, multiple sub-processes exist which aim to guide management with various detailed activities to complete (ISACA, 2012). By following these, management can address the directives from the board through well defined

plan, build, run and monitor activities.

Thus, it is clear that when management addressed the directives from the board through plan, build, run, and monitor by following COBIT 5 processes, an environment of sound ICT Governance is facilitated, ultimately conforming to King III Principle 3. With sound ICT Governance, the board's directives can be implemented, contributing to a good CGICT environment. Consequently, good CGICT leads to due care being applied with respect to the sound functioning of the enterprise. Furthermore, it is important to take note of various role players that exist within an enterprise, all of which have specific roles and responsibilities.

2.5 Governance Roles and Responsibilities

Although various role players exist, three roles will be discussed in more detail. These include the board, management, and lastly, supporting committees.

The first role player is typically the board, which is core to good CGICT. The board remains responsible for the well-being of the enterprise, as mentioned before. Moreover, ICT is core to any modern enterprise nowadays, and the well-being of the enterprise is dependent on it. Thus, part of the board's responsibility is to oversee that the goals of CGICT are met, represented by the Penta Bottom Line (Posthumus et al., 2010). Hence, the board must ensure that ICT adds value to the enterprise and that ICT is aligned with the business strategies of the enterprise. Also, the board must make sure that ICT-related risks are satisfactorily addressed. Additionally, the board must ensure that ICT is running effectively, in essence, making sure the performance of ICT is satisfactory. To do so, the board must monitor performance to determine if this really takes place. Considering all the foregoing, the board provides oversight through CGICT; nonetheless, someone has to implement the directives from the board.

The second role player is senior management in the enterprise, which should implement the directives, as delegated by the board (ISO/IEC 38500, 2008). Normally the CIO, according to King III Principle 3, is given the responsibility of implementation (IoDSA, 2009). This implementation activity is generally referred to as ICT Governance, and COBIT 5 provides the

best practice framework to assist in this regard. It can therefore be said that the CIO is seen as the *'link'* between the board and management. Although management is responsible for implementation, various supporting committees need to be established.

According to the King III Report, various committees which will assist the board with their ICT responsibilities, amongst others, can be established (IoDSA, 2009). Examples of typical committees that should play a role in the implementation of CGICT are ICT Oversight Committee, ICT Steering Committee, Risk Committee, and Audit Committee. According to Posthumus et al. (2010), these various committees will provide the board with guidance and advice on any matters related to ICT. Hence, the committees are made up of various parties or independent directors, according to Nolan and McFarlan (2005), in order to assist in this regard. The committees make sure that all parties are included in the discussions to help align ICT with the business strategies, as well as helping ICT to deliver value to the enterprise.

The three mentioned role players form an essential part to good CGICT in any enterprise. These role players are interdependent on one another. Thus, these role players, working together, facilitate an environment for good CGICT within the enterprise.

2.6 Conclusion

It has been indicated that Corporate Governance plays a major role in all enterprises today. Sound Corporate Governance allows enterprises to deliver value towards shareholders and/or stakeholders. To achieve this, Corporate Governance requires a governing body, represented by the board, which provides direction to the enterprise. Furthermore, the board must show due care, in which it focuses on the well-being of the enterprise. This facilitates sound Corporate Governance in the enterprise.

ICT is critical to the well-being of enterprises and should therefore be governed and managed. Even though Corporate Governance focuses on a more general view, the need has been realised to extend the contemporary Corporate Governance to include ICT. This has led to Corporate Governance of ICT, which is equally important to all other underlying critical aspects that also need to be governed to ensure the well-being of the enterprise.

Therefore, Corporate Governance of ICT, similar to Corporate Governance, remains the board's responsibility. Although the board remains ultimately accountable for the Corporate Governance of ICT, the board should delegate the responsibility to management.

The board provides direction for *what* should be done to implement Corporate Governance of ICT, whereas those in management use ICT Governance to assist them with *how* to implement Corporate Governance of ICT. Thus, the details of how to implement sound Corporate Governance of ICT can be found in ICT governance. Moreover, ICT Governance enables management to ensure that directives from the board are implemented uniformly. Nonetheless, the various role players, which include the board, management, and various supporting committees, together contribute to sound CGICT within the enterprise.

With the above in mind, when ICT is governed properly, it adds value to the enterprise. The value that ICT adds to the enterprise allows shareholders and/or stakeholders to receive maximum benefit. This holds true not only in the private sector but also in the public sector.

Local government has long deemed ICT to be a critical factor in successfully delivering sustainable services to the community. Consequently, ICT must also be governed in local government. This implies that Corporate Governance of ICT is equally important in local government as it is in the private sector.

The next chapter will therefore focus on providing a clear view on the current standings of Corporate Governance of ICT within local government. This will provide one with a clear understanding of the current situation in local government and the way forward towards sound Corporate Governance of ICT.

Chapter 3

Corporate Governance of ICT in Local Government

The intention of this chapter is to provide a clear view on the current standings of Corporate Governance of ICT within local government. After setting the scene, various frameworks for Corporate Governance of ICT are investigated. Subsequently, core aspects which need to be addressed appropriately to achieve good Corporate Governance of ICT in local government are identified. This will provide a clear understanding of the current Corporate Governance of ICT landscape in local government and what is required to facilitate an environment for good Corporate Governance of ICT.

3.1 Introduction

From the preceding chapter, it is clear that ICT is core to any modern enterprise and should therefore be properly governed (Von Solms & Von Solms, 2008), which implies good Corporate Governance of ICT (CGICT). According to the King III Report, CGICT is applicable to all entities, whether public or private, which includes local government (IoDSA, 2009). This had already been realised in 1998 with the release of the Presidential Review Commission (PRC) report, which reported on the state of governance in South Africa (Presidential Commissioners, 1998). In chapter 6 of the PRC's report (1998), the Department of Public Service and Administration (DPSA) stated their vision regarding ICT as follows: *"I[C]T will be aligned with Government Business Goals; and [it] will be a change agent to create a responsive, result-*

orientated, value-added Public Service". From the foregoing, it is clear that CGICT is deemed very important, and as stated in the previous chapter, the well-being of the enterprise is the responsibility of the board. According to Tricker (2015), the board may be called by various terms, one of which is the Council. In the local government context, the board's role is therefore fulfilled by the Municipal Council. The question at this stage, however, is: Are Municipal Councils fulfilling their designated roles towards implementing good CGICT?

To address the above-stated question, this chapter will start by discussing the annual audit outcomes of the Auditor-General of South Africa, which will shed light on the current situation within local government in general. Furthermore, this chapter will continue by discussing more recent frameworks, which were aimed at guiding local government towards implementing sound CGICT. To conclude, this chapter will highlight various core aspects which must be taken into account when a framework is proposed to assist local government with good CGICT.

3.2 The Auditor-General's Findings

According to chapter 9 of the Constitution of South Africa (Constitution of South Africa, 1996), various state institutions exist, which support constitutional democracy. One of these institutions is the Auditor-General. Section 188 of the Constitution clearly describes the function and role of the Auditor-General (Constitution of South Africa, 1996). In summary, the Auditor-General must audit and report on the accounts, financial statements, financial management, as well as the underlying systems, which include ICT, of all national and provincial state departments, as well as all municipalities, which implies local government in general. These reports are released annually for viewing and analysis (The Auditor-General of South Africa, 2016).

About 10 years after the previously mentioned PRC's report, the 2008/2009 financial year audit report was released, in which the Auditor-General identified six key risk areas. One of these areas is ICT. Subsequently, within the area of ICT, the Auditor-General identified four predominant ICT areas that are not satisfactorily controlled (The Auditor-General of South Africa, 2009). These four ICT areas have the following controls: CGICT controls,

security management controls, user access management controls, and lastly, ICT service continuity controls. The fact that these ICT areas are unsatisfactory is alarming and illustrate that little has been done regarding CGICT, even though ICT was deemed very important by the PRC's report in 1998.

In the 2009/2010 report, the same four ICT areas were reiterated. Consequently, the Auditor-General stressed the need for a government-wide governance of ICT framework in order to implement a national ICT strategy, based on defined processes and standards (The Auditor-General of South Africa, 2010), in an attempt to address the six identified key risk areas, and more specifically the four underlying ICT areas, amongst others. The Auditor-General also raised the need for roles and responsibilities to be clearly defined, as there was lack of accountability from management's side (The Auditor-General of South Africa, 2010). Shortly after this disclosure from the Auditor-General, the 2012/2013 report was released, once again readdressing the same concerns.

In the 2012/2013 audit report, the Auditor-General reported that only 3% of local government had implemented CGICT controls (The Auditor-General of South Africa, 2013). The remaining 97% of local government had CGICT controls defined; however, none of these controls were being implemented.

The root cause for this low implementation percentage, as identified by the Auditor-General, is due to the existence of a lack of internal expertise to appropriately design and implement CGICT controls, which stems from the complex nature of implementing good CGICT (The Auditor-General of South Africa, 2013). In failing to address this complexity, the CGICT landscape would surely remain unchanged in local government. This is also evident in the recent 2013/2014 audit report, which highlighted that a shocking 1% of local government has satisfactorily implemented CGICT controls (The Auditor-General of South Africa, 2014). The fact that the percentage has decreased is alarming, once again supporting the need for proper implementation guidance towards sound CGICT. Figure 3.1 depicts a comparison between the 2012/2013 and 2013/2014 audit reports (The Auditor-General of South Africa, 2014).

Considering Figure 3.1, it is clear that local government is currently facing challenges regarding the implementation of sound CGICT. This is due not only to a lack of internal expertise but also to the complexity of im-

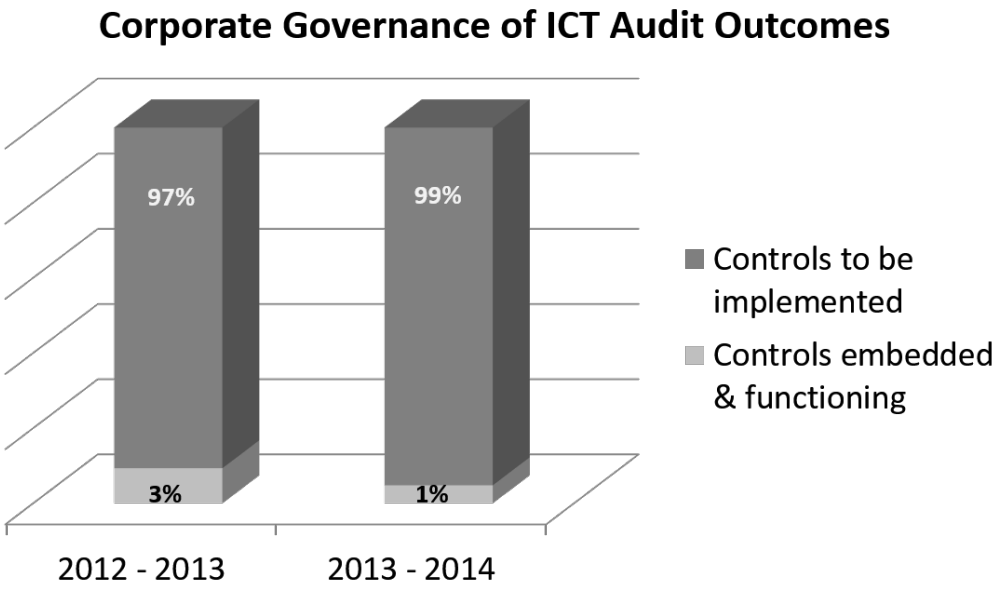


Figure 3.1: 2012/2013 vs. 2013/2014 Audit Outcome. Adapted from The Auditor-General of South Africa (2014)

plementing sound CGICT. It is clear that local government knows *what* it should do in order to implement sound CGICT. This is evident in the fact that CGICT controls have been defined; however, local government does not know *how* to implement CGICT. This can be attributed to a lack of adequate resources such as skilled staff and financial capacity, which stems from budgetary constraints. Although best practices and standards provide sufficient guidance on *what* must be done in order to implement sound CGICT, the unique operating environment of local government requires guidance on *how* to implement sound CGICT.

Figure 3.2 represents the *'gap'* that currently exists in local government,

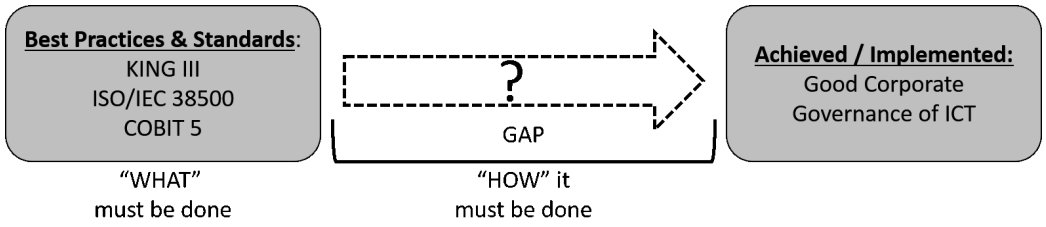


Figure 3.2: Addressing the Gap

which is the gap on *how* to attain sound CGICT. In an attempt to address the identified gap, a number of frameworks and policies were developed by the DPSA, amongst others, the first of which is called the Corporate Governance of ICT Policy Framework (CGICTPF).

3.3 The Corporate Governance of ICT Policy Framework

As mentioned previously, in the 2009/2010 audit report, the Auditor-General stressed the need for a government-wide governance of ICT framework (The Auditor-General of South Africa, 2010). This led to the development of the CGICTPF, which was drafted in December 2012. The purpose of the CGICTPF was to institutionalise CGICT as an important part of corporate governance in government departments (Department: Public Service and Administration, 2012). It also provides the political and executive leadership, the Municipal Council in this case, with principles and practices with which they should comply.

The CGICTPF used a three-phased approach, as summarised in Table 3.1, in which all the departments of government should implement CGICT (Department: Public Service and Administration, 2012). This is highlighted in the following statement from the CGICTPF: *"This CGICTPF is applicable to all spheres of government, organs of State and public enterprises"*. The three phases were intended to be implemented from December 2012 to April 2015 onwards. This unfortunately did not materialise in local government, as it faced various challenges regarding implementation. This can be attributed to the fact that the smaller district and local municipalities do not have the appropriate financial and administrative capacity for the successful implementation of the CGICTPF. This is supported by the Local Government Circular: C5 of 2015, which stated that the CGICTPF is deemed too complex, since it does not take into account the unique operating environment of local government, particularly district and local municipalities (Parker, 2015). In addition, the CGICTPF is too complex because it attempts to cater for all spheres of government. In a general sense, local government does not seem to be capable, from a financial and administrative point of

Table 3.1: Three-Phased Approach of CGICTPF

Phase	**Description**	**Major Outputs**	**Time Frame**
Phase 1	*Establish the Corporate Governance of ICT and ICT Governance environments*	• Corporate Governance of ICT Charter • Roles and responsibilities defined • ICT Plan • ICT Security Policy • ICT Continuity Plan	Completed by March 2014
Phase 2	*Business and ICT Strategic Alignment*	• ICT Implementation Plan	Completed by March 2015
Phase 3	*Continuous improvement of Corporate Governance of ICT and ICT Governance*	• Measurable improvement on everything related to Corporate Governance of ICT and ICT Governance	April 2015 onwards

* Note: Table data retrieved from the CGICTPF (Department: Public Service and Administration, 2012)

view, to implement the CGICTPF effectively.

Combined with the complexity of the CGICTPF, the CGICTPF only provides information and guidance on *what* must be done in order to implement CGICT, thereby lacking in guidance on *how* to implement CGICT. Subsequently, the Auditor-General reported that CGICT, as per the CGICTPF, was not successfully implemented.

Even though the CGICTPF is complex, the various components that form part of the major outputs, as shown in Table 3.1, are critical to good CGICT in local government. Specifically, the Corporate Governance of ICT Charter is critical and should be one of the first components that local government

should adopt in its efforts towards good CGICT. A Corporate Governance of ICT Charter, in this case, can be defined as *"The outline of the decision-making rights and accountability for I[C]T governance that would enable the desirable culture in the use of I[C]T within the company, by requiring I[C]T management to provide timely information, to comply with direction and to conform to the principles of good governance"* (IT Governance Network, 2009). In essence, the Corporate Governance of ICT Charter can be seen as a visionary document which provides strategic direction from the Municipal Council. Although various components exist, the Corporate Governance of ICT Charter is seen as the core component in the first phase, and the remaining components will be discussed in a later chapter.

In alignment with the CGICTPF, the South African Local Government Association (SALGA) used the same principles as the CGICTPF in developing a more detailed document, focusing only on local government. This document is called *"A Municipal Guide/Roadmap to Successful ICT Governance"* (SALGA, 2012), hereafter referred to as the SALGA document.

3.4 A Municipal Guide/Roadmap to Successful ICT Governance: SALGA

Although the CGICTPF's intended audience included local government in general, SALGA identified the need to draft a municipal version of the CGICTPF. This can be attributed to the fact that many municipalities are classified as small municipalities due to not having adequate resources regarding finances and skilled staff. Consequently, these municipalities need more rigorous organisational reforms and restructuring initiatives than other municipalities (SALGA, 2012). As a result, local and district municipalities were in general not able to successfully implement the CGICTPF.

As previously indicated, within local government, three categories of municipalities exist, namely, metropolitan municipalities, district municipalities, and local municipalities. According to the South African National Treasury, these municipalities are categorised according to their financial management capacity, which is either high, medium or low. This is reflected in the phasing in of the Municipal Finance Management Act (MFMA), which can further

be divided into five sub-categories. These five sub-categories, as described in the Division of Revenue Act of 2004 (Republic of South Africa, 2004), are as follows:

- Rich in resources and high capacity
- Adequate resources and medium capacity
- Poor resources and medium capacity
- Adequate resources and low capacity
- Poor resources and low capacity

Even though classification is made regarding the different sizes of municipalities, the SALGA document, after the final version was released in June 2012, still lacked in some areas. One of the major shortcomings is the fact that the document does not give directions on *how* the different municipalities should implement CGICT. Furthermore, the SALGA document, similar to the CGICTPF, provides the principles and practices pertaining to local government as a whole. This once again creates a problem regarding scalability, as 30% of all municipalities fall into the above-mentioned category of *'poor resources and low capacity'* (SALGA, 2012).

This means that the aforementioned local municipalities have very limited financial resources as well as limited skills for the implementation of CGICT, or in this case the SALGA document. It is due to this limited capacity that local government, specifically district and local municipalities, require a more scalable approach which could guide them in implementing CGICT, one that is suitable to their unique size and shape. In contrast, metropolitan municipalities in general would most likely be able to implement the SALGA document, as they typically fall within the *'Rich in resources and high capacity'* category.

Even though the SALGA document lacks in certain areas, such as scalability and addressing the *how* gap, it contains important components which need to be implemented towards achieving good CGICT. These components are divided into a similar approach as the three-phased approach of the CGICTPF. Instead of three phases, the SALGA document makes use of five phases, or steps in this case, towards CGICT. The five steps are as follows (SALGA, 2012):

1. Identify Needs
2. Envision Solution
3. Plan Solution
4. Implement Solution
5. Operationalise Solution.

The foregoing five steps are very similar to the three-phased approach of the CGICTPF. Although the SALGA document provided guidance from a local government perspective, the same components that are contained within the CGICTPF can be found in the SALGA document. As an example, the Corporate Governance of ICT Charter that was discussed in the previous section is also considered by the SALGA document to be one of the critical components towards good CGICT.

With the above in mind, the CGICTPF and the SALGA document can be deemed too complex for implementation towards good CGICT, as both focused on *what* must be done for good CGICT and not *how* good CGICT should be achieved. This is evident in the previous audit reports reporting the same trends of unsatisfactory ICT areas, which remain unchanged. Consequently, the Western Cape Department of Local Government led in the development of a new policy in this regard, focusing on municipalities and their unique operating environment. This new policy was called the Municipal Corporate Governance of ICT Policy (MCGICTP).

3.5 Municipal Corporate Governance of ICT Policy

The newly developed MCGICTP was drafted in January 2015 with the assistance of the DPSA and SALGA, amongst others (Department: Western Cape Local Government, 2015). After the release of the MCGICTP, the Auditor-General communicated in the 2013/2014 audit report: *"The MCGICTP is planned to be implemented from the 2015/2016 financial year"* (The Auditor-General of South Africa, 2014). This is further supported by the Local Government Circular: C5 of 2015, adding that the MCGICTP is following the process of being adopted as a national standard (Parker, 2015).

The question at this stage, however, is: If the previous attempts (CGICTPF and the SALGA document) were not completely successful at guiding local government towards sound CGICT implementation, how does the MCGICTP compare to these previous attempts? In terms of a high-level comparison with the CGICTPF, one can easily maintain that these two documents are remarkably alike. Regarding the approach to CGICT, the MCGICTP also makes use of the same three-phased implementation approach, as does the CGICTPF (Department: Western Cape Local Government, 2015). The same objectives, in each phase, are being addressed in the MCGICTP as with the CGICTPF.

To a large extent, one can contend that the CGICTPF has been taken and modified to fit within the local government environment. This is evident in the 2013/2014 audit report in which the Auditor-General mentioned the following: *"In the 2014/2015 year, the national coordinating and monitoring structure customised the CGICTPF for local government and drafted a MCGICTP"*. Consequently, it can be asserted that the same challenges will arise with the implementation of the MCGICTP, as they did with the CGICTPF. A comparison of the similarities will be discussed in the section that follows.

In light of the above, scalability is not being addressed satisfactorily in the MCGICTP. Also, the MCGICTP only guides local government on *what* must be done to implement good CGICT, and the provision of any guidance on *how* to implement good CGICT is still lacking.

3.6 The CGICTPF vs. the SALGA Document vs. the MCGICTP

Considering each individual document, it is clear that the same principles have been used in the development of the CGICTPF, the SALGA document, and the MCGICTP. Even though the majority of the documents are remarkably similar, the major difference is in the context that has shifted from all government departments (CGICTPF) to a more focused local government context (SALGA document and MCGICTP). Table 3.2 clearly represents a comparison of the similarities of these three documents in this regard.

Table 3.2: Comparison of Similarities

	CGICTPF	**SALGA Document**	**MCGICTP**
Release Date	December 2012	June 2012	January 2015
Audience Size	All Government Departments	Local Government	Local Government
Phases	3 Phases	5 Steps	3 Phases
Timeline	2012 to 2015 Onwards	2012 Onwards	2016 to 2020 Onwards
Based on Best Practices and Standards	King III Report ISO/IEC 38500 COBIT 5	King III Report ISO/IEC 38500 COBIT 5	King III Report ISO/IEC 38500 COBIT 5
Core Components	• CGICT Charter • ICT Plan • ICT Security Policies • ICT Implementation Plan	• CGICT Charter • ICT Plan • ICT Security Policies	• CGICT Charter • ICT Plan • ICT Security Policies • ICT Implementation Plan
Addressing *what* of CGICT	YES	YES	YES
Addressing *how* of CGICT	NO	NO	NO

* Note: Table data retrieved from the CGICTPF, SALGA document, and MCGICTP respectively (Department: Public Service and Administration, 2012; SALGA, 2012; Department: Western Cape Local Government, 2015)

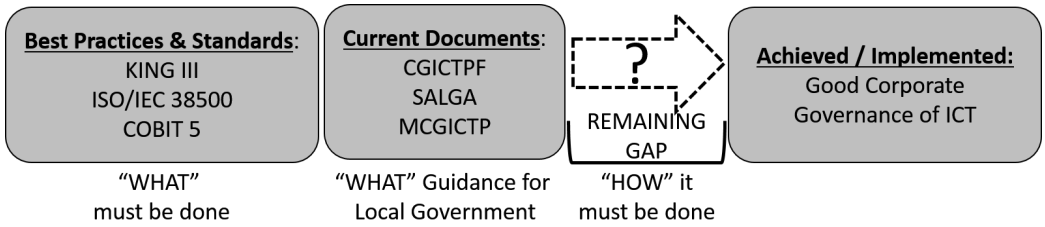


Figure 3.3: Addressing the Remaining Gap

All three documents presented in Table 3.2 were *'attempts'* at addressing the initial gap on *how* to implement and achieve good CGICT, as depicted in the previously mentioned Figure 3.2. However, it can be posited that these documents were providing guidance, similar to best practices and standards, on *what* must be done in order to achieve good CGICT. The difference between the best practices and standards and these three mentioned documents is that the focus has shifted from an enterprise environment over to a governmental or municipal environment, by providing guidance on *what* must be done in a local government context. As consequence, it has the effect of still not fully addressing the *how* gap, as presented in Figure 3.3.

It may therefore be concluded that CGICT has been well defined and that the government has made definite efforts to formalise CGICT. However, due to resource restrictions, such as skilled staff and financial constraints, CGICT up to now has not been implemented with much success in local government, as reported by the Auditor-General (The Auditor-General of South Africa, 2014). It is clear that there still exists a gap of *how* to implement good CGICT, which must be addressed appropriately in order to achieve good CGICT in local government. It is therefore essential that local government receive guidance on *how* to implement good CGICT, not only to address the remaining gap but also to enable them to help themselves and not be solely dependent on third parties. To achieve this, it is necessary that certain required core aspects be addressed, which is imperative for a workable solution towards addressing the *how* gap.

3.7 Addressing the Core Aspects towards Good Corporate Governance of ICT

Throughout the discussion, various core aspects have surfaced which must be addressed in order to facilitate an environment for sound CGICT within any local government. Four required core aspects have been identified, which will be discussed in more detail. The four core aspects are as follows: the aspect of *relevancy*, the aspect of *usability*, the aspect of *scalability*, and lastly, the aspect of *simplicity*. If an attempt at addressing the *how* gap is made, it is crucial that these core aspects be taken into consideration when developing a CGICT framework, which should enable local government to implement good CGICT.

Various best practices and standards exist which provide sufficient guidance on *what* must be done to implement good CGICT, as highlighted in the previous chapter. However, these best practices and standards may be open to interpretation. As an example, the King III Report uses a *'comply or explain'* approach. This approach, as a consequence, has no legal sanctions for non-compliance (IoDSA, 2009). Nevertheless, this does not mean that Municipal Councils can ignore the King III Report. One has to provide an excellent reason as to why one does not comply with the King III Report. This approach, as a result, allows individuals to interpret the importance of the King III principles according to their own understanding. This, in itself, creates an issue, in that Municipal Councils can interpret the King III Report incorrectly, thinking that some of the King III principles are not *relevant* to them.

Another example in connection with the above is the CGICTPF. Because of the broad focus of the CGICTPF, focusing on all government departments, it is challenging for local government to identify what is *relevant* to its unique operating environment and what is not. Thus, in order to address the aspect of *relevancy*, it is important to limit interpretation within a CGICT framework, by ensuring that all components in the CGICT framework are *relevant* to local government.

Furthermore, local government is facing challenges with implementing good CGICT. This is due to a lack of a single integrated approach. To clarify, the ISO/IEC 38500 (2008) standard is used as an example. The ISO/IEC

38500 (2008) standard is one of the many approaches towards CGICT; however, Municipal Councils are not able to implement good CGICT by only using this one approach, as the ISO/IEC 38500 (2008) is a very high-level document, providing only guiding principles and practices of *what* should be done, to achieve sound CGICT. Consequently, this introduces the aspect of *usability*, in the sense that the Municipal Council would not be able to implement CGICT by simply following this standard, as it lacks detailed implementation steps. This is also evident in the CGICTPF, the SALGA document, as well as the MCGICTP, in which the degree of *usability* is limited at best. Thus, it is necessary to provide ample guidance on *how* Municipal Councils should implement sound CGICT, thereby addressing the aspect of *usability*.

As mentioned in Chapter 1, various sized municipalities exist within local government. Each of these municipalities vary in their financial and administrative capacities. This results in the notion that what is attainable for one municipality might not necessarily be attainable for the next. It is therefore important that guidance is provided for Municipal Councils through addressing the aspect of *scalability*, which, in turn, will cater for the unique operating environment of local government, as it is currently lacking in the CGICTPF, the SALGA document, and the MCGICTP. Moreover, considering a best practice, such as COBIT 5, it is important to remember that it is not in itself easily *scalable* to cater for the unique operating environment of local government neither is it *simplistic* enough for local government in general to implement with its own resources.

It is crucial that Municipal Councils be guided in a *simplistic* but structured manner towards sound CGICT. The Local Government Circular: C5 of 2015 stated that previously developed frameworks (CGICTPF, SALGA Document, and MCGICTP) for CGICT were too complex and were not *scalable* because the frameworks tried to implement the complete COBIT 5 framework, which is a complex implementation process with great amounts of detail (Parker, 2015). Thus, it is vital that the aspect of *simplicity* be addressed, which is required in order to guide Municipal Councils with implementation towards good CGICT.

The four identified core aspects consequently present a difficult obstacle for local government to overcome while trying to achieve sound CGICT, if not

properly addressed. Hence, these core aspects should be taken into consideration when proposing a framework towards implementing sound CGICT.

3.8 Conclusion

It is clear that ICT plays a pivotal role in the success of any enterprise, which includes local government. This has clearly been described by the PRC's report, and therefore local government must ensure that sound CGICT is implemented in order for ICT to deliver value towards the achievement of strategic objectives. The responsibility remains with the Municipal Council to ensure that this is done.

Even though Municipal Councils are to some degree aware of their responsibility, the annual audit reports from the Auditor-General of South Africa have shown the status of CGICT in local government as unsatisfactory. Throughout the audit reports, the Auditor-General has highlighted the need for guidance that exists within local government. This need was due to a lack of internal expertise and resources to appropriately implement CGICT controls, which stemmed from the complexity of implementing good CGICT. This led to the need for a government-wide governance of ICT framework.

Various attempts have been made to try and guide local government with the implementation of CGICT. Unfortunately, these attempts have failed due to issues that exist within these various attempts. Furthermore, these attempts have provided local government with sufficient guidance on *what* must be done in order to implement CGICT, however leading to a gap that still exists in local government on *how* to implement sound CGICT.

Figure 3.4: Timeline of CGICT in Local Government

It is apparent that the current situation in local government is very much unsatisfactory. As depicted in Figure 3.4, from as early as 1998 until present, little has been accomplished regarding the implementation of CGICT in local government. This is evident in the 2013/2014 audit report showing that

99% of local government has not implemented any CGICT controls (The Auditor-General of South Africa, 2014). To improve on this, the four identified required core aspects should be appropriately addressed. In turn, this would address the gap that currently exists, by guiding local government on *how* to implement good CGICT, essentially helping local government to help themselves. The next chapter will therefore discuss the intended research approach to be followed in order to develop a framework which will guide local government on *how* to implement sound CGICT.

Chapter 4

Research Approach

This chapter will discuss the approach followed to produce a research contribution towards solving the identified real-world problem mentioned in this study. Additionally, this chapter suggests a specific research paradigm which dictates that a structured research process be followed. By following this research process, a clear understanding will be provided on how the research contribution was developed.

4.1 Introduction

It is clear from the foregoing chapter that local government in general has received sufficient guidance on *'what'* to do in order to implement good Corporate Governance of ICT (CGICT). This guidance has been provided by the various CGICT frameworks that currently exist (CGICTPF, SALGA Document, and MCGICTP). However, these frameworks lack in providing any guidance on *'how'* to implement good CGICT. It can therefore be argued that local government is currently facing challenges with implementing good CGICT. This is due to a *'gap'* that exists between the guidance of *what* must be done for good CGICT and the lack of guidance on *how* to achieve it, as explained in detail in Section 3.2.

To address the above-mentioned gap between *what* must be done for good CGICT and *how* it should be done, this chapter will start off by discussing the overarching research paradigm followed. Secondly, the underlying research process will be discussed, which guided the researcher with the process followed in order to develop the research contribution in the context of local

government. Lastly, this chapter will conclude by providing guidance on how the research contribution was developed, by identifying various methods that were used.

4.2 Research Paradigm

The approach followed to address the problem at hand is positioned within the design-oriented information systems (IS) research paradigm. Österle et al. (2010) clearly describe that design-oriented IS research aims to develop and provide an artefact as a research contribution or output. This artefact should aim to address a real-world problem. Furthermore, Österle et al. (2010) mention that the identified real-world problem can have various stakeholders. These stakeholders ideally provide resources for the research, and in return, they expect favourable results for themselves (Österle et al., 2010).

Typical stakeholders, as identified by Österle et al. (2010) are listed below.

- Economic players, such as companies and employees
- Public administration
- The political system
- All kinds of groups in society, such as students, road users, patients, and bank customers

During the study, the stakeholders formed an essential part of the artefact creation. Concerning the artefact, Österle et al. (2010) further state that the artefact can be in the form of guidelines, frameworks, business models, and more. The output of this study is an artefact in the form of a framework. As discussed in Chapter 1, a framework is defined as *"a fundamental construct that defines assumptions, concepts, values, and practices, and that includes guidance for implementing itself"* (Tomhave, 2005). With this definition in mind, it can be added that the framework of this study refers to a high-level graphical representation of elements and relationships. The operational and/or detailed functioning of the elements enhances the static nature of the graphical representation into a dynamic framework. The dynamic nature of

the framework, which includes a supporting tool-set, would allow local government to implement good CGICT in practice. In essence, the framework consists of two parts. First, *Part A* is a conceptual architecture, which is a high-level graphical representation of good CGICT. Secondly, *Part B* is a supporting tool-set to guide the implementation of good CGICT in practice. Concerning *Part A*, the conceptual architecture provides guidance on *what* must be done to implement good CGICT in local government. In contrast, *Part B* is the supporting tool-set and provides guidance on *how* to implement good CGICT in local government. Nonetheless, both these parts will be discussed in detail in the following chapter (Chapter 5). It is also important to note that both *Part A* and *Part B* constitute the framework for good CGICT in local government which will be termed F-CGICT in this study.

For a study to be classified as a design-oriented IS research approach, certain principles must be complied with (discussed in Chapter 7). These principles are briefly described below, as extracted from Österle et al. (2010).

- *Abstraction*: Each artefact must be applicable to a class of problems. In other words, the artefact must be generally applicable, not focused on one single solution, such as during a consultation exercise.

- *Originality*: Each artefact must substantially contribute to the advancement of the body of knowledge. Österle et al. (2010) clearly bring out that the body of knowledge of design-oriented IS research is constituted by the scientific literature produced and - to a larger extent - by the experiences and knowledge accumulated in business.

- *Justification*: Each artefact must be justified in a comprehensible manner and must allow for the validation thereof.

- *Benefit*: Each artefact must yield benefits - either immediately or in the future - for the respective stakeholder group.

The above-mentioned four principles provide the basis on which design-oriented IS research is built. To use these principles towards producing F-CGICT, design-oriented IS research suggests a specific research process be followed.

4.3 Research Process

Notwithstanding the aforementioned principles, design-oriented IS research also supports academic freedom, in that researchers are free to decide on research objectives and research methods. This holds as long as researchers adhere to the said principles (Österle et al., 2010). Design-oriented IS research ideally follows an iterative research process. This iterative research process comprises four consecutive phases grounded on the foregoing four principles, as stated by Österle et al. (2010). Figure 4.1 depicts these four phases. These four consecutive phases, as per Figure 4.1, do not prescribe, dictate or propose comprehensive guidance to be followed and allow for *'academic freedom'*, as mentioned by Österle et al. (2010). Thus, this academic freedom does allow the researcher the freedom to select the most appropriate methodology and/or methods at hand. This methodology and/or methods should provide detailed guidance for the researcher to follow.

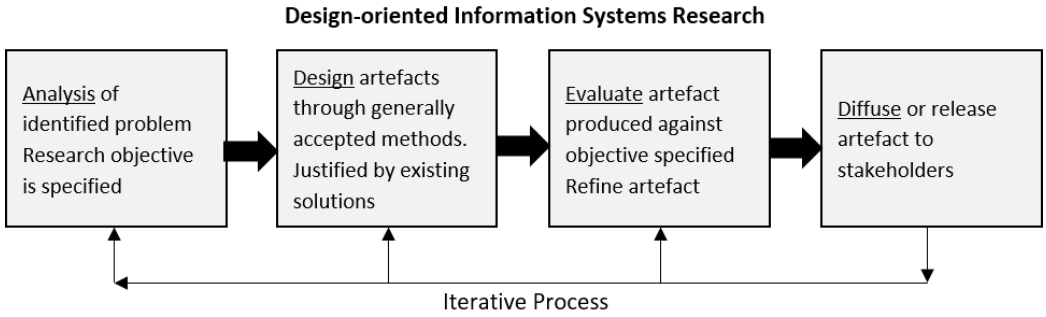


Figure 4.1: Design-oriented IS Research Phases (Österle et al., 2010)

To identify comprehensive guidance to follow, design-based research has been consulted. This approach has similar goals to that of design-oriented IS research. The fundamental difference is that design-based research stemmed from the learning sciences and not IS. However, this approach includes comprehensive guidance which could be followed. The comprehensive guidance is in the form of elements that should be completed within each phase and will be discussed later. To understand the link between design-oriented IS research and design-based research, design-based research will briefly be discussed.

Design-based research is defined by Barab and Squire (2004) as *"a series of approaches, with the intent of producing new theories, artefacts, and practices that account for and potentially impact learning and teaching in naturalistic settings"*. From this definition, it is clear that a very similar artefact to that of design-oriented IS research is produced. The naturalistic setting, in this case, is the local government environment. With this in mind, design-based research also has four phases through which research is conducted, as identified by Reeves (2006). Figure 4.2 depicts these four phases.

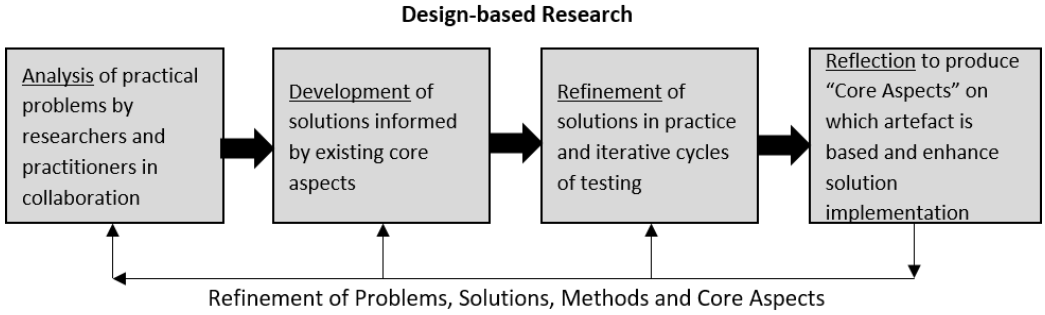


Figure 4.2: Design-based Research Phases (Reeves, 2006)

Each of the four phases of design-based research include comprehensive guidance on how to complete the individual phase. As mentioned previously, the comprehensive guidance is in the form of various elements that are contained within each individual phase. These elements act as guidance and should be completed in order to conduct the study. Herrington, McKenney, Reeves, and Oliver (2007) provide a table which contains these elements. Table 4.1 depicts the individual elements within each of the four phases. The detail of each phase and its underlying elements will be discussed in the next section.

Table 4.1: Design-based Research: Elements in Phases

Phase	**Element**
Phase of design-based research	*The elements that need to be completed*
PHASE 1: Analysis of practical problems by researchers and stakeholders in collaboration	Statement of problem
	Consultation with researchers and stakeholders
	Research objectives
	Literature Review
PHASE 2: Development of solutions informed by existing core aspects and technological innovations	Theoretical framework
	Development of draft core aspects to guide the design of the intervention
	Description of proposed intervention
PHASE 3: Iterative cycles of testing and refinement of solutions in practice	Implementation of intervention (First iteration)
	Participants
	Data collection
	Data analysis
	Implementation of intervention
	Second and further iterations
	Participants
	Data collection
	Data analysis
PHASE 4: Reflection on core aspects of produced artefact and enhanced solution implementation	Design principles
	Designed artefact(s)
	Professional development

* Note: Adapted from Herrington et al. (2007)

At this stage, it is clear that both design-oriented IS research and design-based research phases have similar goals, that of designing an artefact to a real-world problem. In the former case, the phases are Analysis, Design, Evaluate, and Diffuse; and its goals are depicted in Figure 4.1. In the latter case, design-based research phases are Analysis, Development, Test & Refine, and Reflect, and its goals are highlighted in Figure 4.2. This similarity of the goals can be credited to the fact that both research approaches focus on providing an output of an artefact, and in this case F-CGICT. However, design-oriented IS research does not provide comprehensive guidance on how

to produce the said F-CGICT. Because of the academic freedom that design-oriented IS research provides, the researcher consulted design-based research, as it provides guidance on how to produce F-CGICT. Thus, the four phases of design-based research and its underlying elements were integrated into the four phases of design-oriented IS research. As a result, a unique integrated research approach was created to guide the researcher on how to produce F-CGICT. This unique integrated research approach is depicted in Figure 4.3.

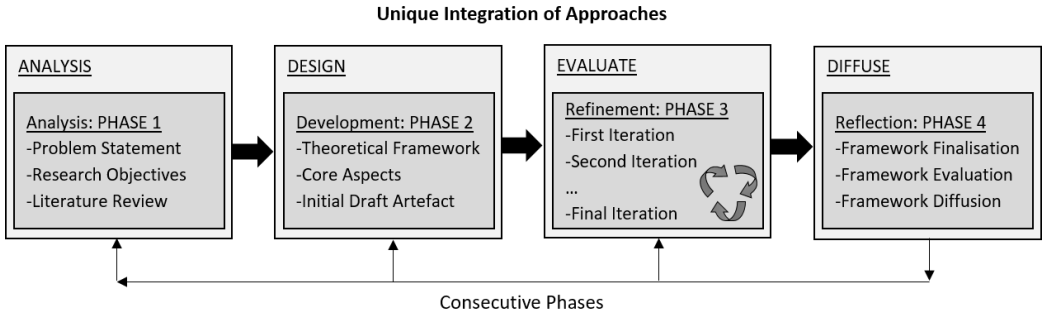


Figure 4.3: Unique Integrated Phases

Considering the above unique integrated research approach, it is important to contextualise and position this study within the four phases as presented in Figure 4.3.

4.4 Contextualisation of Research Approach

To contextualise this study, Table 4.1 will be adapted by adding a third column. This third column provides details on the position of the study within each of the four phases in design-based research. For ease of use, Table 4.1 has been divided into four individual tables, each one representing one of the four phases. Each phase will be discussed individually.

4.4.1 Phase 1

According to Herrington et al. (2007), the goal of Phase 1 is the *"analysis of practical problems by researchers and stakeholders in collaboration"*. To do so, Phase 1 requires the researcher to complete various elements as described

in Table 4.2. First, upon initial findings from the Auditor-General's report, the researcher collaborated with the local government stakeholder in order to formulate the problem statement. By collaborating with local government, the researcher identified that the problem was situated within CGICT. After formulating the problem statement, unique research objectives for the study were constructed. Furthermore, Phase 1 requires the researcher to conduct a literature review. Upon the completion of the literature review, the final output of Phase 1 is first a problem statement that has been formulated, and secondly, it presents unique objectives that have been identified that will address the problem at hand. With this output, the goal of Phase 1 has been achieved.

Table 4.2: Design-based Research Phase 1

Phase	**Element**	**Position**
Phase of design-based research	*The elements that need to be completed*	*Position in study*
PHASE 1: Analysis of practical problems by researchers and stakeholders in collaboration	Statement of problem Consultation with researchers and stakeholders	By consulting stakeholders in local government, an initial problem is identified
	Research objectives	Based on problem statement, initial research objectives were identified
	Literature review	From objectives, a literature review was conducted to further understand identified problem

* Note: Adapted from Herrington et al. (2007)

4.4.2 Phase 2

Herrington et al. (2007) describe the goal of Phase 2 as the *"development of solutions informed by existing core aspects and technological innovations"*. Table 4.3 represents Phase 2 and its underlying elements. With this in mind, Phase 2 first requires the researcher to study literature and related government policy documents in order to identify core aspects that are typically required in a sound CGICT framework. These core aspects were discussed in detail in Chapter 3 (*relevancy*, *usability*, *scalability*, and *simplicity*). Lastly, Phase 2 also requires the researcher to address the *'Theoretical framework'*

element. This is done by identifying criteria from literature, which is the basis for developing a good CGICT framework. These criteria will be discussed in detail in Chapter 5. As a result, the output of Phase 2 is an initial draft of F-CGICT, which aims to contribute to the real-world problem. The initial F-CGICT is drafted by taking into consideration the core aspects together with the identified criteria. The output of the initial drafted F-CGICT concludes Phase 2.

Table 4.3: Design-based Research Phase 2

Phase	**Element**	**Position**
Phase of design-based research	*The elements that need to be completed*	*Position in a study*
PHASE 2: Development of solutions informed by existing core aspects and technological innovations	Theoretical framework Development of draft core aspects to guide the design of the intervention	Study related policy documents and Best Practices & Standards to extract core aspects
	Description of proposed intervention	Develop initial draft intervention (F-CGICT) from core aspects to GCICT in local government

* Note: Adapted from Herrington et al. (2007)

4.4.3 Phase 3

Herrington et al. (2007) clearly describe the goal of Phase 3 as *"iterative cycles of testing and refinement of solutions in practice"*. With this in mind, Phase 3, as represented by Table 4.4, requires the researcher to refine F-CGICT through various iterative cycles. F-CGICT is refined until it has reached an acceptable level, which is determined by the stakeholders of local government. Considering the first element of Phase 3, the researcher is required to complete a first iteration of the refinement process. Subsequently, the initial drafted F-CGICT from Phase 2 is taken and presented to the stakeholders of local government. After presenting F-CGICT, feedback is gathered. The feedback is then incorporated into a second drafted F-CGICT. After incorporating the feedback, the second iteration which follows the exact pattern of the first iteration starts. The iterative cycles will

continue until F-CGICT reaches an acceptable level, as determined by the stakeholders of local government (Österle et al., 2010). The final refined F-CGICT is considered the output of Phase 3. This final output also concludes Phase 3.

Table 4.4: Design-based Research Phase 3

Phase	**Element**	**Position**
Phase of design-based research	*The elements that need to be completed*	*Position in a study*
PHASE 3: Iterative cycles of testing and refinement of solutions in practice	**First iteration**	First iteration starts with initial artefact (F-CGICT) as drafted in previous phase
	Stakeholders	Members from local government (e.g. executive management)
	Data collection (Mixed Research Methods)	Artefact (F-CGICT) is tested for acceptance
	Data analysis	Data interpretation and critical analysis thereof
	Implementation of intervention	Second draft of artefact (F-CGICT)
	Second and further iterations (Same elements as first iteration)	Second iteration starts with second draft of artefact (F-CGICT) from previous iteration. Refinement of artefact continues until acceptable level is reached

* Note: Adapted from Herrington et al. (2007)

4.4.4 Phase 4

According to Herrington et al. (2007), the goal of Phase 4 is to *"reflect on core aspects of produced artefact and enhance solution implementation"*. Essentially, Phase 4, as represented by Table 4.5, contains three elements that were completed. First, it is necessary to compare the refined F-CGICT from Phase 3 with the identified core aspects from Phase 2 (core aspects of *relevancy*, *usability*, *scalability*, and *simplicity*). The comparison is done in order to check for compliance with these core aspects. Secondly, if F-CGICT complies with these core aspects, finalisation of F-CGICT takes place. Lastly, after finalisation, F-CGICT is published, which aims to aid a Municipal

Council with the implementation of good CGICT in local government. The output of Phase 4 is the distribution or diffusion of the final F-CGICT to the stakeholders of local government.

Table 4.5: Design-based Research Phase 4

Phase	**Element**	**Position**
Phase of design-based research	*The elements that need to be completed*	*Position in a study*
PHASE 4: Reflection on core aspects of produced artefact and enhanced solution implementation	Core Aspects	Ensure F-CGICT complies with identified core aspects from Phase 2, as listed below • Relevancy • Usability • Scalability • Simplicity
	Designed artefact(s)	Finalisation of artefact (F-CGICT)
	Professional development	Make available (Diffuse) to local government as far as possible and publish solution

* Note: Adapted from Herrington et al. (2007)

By considering the four phases and their underlying elements, it is clear that a mixed-method research approach is used. This mixed-method approach is supported by Österle et al. (2010), stating that researchers are free to decide which research methods to use.

4.5 Research Methods

According to Österle et al. (2010), researchers are *"free to decide on research objectives and research methods"*, as design-oriented IS research embraces academic freedom. Subsequently, a mixed-method approach was followed in this study. Table 4.6 clearly describes the various methods used within each phase. The definitions of each method will be used throughout this section.

Table 4.6: Definition of Research Methods

Research Methods	**Phase of Process**	**Definition**
Literature Review	Phases 1 & 2	An iterative process of obtaining information sources relevant to one's study (Olivier, 2009)
Semi-structured Interview	Phase 1	A verbal interchange where the interviewer attempts to elicit information from another person by asking questions. Although there is a set of predetermined questions, this interview is conversational in nature and allows participants to explore issues they feel are important (Longhurst, 2003)
Modelling	Phases 2 & 3	A model captures the essential aspects of a system or process, while it ignores the non-essential aspects and can serve as a blueprint for new systems or processes (Olivier, 2009)
Focus Group	Phase 3	Involves a group of people who meet in an informal setting to talk about a topic set by the researcher and allows the group to explore the subject from as many angles as they please (Longhurst, 2003)
Questionnaire	Phase 4	An instrument consisting of a series of questions and/or attitude/opinion statements designed to elicit responses which can be converted into measures of the variable under investigation (Franklin & Osborne, 1971)

With the foregoing in mind, Phase 1 made use of a literature review in order to formulate the initial problem statement as well as the research objectives. Upon completion of formulating the initial problem statement, semi-structured interviews were conducted with the stakeholders of local government, in order to better comprehend the problem at hand.

Phase 2 used what was learnt from the literature review in Phase 1 and identified core aspects on which good CGICT in local government is built. In addition, an initial drafted F-CGICT was developed from the identified core aspects by using modelling techniques. The initial drafted F-CGICT was presented to the stakeholders of local government, and will be discussed in detail in the next chapter.

After presenting the initial drafted F-CGICT to the stakeholders of local government, Phase 3 started. Within Phase 3, a focus group was used to determine if the initial drafted F-CGICT was acceptable. During Phase 3, the results from the focus group were analysed, after which feedback was gathered. Taking the feedback into consideration, changes were made to the initial drafted F-CGICT. It is important to note that the same process was followed for each iterative cycle, which includes the use of a focus group to acquire feedback. Upon completion of refining F-CGICT, both *Part A* (the conceptual architecture) and *Part B* (the supporting tool-set) were finalised. As a result, the final F-CGICT was developed.

Regarding Phase 4, the final F-CGICT was evaluated against the core aspects discussed in Chapter 3 (*relevancy*, *usability*, *scalability*, and *simplicity*). To do so, a two-day workshop was used which conducted a survey in the form of a questionnaire. This will be discussed in detail in Chapter 6. Furthermore, this questionnaire also formed part of the overall validation of the entire F-CGICT.

The above-mentioned methods collectively form part of the mixed-method approach that was used in this study.

4.6 Conclusion

With the real-world problem at hand, it has been identified that design-oriented IS research by Österle et al. (2010) should be followed in order to provide a research contribution. The design-based IS research paradigm has been selected due to the practical nature of the problem as well as the naturalistic setting of local government in general.

Unfortunately, design-oriented IS research lacks in providing comprehensive guidance on how to conduct research. However, design-oriented IS does provide academic freedom to the researcher on choosing how to conduct research. Therefore, as a result, another paradigm was consulted, the paradigm of design-based research by Herrington et al. (2007). Design-based research, although stemming from learning sciences, has very similar goals to that of design-oriented IS research, for example, that of providing an artefact. However, design-based research provides comprehensive guidance on how to complete research. Thus, the comprehensive guidance from design-based re-

search was integrated with design-oriented IS research in order to produce a unique integrated research approach. This unique integrated research approach, as depicted in Figure 4.3, was used to conduct this study.

The fact that design-oriented IS research allows for academic freedom also led to the use of a mixed-method approach. This approach is used throughout the four phases, as already discussed.

The use of the unique integrated research approach allows this study to address the identified real-world problem. This is done by producing F-CGICT that consists of *Part A* (the conceptual architecture) and *Part B* (the supporting tool-set), as explained in Section 4.2. Furthermore, F-CGICT aims to guide local government and Municipal Councils in general with the implementation of good CGICT. The chapter that follows will use the discussed unique integrated research approach to develop F-CGICT.

Chapter 5

Development of a Framework for the Corporate Governance of ICT in Local Government

The purpose of this chapter is to discuss the research contribution towards addressing the identified real-world problem within local government. By using the principles and aspects from the research approach, a four-phased approach was followed to develop a framework, which will be discussed. Furthermore, the outcome of the final framework accompanied by a supporting tool-set will also be discussed in more detail.

5.1 Introduction

It is now clear what research approach has been followed in order to address the problem at hand. As mentioned in the previous chapter, the academic freedom of design-oriented information systems (IS) research resulted in the researcher using a unique integrated research approach. This approach stemmed from integrating the design-based research phases and their underlying elements into the research phases of design-oriented IS research. This unique integrated research approach provided the researcher with comprehensive guidance on how to conduct the study. As a result, a framework consisting of two parts, *Part A* (the conceptual architecture) and *Part B* (the supporting tool-set) was developed, as discussed in Section 4.2. Furthermore, *Part A* (the conceptual architecture) aims to guide local government on *what*

must be done to implement good Corporate Governance of ICT (CGICT). In contrast, *Part B* (the supporting tool-set) primarily aims to guide the Municipal Councils of local government on *'how'* to implement good CGICT. Parts A and B constitute the framework for CGICT in local government and are termed F-CGICT in this study.

To provide clarity on the development of F-CGICT, this chapter will discuss each individual phase of the four-phased unique integrated research approach followed. As discussed in the preceding chapter, the underlying four phases are as follows: Phase 1 - Analysis, Phase 2 - Development, Phase 3 - Refinement, and Phase 4 - Reflection. Figure 4.3 previously depicted these four phases and their underlying elements, which were integrated into the overarching design-oriented IS research approach. In view of that, this chapter will only discuss the first three phases, as represented in Figure 5.1. Phase 4, however, will only be discussed in Chapter 6. Nonetheless, as a start, the *'Analysis'* phase (Phase 1) will be discussed by focusing on how the problem statement was formulated. Secondly, the *'Development'* phase (Phase 2) will be discussed by identifying core aspects that are required when developing F-CGICT. Thirdly, the *'Refinement'* phase (Phase 3) will be discussed, which provides details on how F-CGICT was refined through various iterations. Finally, to conclude this chapter, the final refined F-CGICT will be discussed.

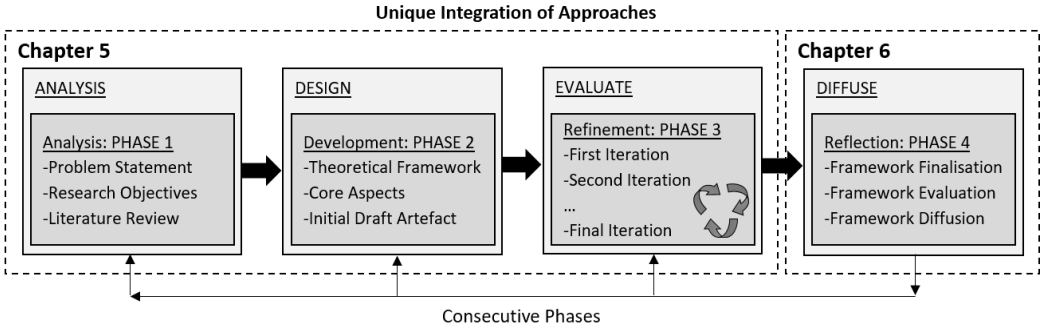


Figure 5.1: Phases towards Finalising F-CGICT

5.2 Phase 1 - Analysis

As discussed in the foregoing chapter, Phase 1, to a large extent, constitutes the analysis of a practical problem, which is done by researchers and stakeholders in collaboration (Herrington et al., 2007). Nonetheless, the starting point for Phase 1 was from the first element of Table 5.1, which is an initial problem statement.

Table 5.1: Phase 1 Elements

Phase	**Element**
Phase of design-based research	*The elements that need to be completed*
PHASE 1: Analysis of practical problems by researchers and stakeholders in collaboration	Statement of problem
	Consultation with researchers and stakeholders
	Research objectives
	Literature Review

* Note: Adapted from Herrington et al. (2007)

By studying the annual Auditor-General's reports, it became clear that local government is facing challenges concerning one of the key risk areas, which is Information and Communication Technology (ICT). It was evident that ICT is considered a key risk area due to four underlying ICT area controls that are not satisfactorily controlled (CGICT controls, security management controls, user access management controls, and ICT service continuity controls), as discussed in detail in Section 3.2. With this in mind, an initial problem statement was constructed, which addressed the first element, as seen in Table 5.1. Subsequently, an effort was made to collaborate with stakeholders from local government, in order to elaborate on the initial problem statement and to determine how this problem can be addressed. For this purpose, two stakeholders have been identified, the first of which is the Ministry of Cooperative Governance and Traditional Affairs (CoGTA).

CoGTA, which aims to ensure that all municipalities perform their basic responsibilities and functions consistently (CoGTA, 2016), was visited on the 30th of March 2015. During this visit, a semi-structured interview was conducted with a representative from CoGTA (semi-structured interview topics/questions attached in Appendix B.1). Although an initial prob-

lem statement was formulated at this stage, it was necessary to elaborate on the problem statement and determine possible stakeholders to collaborate with. During the interview, it was learned that local government has various frameworks (CGICTPF and SALGA document) to consult in implementing CGICT, as discussed in Chapter 3. Furthermore, it was also learnt that these frameworks were difficult to implement within smaller local government, as they did not take into consideration the unique operating environment of local government. Consequently, it was learnt that a new framework was drafted. This framework, called the Municipal Corporate Governance of ICT Policy (MCGICTP), is discussed in Chapter 3. After gaining a better understanding of the local government environment, a district municipality within the South African Western Cape province was identified as the second stakeholder. This district municipality was chosen to serve as the primary collaborative stakeholder throughout this study, due to having a long-standing clean ICT audit.

The district municipality was visited on the 31st of March 2015 for the first time. Various members from the district municipality were present during this visit, which included the ICT Management, Risk, Audit and Technology functions, amongst others. During this meeting, a semi-structured interview was conducted in order to gain some insight on the newly drafted MCGICTP. As a result, it was found that the district municipality foresees the same issues regarding implementation as with the other CGICT frameworks (CGICTPF and SALGA document). It was highlighted that the previous frameworks, as well as the MCGICTP, lack any guidance on *'how'* to implement the said framework. This led to the realisation of a *'gap'* that exists between *'what'* must be done to implement good CGICT and *how* it can be implemented. This *gap* was explained extensively in Chapter 3. Linking to this *gap* was the concept of roles and responsibilities. It became apparent that the implementation of CGICT is seen as a complex topic. As a result, little expertise exists within local government in general on effectively implementing good CGICT. Consequently, roles and responsibilities must clearly be defined regarding the implementation of good CGICT. Furthermore, it was learnt that the previous frameworks, and possibly the MCGICTP, do not scale effectively with a much smaller local government, as it has limited financial and administrative capacity. This has also been discussed in detail

in Chapter 3. Taking into consideration all the foregoing, a final problem statement was formulated. This problem statement was discussed and motivated in detail in Chapter 1, and it also forms one of the elements that need to be addressed in Phase 1.

To address the formulated problem, unique research objectives for the study were constructed. These objectives, as addressed in Chapter 1, provide the means to how the researcher aims to address the problem at hand. As a start, the objectives required that a comprehensive literature review be done. Therefore, various academic literature, government reports and policies, standards and best practices, and lastly, pieces of legislation were studied. The literature review provided a summary on how the problem should be addressed. The literature review is discussed in Chapters 2 and 3 respectively. After conducting the literature review, a clear understanding was gained on what challenges local government is facing and what the stakeholder's needs are. As a result, the last two elements have been addressed as per Table 5.1. Subsequently, Phase 1 ended after addressing all the elements satisfactorily, as per Table 5.1. As such, Phase 1 provided detailed information on what must be done in order to address the problem at hand. Consequently, the detailed information is used in the phase that follows, to identify various core aspects for F-CGICT.

5.3 Phase 2 - Development

Phase 2 from the unique integrated research approach dictates the development of solutions informed by existing core aspects. Therefore, as discussed in the previous chapter, the first element requires the researcher to identify core aspects on which a good CGICT framework is built, as per Table 5.2.

The literature review from Phase 1 was continued, as discussed in detail in Chapter 3, in order to identify the core aspects. As a result, four core aspects were identified, which dictates what F-CGICT should be built on. These four core aspects are as follows: aspect of *relevancy*, aspect of *usability*, aspect of *scalability*, and aspect of *simplicity*. These four aspects are core to the development of F-CGICT. As such, the four core aspects address the first element of Phase 2, as per Table 5.2. However, Phase 2 further dictates that a theoretical framework, or in this case various criteria on which F-CGICT

Table 5.2: Phase 2 Elements

Phase	**Element**
Phase of design-based research	*The elements that need to be completed*
PHASE 2: Development of solutions informed by existing core aspects and technological innovations	Development of draft core aspects to guide the design of the intervention
	Theoretical framework
	Description of proposed intervention

* Note: Adapted from Herrington et al. (2007)

is based (see Section 4.4.2), also be identified.

Before identifying the criteria, it is important to understand where the criteria stem from. Hence, when considering the concept of CGICT, literature provides a *'foundation'* or *'bare minimum'* that should be included into building any CGICT framework. Thus, this *foundation* is seen as the criteria. In light of that, four criteria have been identified from literature and will now be discussed individually in the next subsections.

5.3.1 Criterion 1 - Governance and Management

Considering the first criterion, it is important that a clear differentiation be made between the concept of *governance* and *management* (ISACA, 2012). As discussed in Section 2.2, governance is seen as providing local government with directives, or in other words, steering local government towards specific strategic goals. In contrast, management will be responsible for implementing or applying these directives, thus aiming to benefit local government as a whole.

It is important that F-CGICT differentiate and include the concept of governance as well as management into its design. The aforementioned forms part of the first criterion; however, it is essential to consider the three well-known levels of management as well.

5.3.2 Criterion 2 - Three Well-Known Management Levels

Section 2.5 only hinted at the existence of different levels of management. According to Von Solms and Von Solms (2006), these different levels of management are one of the core principles to CGICT. These three management levels are Strategic, or in this case Executive; Tactical; and Operational, as depicted in Figure 5.2, which was adapted from Coertze and Von Solms (2014).

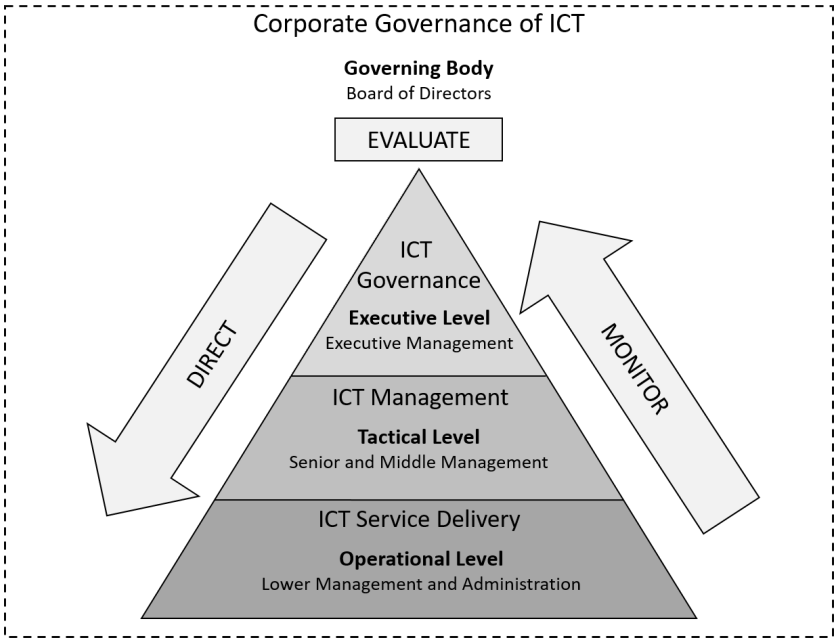


Figure 5.2: The Three Well-Known Levels of Management. Adapted from Coertze and Von Solms (2014)

These three well-known management levels form a critical part of F-CGICT. Therefore, the second criterion will also be incorporated into the design of F-CGICT. Nonetheless, another criterion for F-CGICT is the task of directing and monitoring.

5.3.3 Criterion 3 - Directing and Monitoring

As previously discussed in Section 2.3, important criteria of CGICT are the tasks of *directing* and *monitoring*. These two tasks are also represented in

Figure 5.2. Without these tasks, good CGICT is not possible; therefore, these two tasks will be incorporated into the design of F-CGICT.

The two tasks of directing and monitoring form part of the third criterion. Linking to this criterion is the Penta Bottom Line, also previously discussed in Section 2.3.

5.3.4 Criterion 4 - Penta Bottom Line

As previously discussed, the Penta Bottom Line states that CGICT has the goals of strategic alignment, value delivery, risk management, resource management, and lastly, performance measurement (Posthumus et al., 2010). These goals, previously explained in Table 2.2, are essential to the design of F-CGICT. Therefore, the Penta Bottom Line, the fourth criterion, was incorporated into F-CGICT.

These four aforementioned criteria holistically form the *'theoretical foundation'* element, as required in Table 5.2. Furthermore, the combination of the four above-mentioned criterion and the core aspects (*relevancy*, *usability*, *scalability*, and *simplicity*) provide a solid basis for the development of the first draft of F-CGICT. Consequently, the first draft of F-CGICT was developed, as depicted in Figure 5.3.

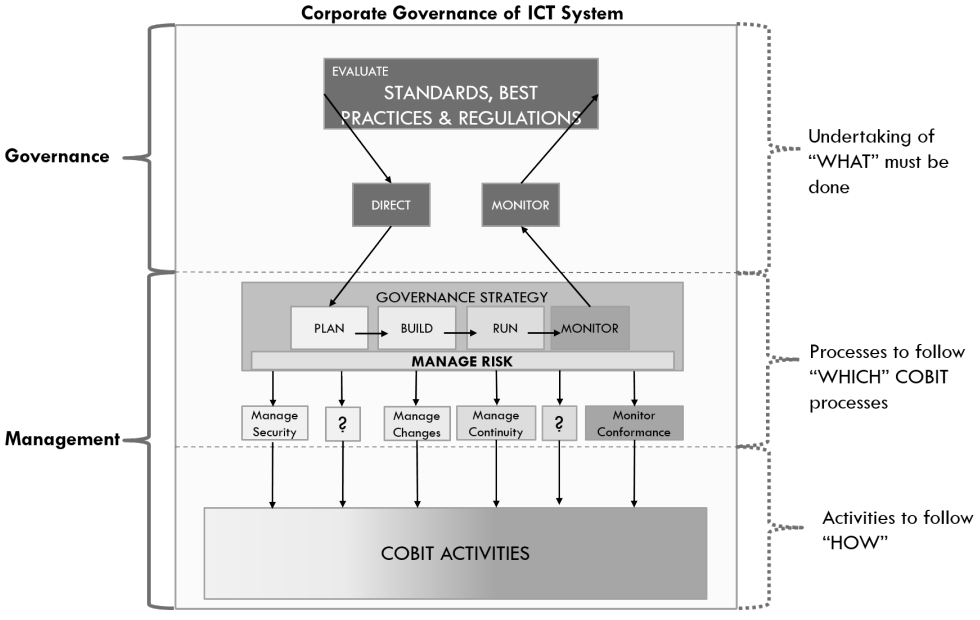


Figure 5.3: Initial Draft of Conceptual Architecture

Figure 5.3 represents the first draft of *Part A* (conceptual architecture) of F-CGICT, which is a high-level graphical representation of *what* must be done for good CGICT. This conceptual architecture is based on the core aspects and criteria from literature. As a result, the first draft of the conceptual architecture addresses the final element in Phase 2, as per Table 5.2. Nonetheless, a detailed explanation of the conceptual architecture will follow at a later stage (Section 5.5).

Considering Table 5.2, it is clear that all the elements of Phase 2 have been addressed satisfactorily. Therefore, the initial conceptual architecture was used as the input into the next phase, from which further iterations of refinement were explored.

5.4 Phase 3 - Refinement

With an initial conceptual architecture from the previous phase, it was necessary to refine the conceptual architecture, as described in Table 5.3. Using refinement iterations, Phase 3 resulted in the final F-CGICT. A total of four major refinement iterations took place, in which various components of F-CGICT were introduced and designed, after which it was refined. With this in mind, each refinement iteration will now be discussed.

Table 5.3: Phase 3 Elements

Phase	**Element**
Phase of design-based research	*The elements that need to be completed*
PHASE 3: Iterative cycles of testing and refinement of solutions in practice	**First iteration**
	Stakeholders
	Data collection (Mixed Research Methods)
	Data analysis
	Implementation of intervention
	Second and further iterations (Same elements as first iteration)

* Note: Adapted from Herrington et al. (2007)

5.4.1 Refinement Iteration 1

As part of the first refinement iteration, the initial drafted conceptual architecture from Phase 2 was used. Using the initial conceptual architecture as an *'input'*, it was presented to the stakeholder on the 04th of June 2015 in the form of a focus group session. During this focus group session, various members from local government were present. These members stemmed from, amongst others, ICT Management, Risk and Technology functions.

The draft conceptual architecture, as represented in Figure 5.3, was discussed extensively. This resulted in the stakeholder providing valuable feedback on the refinement of the conceptual architecture. First, consensus was reached on the integration of the criteria, as discussed in Phase 2. This led to a discussion on further exploring and introducing the concept of a CGICT Charter, which the stakeholder deemed essential. Although the structure and design of the conceptual architecture were accepted, it was pointed out that a CGICT Charter represents the high-level undertaking of the local government and should therefore be integrated into the conceptual architecture. The CGICT Charter was discussed in Section 3.3 in general and will be placed into context at a later stage (Section 5.5.3).

As a result of the feedback gathered from the stakeholder, the initial conceptual architecture was refined. The refinement focused on changing the structure in order to accommodate the inclusion of a *'CGICT Charter'*. Moreover, few minor changes were made regarding terminology, to better support the local government environment. Thus, taking into consideration the above, a refined conceptual architecture was drafted, as depicted in Figure 5.4. Furthermore, it is important to note that the dashed circles in Figure 5.4 highlight the refinements made from the previous iteration's conceptual architecture. Nonetheless, Figure 5.4 will serve as the input into the second refinement iteration.

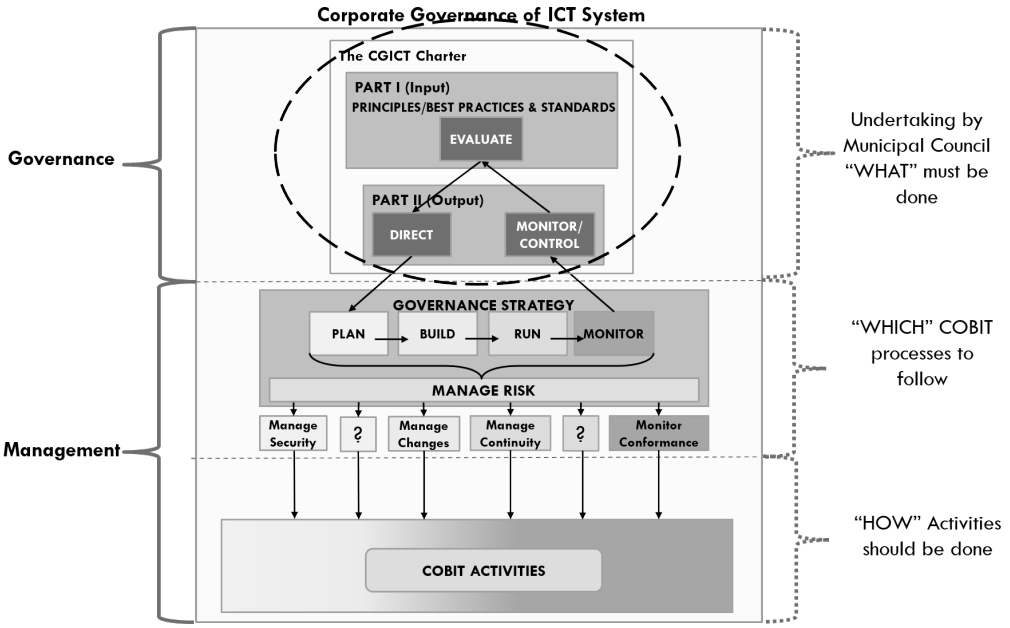


Figure 5.4: Conceptual Architecture after First Refinement

5.4.2 Refinement Iteration 2

The output from the previous iteration, as depicted in Figure 5.4, served as an input to the second refinement iteration. The second refinement iteration was undertaken on the 19th of August 2015, in the form of another focus group session. Attending the focus group were the same members as mentioned in the first iteration. During this session, the refined conceptual architecture was presented to the stakeholder in order to elicit various discussions of potential considerations and changes.

At the start of the discussion, the integration of the CGICT Charter was accepted, and consensus was reached regarding its importance. This led to a further discussion on the fact that the CGICT Charter leans on an *'executive level'*. As a result, the concept of an *'ICT Plan'* surfaced, which should support the CGICT Charter, albeit on the *'tactical level'*.

The ICT Plan, as highlighted in Table 3.2, aims to guide local government with the implementation of the CGICT Charter on a lower *tactical level*. This ICT Plan will be discussed in detail at a later stage (Section 5.5.4). Furthermore, it was mentioned that instead of using the term *'Corporate Governance of ICT System'* as the descriptive title for the conceptual

architecture, the term *'Corporate Governance of ICT Architecture'* is more fitting in the local government environment.

As a final comment during the focus group session, the concept of a supporting tool-set surfaced. As discussed in the previous chapter (Section 4.2), the supporting tool-set serves as *Part B* of F-CGICT. This supporting tool-set, which will be discussed extensively at a later stage (Section 5.5.6), aims to guide local government on *how* to implement good CGICT without the need of consulting any third-party organisations. Essentially, the supporting tool-set aims to help local government to help themselves.

After considering the various topics from the discussion, the conceptual architecture was refined by including the concept of an ICT Plan, as depicted in Figure 5.5. As stated previously, the dashed circles in the figure highlight the refinements made from the previous iteration's conceptual architecture. Furthermore, an initial supporting tool-set was constructed, at which point it was realised that a third refinement iteration is required. The refined conceptual architecture as well as the initial supporting tool-set served as the input towards the third refinement iteration.

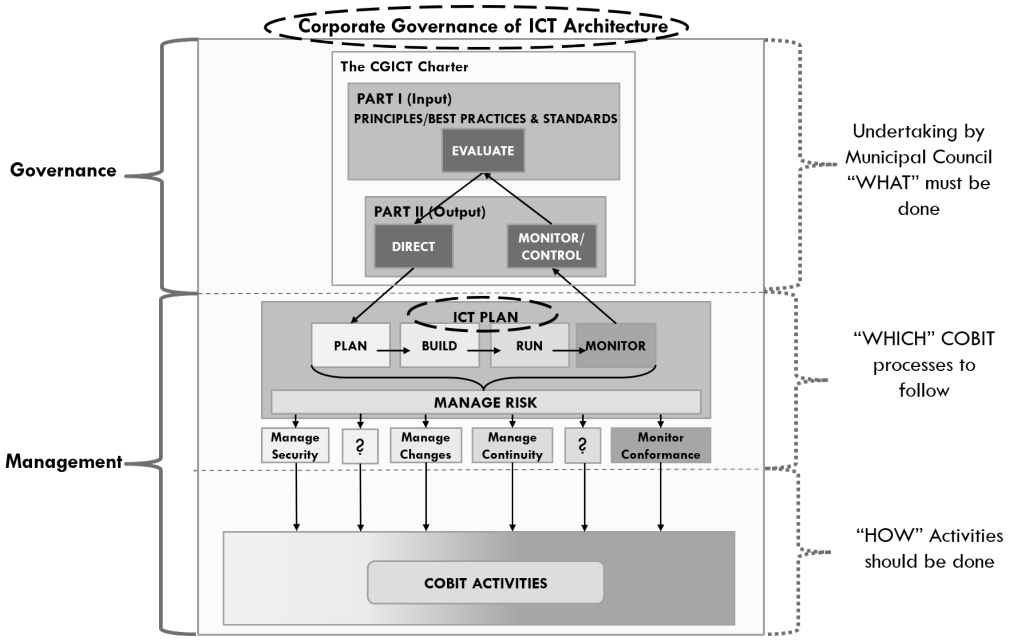


Figure 5.5: Conceptual Architecture after Second Refinement

5.4.3 Refinement Iteration 3

On the 17th of November 2015, the third refinement iteration took place in the form of another focus group session. Based on the output from the previous iteration, the conceptual architecture and initial supporting tool-set served as the focal point of the discussion. Concerning the attendees of the session, the same members attended as in the previous iterations. Subsequently, the discussion started by reaching consensus among the members regarding the acceptance of the amendments to F-CGICT. After completing the presentation of F-CGICT, various discussions followed.

One of the first discussions included a topic on the practical implementation of the ICT Plan. This implementation should be done on the lowest management level, which is the *'operational level'*. As a result, a new concept came into existence, called the *'ICT Implementation Plan'*. This ICT Implementation Plan will be discussed in detail at a later stage (Section 5.5.5).

A second discussion began by focusing on the supporting tool-set. Although the supporting tool-set will be discussed extensively at a later stage, it is important to understand that this iteration produced the basis on which the supporting tool-set is built. The mechanics of the supporting tool-set were discussed in detail, after which the stakeholder agreed on the mechanics of the supporting tool-set. Furthermore, it was decided that the supporting tool-set should support the ICT Implementation Plan with the implementation of good CGICT on a practical basis yet structured manner.

After integrating all the aforementioned comments, the conceptual architecture was refined, as represented in Figure 5.6. As stated previously, the dashed circles in the figure highlight the refinements made from the previous iteration's conceptual architecture. Moreover, the supporting tool-set was completed by considering the suggestions from the stakeholder. Both the conceptual architecture and the supporting tool-set, as a result, ended the third refinement iteration.

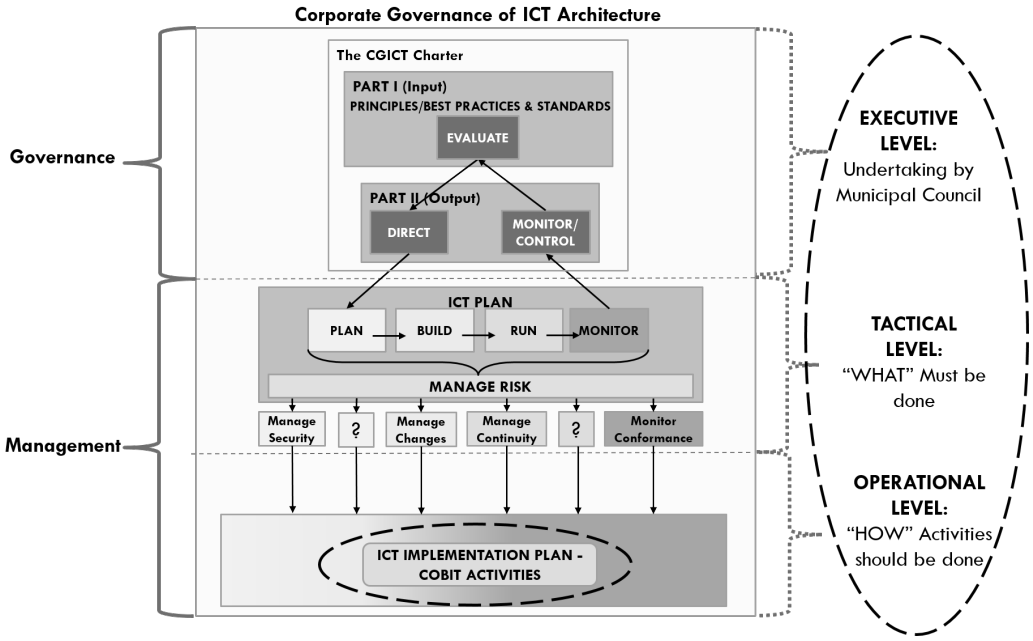


Figure 5.6: Conceptual Architecture after Third Refinement

5.4.4 Refinement Iteration 4

At the end of the third refinement iteration, it was clear that one final refinement iteration was needed to finalise F-CGICT. As a result, the fourth refinement iteration started with the conceptual architecture from Figure 5.6. Subsequently, the fourth iteration took place on the 08th of December 2015 in the form of a final focus group session. Members from ICT Management and Technology functions from the district municipality were present in this session. As a start to the session, the refined conceptual architecture from the previous iteration was presented, and consensus was reached regarding all the components of the conceptual architecture. Upon reaching consensus, various discussions followed, each focusing on an individual component of the conceptual architecture.

The first discussion focused on the CGICT Charter. As depicted in Figure 5.6, the CGICT Charter consists of two parts. Both parts will be discussed in detail later; however, this iteration focused on *'Part II'*, which is a physical document. The stakeholder discussed the structure of the physical document, after which it was finalised.

Regarding the second discussion, focus shifted towards the ICT Plan. The structure of the ICT Plan was discussed in detail after which it was finalised. Subsequently, the ICT Implementation Plan and the supporting tool-set were also finalised.

Lastly, it was decided to simplify the conceptual architecture. This was done to first promote understanding and secondly to cater for the core aspects of *simplicity*, as discussed in Section 5.3.

Concluding the fourth refinement iteration was a finalised conceptual architecture and supporting tool-set, which was deemed acceptable by the stakeholder. In addition, according to Österle et al. (2010), refinement of the artefact, or in this case F-CGICT, should continue until it reaches an acceptable level, which is determined by the relevant stakeholder. Thus, it was not necessary to continue with further refinement iterations.

At the end of the fourth refinement iteration, the complete F-CGICT, both *Part A* (the conceptual architecture) and *Part B* (the supporting tool-set), was finalised. As a result, each of the elements in Table 5.3 have been addressed satisfactorily. Subsequently, Phase 3 of the unique integrated research approach had been completed.

By addressing the elements from Phase 1 (Table 5.1), Phase 2 (Table 5.2) and Phase 3 (Table 5.3), a complete F-CGICT was finalised. However, before continuing to the fourth phase of the unique integrated research approach, which will be discussed in Chapter 6, it is essential to explain the finalised F-CGICT and each underlying component in detail.

5.5 Finalised Framework for Corporate Governance of ICT in Local Government

At this stage, it is clear that the first three phases of the unique integrated research approach resulted in the final F-CGICT, consisting of both *Part A* (the conceptual architecture) and *Part B* (the supporting tool-set). Starting with an initial conceptual architecture based on core aspects and criteria (discussed in Section 5.3), refinements took place through four phases, resulting in a final conceptual architecture. This final conceptual architecture will first be discussed in a general sense, after which it will be contextualised

within the local government environment.

5.5.1 Generalised Framework for CGICT

As discussed in Phase 2, four criteria were identified on which F-CGICT was built. The four criteria are as follows:

1. Governance and management
2. The three well-known management levels
3. Directing and monitoring
4. Penta Bottom Line

The four above-mentioned criteria are clearly represented in Figure 5.7. Regarding the first criterion, it can easily be seen from the figure that Governance is on top, followed by Management, which is below. Regarding the second criterion, the three well-known management levels are also taken into consideration, which is clearly visible on the right. The directing and monitoring components were incorporated into the Figure 5.7 as well. Lastly, the fourth criterion is also taken into account; it addresses the Penta Bottom Line. However, this criterion has been incorporated indirectly and therefore cannot clearly be distinguished in Figure 5.7.

Combining the four mentioned criteria, the conceptual architecture represents the general components of CGICT. The dashed line on the outside border of the figure represents the encompassing CGICT's definition, as discussed in Chapter 2. Subsequently, the first block represents normal ICT Governance activities, which are fulfilled by the executive level of management, also discussed in Chapter 2. Accordingly, a proper risk management approach should be followed in order to address good CGICT (IoDSA, 2009).

After risk management is introduced, specific ICT-related policies should follow. The purpose of the ICT-related policies is to dictate acceptable behaviour regarding typical topics, such as ICT security, ICT continuity, and other ICT-related policies, which are represented by the question marks. Considering Figure 5.7, it is clear that both risk management and the ICT-related policies typically fall under the tactical level of management.

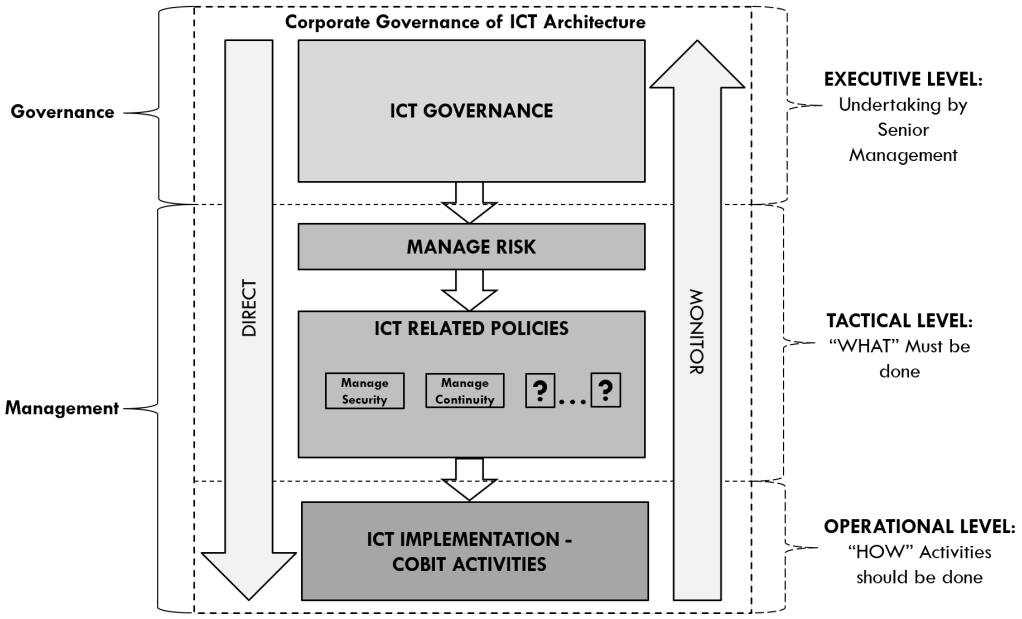


Figure 5.7: Finalised Conceptual Architecture

Having drafted the ICT-related policies, it is important to *'flow'* into an ICT implementation level. This is typically at the operational level, where the implementation of the directives from the executive management manifests (Coertze & Von Solms, 2014). After the implementation has been done satisfactorily, it is important to monitor and report back to executive management, which completes CGICT.

Figure 5.7 represents the core components of CGICT and their interrelationships. However, it is necessary to contextualise it within the local government environment.

5.5.2 Contextualised Framework for CGICT in Local Government

The Municipal Corporate Governance of ICT Policy (MCGICTP), as discussed in detail in Chapter 3, clearly states that various components need to be addressed in order to achieve good CGICT. This study, however, will only focus on three main components, namely, the CGICT Charter, the ICT Plan, and the ICT Implementation Plan. Each of these will be discussed in more detail at a later stage. With this in mind, it is important to map these three components onto the generalised CGICT conceptual architecture, as

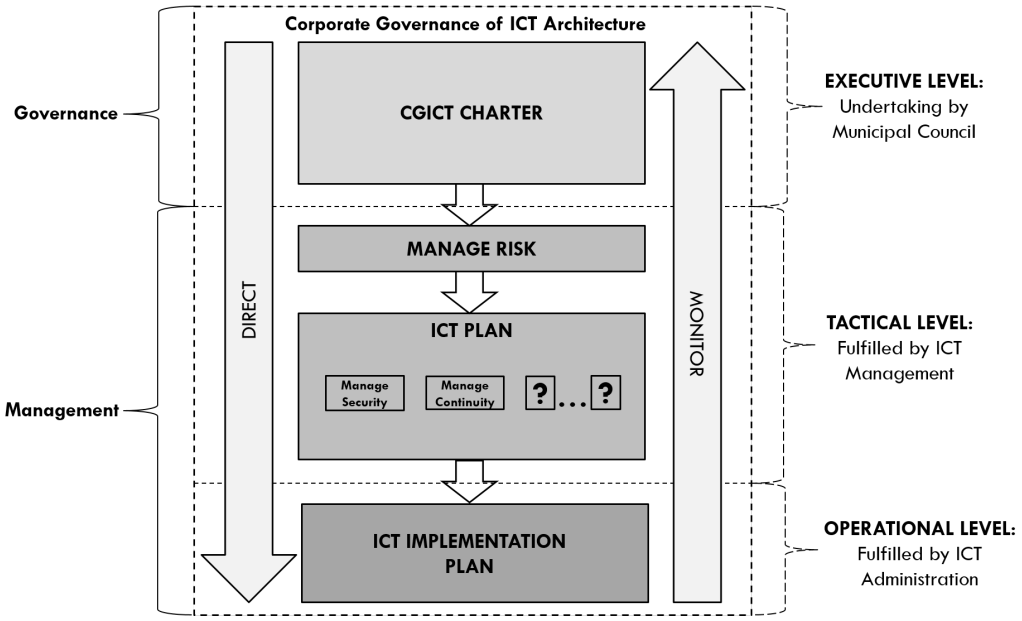


Figure 5.8: Finalised Conceptual Architecture for Local Government

depicted in Figure 5.7. As a result, the mapping will contextualise the conceptual architecture within the local government environment. Figure 5.8 represents this mapping and contextualisation.

As seen in Figure 5.8, ICT Governance is contextualised with a CGICT Charter, hereafter referred to as the Charter. On this level, the Charter will address the ICT Governance activities, which is situated at the executive level. The executive level is typically fulfilled by the Municipal Council. Furthermore, ICT-Related Policies, on the tactical level, are in the form of an ICT Plan. This ICT Plan will contain the various ICT-related policies. Additionally, the tactical level is typically fulfilled by the ICT Management function. Concerning the lowest level, the operational level, an ICT Implementation Plan is introduced, which contains the various COBIT 5 activities, as discussed in Chapter 2, to achieve good CGICT. The operational level is typically fulfilled by ICT Administration.

Notwithstanding the foregoing, it is important that the three main components (the Charter, ICT Plan, and ICT Implementation Plan) be discussed individually in order to gain a better understanding of the workings and interrelationships of the complete F-CGICT.

5.5.3 Component 1: The Corporate Governance of ICT Charter

Local government entities (which refer to individual municipalities) are individually responsible for creating and accepting a Charter (Department: Western Cape Local Government, 2015). Therefore, this first component addresses the creation of a Charter, which was discussed in Chapter 3. For purposes of this context, a Charter is defined as *"The outline of the decision-making rights and accountability for I[C]T governance that would enable the desirable culture in the use of I[C]T within the company, by requiring I[C]T management to provide timely information, to comply with direction and to conform to the principles of good governance"* (IT Governance Network, 2009). Accordingly, the MCGICTP provides direction on what constituting aspects the Charter must address (Department: Western Cape Local Government, 2015). It states that the Charter should guide the creation and maintenance of effective enabling governance structures, processes, and practices.

Further to the above, the Charter should also clarify the governance of ICT-related roles and responsibilities in achieving the local government's strategic goals. Essentially, the Charter provides a local government with a mandate. Having said this, Figure 5.9 provides a graphical representation of the proposed Charter structure.

It is proposed that the Charter contain two main parts. *'Part One'* forms the input and *'Part Two'* the output, the output being the physical document, as mentioned previously. Considering these two parts, *Part One* will start with evaluating the current and future needs of ICT within the local government, which is the starting point of CGICT. To evaluate, various constituting aspects must be considered.

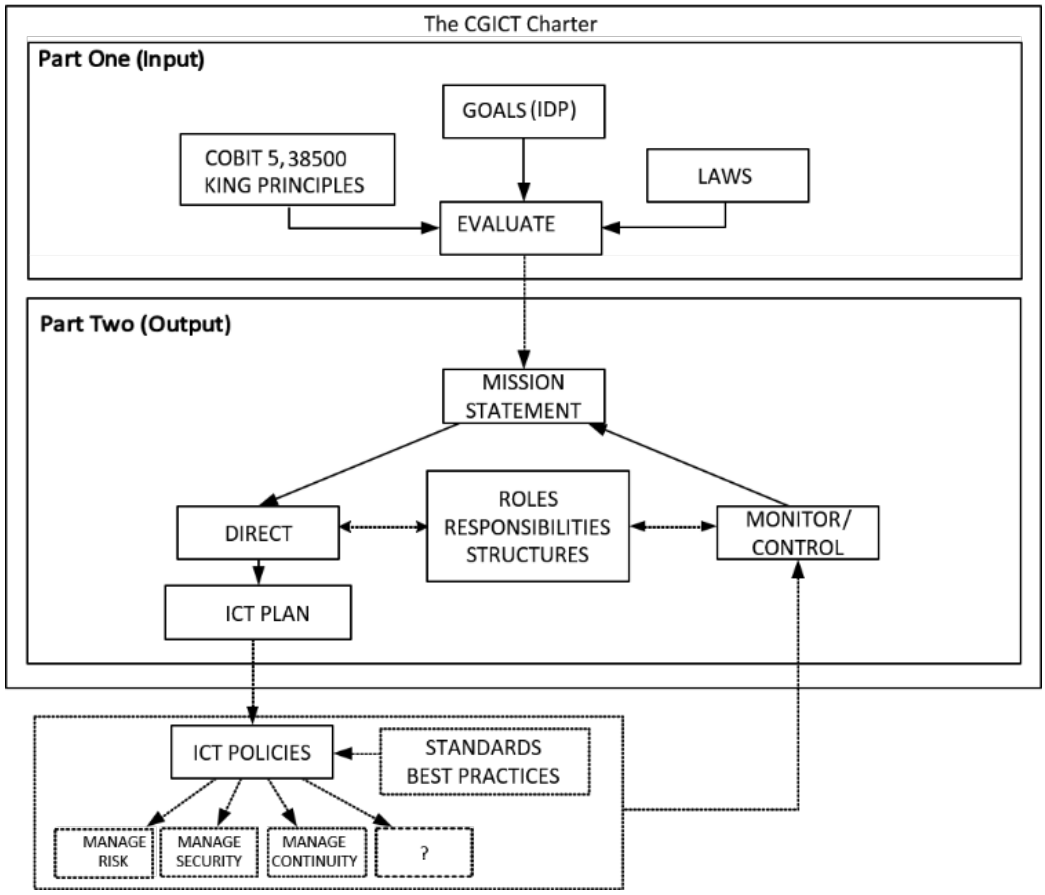


Figure 5.9: The Corporate Governance of ICT Charter Structure

First, it is important to consider related best practices and standards, as discussed in Chapter 2. It is also indispensable that the Charter use the principles of these best practices and standards.

Secondly, it is critical to take into consideration the unique goals of the local government. These goals are contained within the Integrated Development Planning (IDP) of local government. The IDP can be described as the principal strategic planning instrument which guides and informs all planning and development, and all decisions with regard to the planning, management, and development in local government (Municipal Systems Act, 2000). In essence, the IDP can be seen as the strategic goals of local government, and it should include the contribution of ICT in order to achieve these goals.

Lastly, the relevant legislation and regulations pertaining to local government need to be studied and taken into consideration. The aforemen-

tioned three aspects together comprise the evaluation process, which is part of CGICT and essential to *Part Two*, the Charter document.

The output from the evaluation in *Part One* is used to formulate a *'Mission Statement'*. From this mission statement, it is crucial that the Municipal Council provide direction in the form of directives, thereby instituting the *'Direct'* step of CGICT. To direct, one has to consider the related roles and responsibilities of the related parties. A Typical RACI (Responsible, Accountable, Consult, and Inform) chart is used to provide the details concerning the roles and responsibilities.

The following step is to implement the direction that is given from the top and to provide a plan on how to achieve what was initially directed. This plan is termed the *'ICT Plan'*, and it typically functions on the tactical management level fulfilled by ICT Management, which will be discussed later.

After the *ICT Plan* has been established, various *'ICT policies'* would be created by ICT Management. From Figure 5.9, it is clear that these policies do not form part of the Charter block. This is because these policies form part of the *'Management'* section. It is important to note that the various *ICT policies* should carry the full support of the Municipal Council (Delport, Von Solms, & Gerber, 2016).

The final component of the Charter, *'Monitor' and/or 'Control'*, is essential, and it forms the basis of CGICT. Once direction is given, it is of absolute importance to monitor for conformity to the direction given, since it is difficult to manage what one cannot measure and thus monitor (Von Solms & Von Solms, 2008). Supporting the step of monitoring, there are definite roles and responsibilities which need to be in place. Consequently, an effective reporting structure is created, which is critical to good CGICT. Furthermore, it is important to note that *'Monitor' and/or 'Control'* is a continuous process.

After the *Monitor* step, the Charter document will constitute the local government's evaluation of the ICT environment, the direction given, in order to conform to the *Mission Statement* and lastly how the necessary reporting structure should look, so as to monitor for conformity. The Charter forms part of the Municipal Council's mandate and will provide input into the ICT Plan.

5.5.4 Component 2: The ICT Plan

The second component from the MCGICTP is called the ICT Plan. According to the MCGICTP, the first phase of implementation requires local government to create an ICT Management Framework. It is argued that the term *'ICT Management Framework'* is inappropriate at this level, and therefore the term *'ICT Plan'* is used in this context.

The ICT Plan can be defined as providing guidance on what must be done for the creation and maintenance of effective enabling governance structures, processes, and practices, as dictated by the Charter. The ICT Plan will also clarify the governance of ICT-related roles and responsibilities in achieving the municipality's strategic goals, as directed by the Charter (Department: Western Cape Local Government, 2015). Although very similar to the definition of the Charter, the ICT Plan will essentially support the Charter, by providing more detail on certain areas. Figure 5.10 clearly indicates the structure of the ICT Plan.

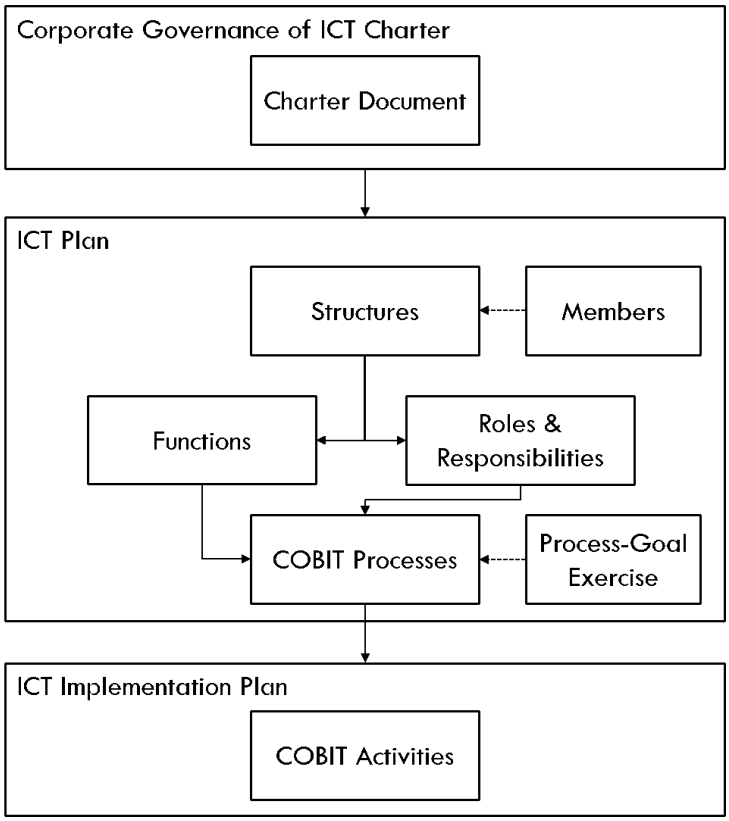


Figure 5.10: The ICT Plan Structure

The main input into the ICT Plan stems from the Charter. The ICT Plan in itself is also a physical document which contains various set components. First, as seen from the definition, the ICT Plan should mention various *'Structures'* that should be in place regarding ICT. Forming part of these structures are various *'Members'*. To give an example, if an Audit Committee exists in local government, it needs to be clarified who is part of the Audit Committee.

Secondly, it is essential to state what the various *'Functions'* are of each structure. Accordingly, the functions should be supported by the *'Roles & Responsibilities'* of each function. It would, for instance, state what the functions are regarding the Audit Committee as well as who is responsible for what.

Lastly, it is important to state which *'COBIT 5 Processes'* should be part of the ICT Plan, together with who is responsible for them, in order to achieve sound CGICT. To determine which *COBIT 5 Processes* are applicable, local government would have to complete a *'Process-Goal Exercise'*, which is part of the supporting tool-set. This will be discussed later.

After identifying all the related *COBIT 5 Processes*, it is important to make use of the various activities within COBIT 5 in order to implement the processes on the operational management level, which is the third and final component proposed by the MCGICTP.

5.5.5 Component 3: The ICT Implementation Plan

The third component, which needs to be formalised, is called the ICT Implementation Plan. This component functions on the operational management level, and contrary to the first two components, it is not an actual document. The ICT Implementation Plan, however, provides the basis on which the practical implementation of various COBIT 5 activities takes place. Together with the implementation, it also forms the link with monitoring for conformity.

The ICT Plan should enable a reporting structure in which the Municipal Council can monitor the progress of CGICT-related activities. In light of this, the MCGICTP clearly states that the Governance of ICT within a municipality should be implemented based on an approved implementation plan (Department: Western Cape Local Government, 2015). Therefore, local

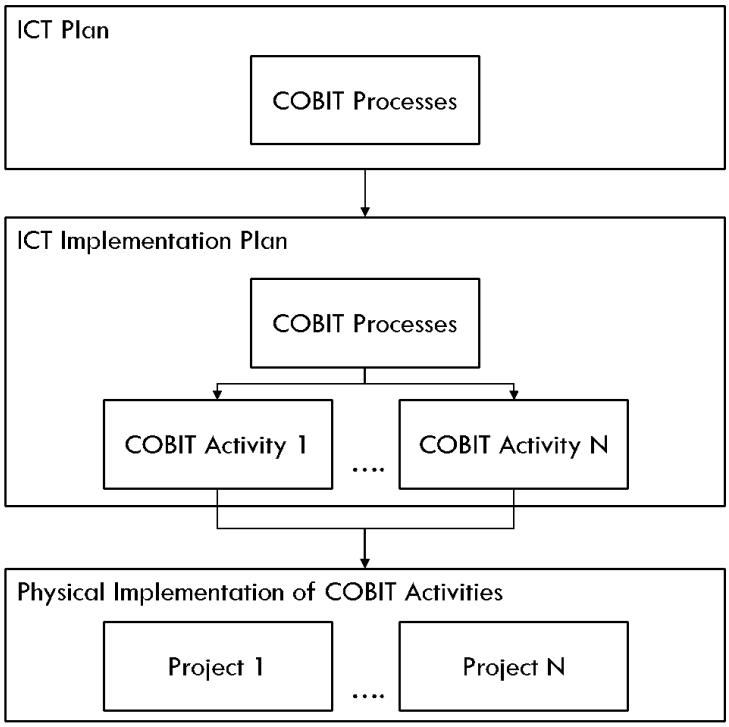


Figure 5.11: The ICT Implementation Plan Structure

government should draft an ICT Implementation Plan based on the ICT Plan.

An ICT Implementation Plan can be defined as a list of processes which have to be implemented by ICT Administration on an operational level and in a timely fashion in order to achieve sound CGICT in local government. Based on this definition, Figure 5.11 provides a graphical representation of the ICT Implementation Plan structure.

After identifying the main *COBIT 5 Processes* in the ICT Plan, the list of *COBIT 5 Processes* will be used as an input into the ICT Implementation Plan. Each COBIT 5 process contains one or more COBIT 5 activities. Each COBIT 5 activity will translate into a project that should physically be implemented.

To assist with the implementation of the aforementioned projects, one can make use of some sort of project planner. This would allow an effective reporting mechanism from which a progress report could be queried, allowing one to measure and monitor the progress. By using this type of reporting mechanism, the Municipal Council would be able to monitor the

implementation of the ICT Plan.

To assist local government in initiating and implementing the Charter, the ICT Plan and the ICT Implementation Plan, a supporting tool-set has been developed (as per Phase 3) and validated (to be discussed in Chapter 6) to assist in this regard. This supporting tool-set thus aims to assist with *'how'* to implement good CGICT in local government.

5.5.6 Supporting Tool-set

As mentioned previously, local government makes use of a *Process-Goal Exercise*, depicted in Figure 5.10, in order to identify the relevant *COBIT 5 Processes*. The *Process-Goal Exercise* was developed in order to produce the supporting tool-set. The *Process-Goal Exercise* essentially enables the supporting tool-set to be practically implementable. In view of this, the supporting tool-set aims to aid local government with *how* to implement good CGICT. After refinement, as discussed in Phase 3, the final supporting tool-set was developed by taking into consideration the core aspects of *relevancy*, *usability*, *scalability*, and *simplicity*, discussed in Chapter 3. Further, this supporting tool-set allows local government to identify various *COBIT 5 Processes* which support their unique operating environment. Figure 5.12 represents the mechanics of the *Process-Goal Exercise*.

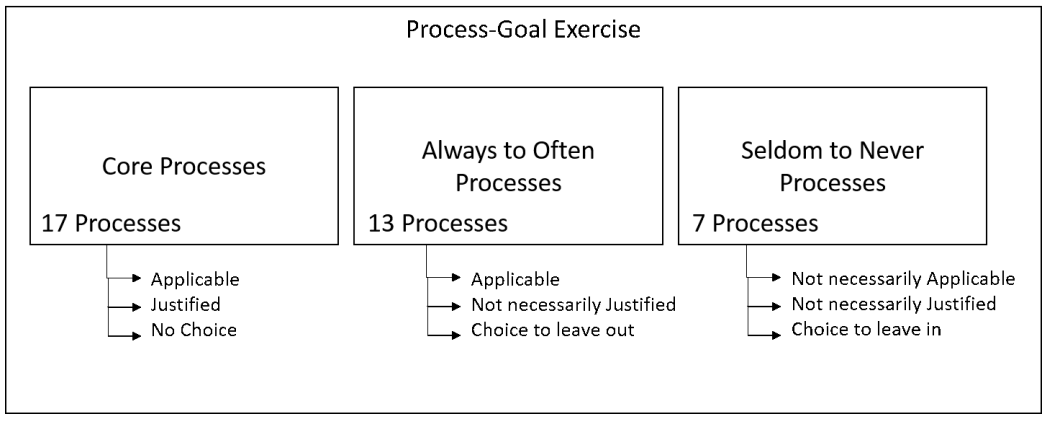


Figure 5.12: Supporting Tool-set Categories

Based on the mechanics of the *Process-Goal Exercise*, Microsoft Excel was used to develop the *Process-Goal Exercise*. Figure 5.13 depicts a sample

screenshot of the *Process-Goal Exercise*. Appendix C.1 provides more details on the *Process-Goal Exercise*.

	A	B	C	D	E
1	CORE PROCESSES – (Applicable & Justified)				
2	**Process**	**Sub-Process**	**Applicability & Justification**	**Will you Have this Process?**	**Reason if "NO"**
3	EDM01: Ensure Governance Framework Setting and Maintenance	EDM01.1: Evaluate the governance system	MCGICTP Principle 3/ KING III 5.1.6,5.3	YES	Each Process is applicable because it is a Core Process
4		EDM01.2: Direct the governance system		YES	Each Process is applicable because it is a Core Process
5		EDM01.3: Monitor the governance system		YES	Each Process is applicable because it is a Core Process
6	EDM02: Ensure Benefits Delivery	EDM02.1: Evaluate value optimisation	KING III 5.2, 5.4	YES	Each Process is applicable because it is a Core Process
7		EDM02.2: Direct value optimisation		YES	Each Process is applicable because it is a Core Process
8		EDM02.3: Monitor value optimisation		YES	Each Process is applicable because it is a Core Process
9	EDM03: Ensure Risk Optimisation	EDM03.1: Evaluate risk management	MCGICTP Principle 6/ KING III 5.5, 5.7	YES	Each Process is applicable because it is a Core Process
10		EDM03.2: Direct risk management		YES	Each Process is applicable because it is a Core Process
11		EDM03.3: Monitor risk management		YES	Each Process is applicable because it is a Core Process

Figure 5.13: Process-Goal Exercise Sample Screenshot

With the aforementioned in mind, COBIT 5 has a total of 37 main processes (ISACA, 2012). To determine which of these processes apply to a particular local government entity, the 37 processes were divided into three main categories. The division of these categories was done by collaborating with the stakeholder during the third refinement iteration. The three categories, as represented in Figure 5.12, are as follows: *'Core Processes', 'Always-to-Often Processes' and 'Seldom-to-Never Processes'*. The motivation behind the 17 processes in the *Core Processes* category is substantiated from literature, best practices and standards, as well as legislation. As a result, it is not only applicable to local government but also justified. Local government has no choice but to accept these 17 processes as a *'baseline'*.

Regarding the 13 *Always-to-Often Processes* category, all processes are applicable from a best practice and standards perspective; however, if there is a reason why any local government entity does not require any of the specific processes, then they have to provide a reason as to why it should be omitted. One such reason might be that the local government entity has limited financial and administrative capability, and therefore, it is best left out.

The last category contains seven *Seldom-to-Never Processes*. These processes are neither necessarily applicable nor justifiable, and therefore, they can be left out by default. If a local government entity chooses to accept and implement one of these processes, they would have to provide a justification to do so.

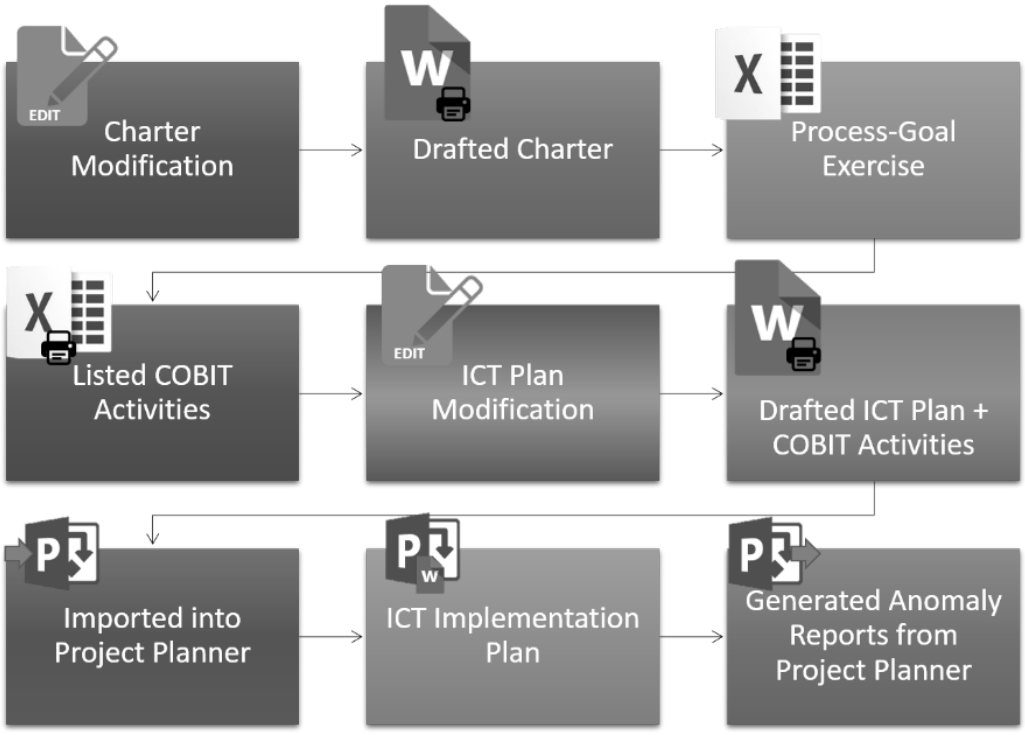


Figure 5.14: Supporting Tool-set Process Model

By working through the *Process-Goal Exercise*, local government can select processes to implement which are *relevant* to it, *usable* in its environment, *scalable*, as well as *simplistic* enough to implement. To make use of the supporting tool-set, a process model has been developed which should be followed.

Process Model

To use the supporting tool-set, the process model, depicted in Figure 5.14, should be followed (refer to Appendix C.2 for more information).

As a start, a Charter, with generic content has been developed by following the structure as depicted in Figure 5.9 (Delport et al., 2016) and attached as Appendix C.3. Local government will be presented with this generic Charter, which it would be able to modify according to its unique environment. After modification, the local government entity would be in possession of a draft Charter in document format.

The next step is to complete the *Process-Goal Exercise* to determine which COBIT 5 Processes are applicable to local government's environment.

By answering the questions in the *Process-Goal Exercise*, various COBIT 5 Processes will be generated, which are relevant to the unique local government entity. Upon completion of the exercise, the local government entity should have a list of applicable COBIT 5 Processes that are specific to its unique environment.

The next step is to use the generic ICT Plan, attached as Appendix C.4. This generic ICT Plan was also developed by following the structure depicted in Figure 5.10. With this generic ICT Plan, local government can modify and adapt the generic document according to its unique environment and requirements. After modification, the local government entity would then once again be presented with a draft ICT Plan, constituting applicable COBIT 5 Processes and activities.

It is imperative to note at this stage that a project planner software, e.g. Microsoft Project, should be used as the basis for the next step, which is the ICT Implementation Plan. All the COBIT 5 activities should be imported into the project planner software, in order to create various individual but related projects.

After all projects have been created, the particular local government would then be able to generate anomaly reports. These anomaly reports provide the Municipal Council with the ability to measure progress and to check conformity.

To cater for *simplicity*, the process model involves the use of Microsoft Word and Microsoft Excel. This allows the use of the process model to be simplistic and understandable in nature. Furthermore, by following this process model, local government would be able to implement F-CGICT in a simplistic and scalable manner. This is due to *Part A* (the conceptual architecture) guiding local government on *what* must be done for good CGICT and *Part B* (the supporting tool-set) guiding it on *how* to implement good CGICT.

5.6 Conclusion

It was clear from Chapter 4 that a unique integrated research approach was formulated for this study. By following this unique integrated research approach, the objective of this chapter was to discuss the creation of the re-

search contribution. As a result, an artefact was created in the form of a framework named F-CGICT. F-CGICT consisted of two parts, *Part A*, which is a conceptual architecture or high-level graphical representation of *what* must be done to implement good CGICT. Accordingly, there was also *Part B*, which is a supporting tool-set aimed at guiding local government with *how* to implement good CGICT.

According to the unique integrated research approach, four phases were required to develop and validate F-CGICT. For the purpose of this chapter, only the first three phases, as per Figure 5.1, were discussed. Phase four will only be discussed in the chapter that follows.

Nonetheless, to develop F-CGICT, Phase 1 was used to identify the real-world problem, by collaborating with local government as a stakeholder. Consequently, objectives were identified which address how this study aims to contribute to addressing the real-world problem. Upon completion of Phase 1, various core aspects and criteria were identified on which F-CGICT should be built. The core aspects and criteria, as presented in Phase 2, were used in constructing an initial drafted conceptual architecture (*Part A*). This initial conceptual architecture served as an input into Phase 3.

By presenting the initial conceptual architecture to the stakeholder, Phase 3 enabled the use of various refinement iterations. During each refinement iteration, effort was made to build on the results of the previous iteration. As a result, a final conceptual architecture (*Part A*) and supporting tool-set (*Part B*) was developed. The supporting tool-set used the four core aspects (core aspects of *relevancy*, *usability*, *scalability*, and *simplicity*) as the foundation of its mechanics. First, the supporting tool-set ensured that a local government entity has the option to only implement what is *relevant* to it. This is done by allowing the local government entity to choose from various processes, as discussed in Section 5.5.6. Secondly, by making use of Microsoft Word and Microsoft Excel, the supporting tool-set was designed to be easily *usable*. Thirdly, the supporting tool-set was developed to allow various sized local government entities to *scale* the implementation to their unique environment. Lastly, the supporting tool-set was designed to be *simplistic*, to cater for the limited expertise within local government. As a result, the final F-CGICT was produced.

Accordingly, F-CGICT aims to guide and assist local government with the implementation of good CGICT. However, in order to adhere to the unique integrated research approach, it is necessary to validate F-CGICT against the initial identified core aspects (core aspects of *relevancy*, *usability*, *scalability*, and *simplicity*). Thus, Phase 4 will be discussed in the following chapter, as per Figure 5.1. The next chapter will therefore present the validation of the final F-CGICT.

Chapter 6

Validation of the Framework for Corporate Governance of ICT in Local Government

With a final framework for good Corporate Governance of ICT in local government in hand, the unique integrated research approach requires the final phase to be completed. This final phase aims to validate the completed framework, or in this case F-CGICT, and determine whether F-CGICT conforms to the core aspects of 'relevancy', 'usability', 'scalability', and 'simplicity'. This chapter will therefore discuss the final phase (Phase 4) of the unique integrated research approach by discussing the validation process for the finalised F-CGICT.

6.1 Introduction

From the previous chapter, it is clear that a final framework for the Corporate Governance of ICT (CGICT) in local government emerged. The final framework consists of two parts. First, there is *Part A* - the conceptual architecture, which addresses *what* must be done for good CGICT in local government. Secondly, there is *Part B* - the supporting tool-set, which provides guidance on *how* good CGICT in local government could be achieved. Even though the framework consists of two parts, it should be noted that the name *'F-CGICT'* will be used throughout this chapter in reference to both parts collectively. Nonetheless, F-CGICT was constructed by using the

first three phases of the unique integrated research approach, as depicted in Figure 6.1. However, the unique integrated research approach requires that a fourth and final phase be completed. Phase 4, as represented in Figure 6.1, will therefore be the focus of this chapter.

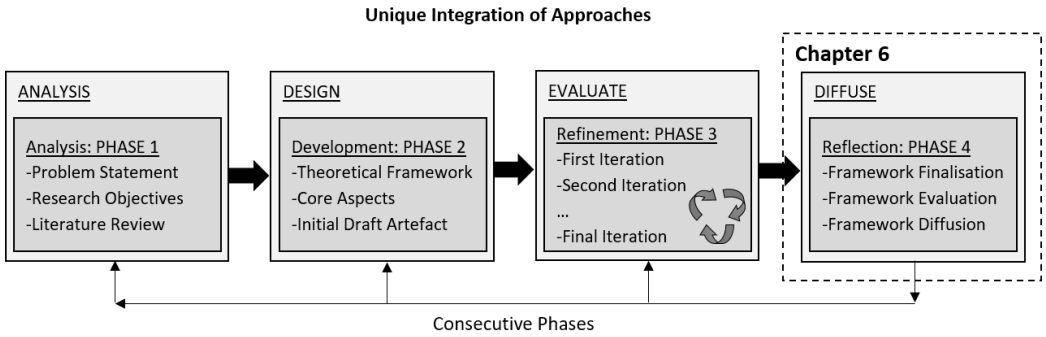


Figure 6.1: Reflection in Chapter 6

Phase 4 represents the validation phase, which is required by the unique integrated research approach. Therefore, Phase 4 will determine and validate whether F-CGICT conforms to the core aspects of *relevancy*, *usability*, *scalability*, and *simplicity*, as discussed extensively in Chapter 3.

To validate conformance to these core aspects, this chapter will discuss the validation process that was used. Furthermore, this chapter will discuss the method used in analysing the data, which led to various results. Subsequently, the chapter will conclude with findings on F-CGICT's ability to conform to the core aspects.

6.2 Data Collection

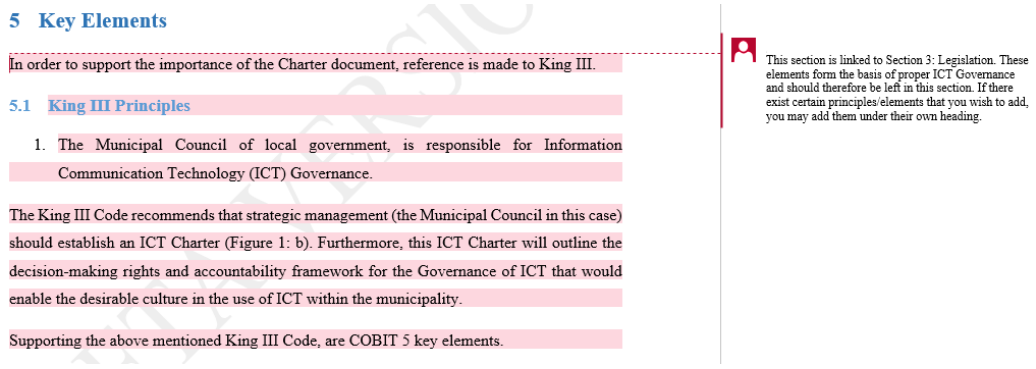
To validate F-CGICT, it was decided to make use of a practical workshop. This workshop was held over a period of two days, the 25^{th} and 26^{th} of April 2016. A total of 24 representatives, who were primarily from the ICT functions of various local municipalities, attended the workshop. These representatives stemmed from 22 municipalities which fall under the category of *'poor resources and low capacity'*, as discussed in Section 3.4. It should be noted that some of the representatives stemmed from other local government functions such as internal auditing, governance, and risk, amongst others.

With regard to the design of the workshop, the two days were divided into two sessions. The first session consisted of a theoretical background presentation. This presentation provided the necessary background information regarding CGICT in local government. In essence, the first session focused on explaining the conceptual architecture (Part A), as discussed in Section 5.5. In contrast, the second session focused on the supporting tool-set (Part B), as discussed in Section 5.5.6. It can be said that this session was a practical hands-on exercise session of sorts. Nonetheless, during this session, the process model was followed and completed, as previously depicted and discussed in Section 5.5.6. By working through the entire process model, the attendees of the workshop were in a position to provide feedback on the entire F-CGICT.

After conducting the first session of the theoretical background presentation, various material was provided to each of the representatives. Included in the material were the following four items:

- The Process-Goal Exercise in Microsoft Excel format, as discussed in Section 5.5.6 (attached to Appendix C.1)
- A guiding document on how to use the process model, as discussed in Section 5.5.6 (attached to Appendix C.2)
- A generic CGICT Charter document in Microsoft Word format, as discussed in Section 5.5.3 (attached to Appendix C.3)
- A generic ICT Plan document in Microsoft Word format, as discussed in Section 5.5.4 (attached to Appendix C.4)

The representatives followed the process model (discussed in Section 5.5.6) and studied these four items with a *'hands-on'* approach. In doing so, the representatives modified the generic CGICT Charter document to fit their unique operating environment. This was done through considering various comments inside the CGICT Charter document, which required the representatives to either remove or add statements to or from the CGICT Charter document. Figure 6.2 depicts a sample of this process inside the CGICT Charter document.



5 Key Elements

In order to support the importance of the Charter document, reference is made to King III.

5.1 King III Principles

1. The Municipal Council of local government, is responsible for Information Communication Technology (ICT) Governance.

The King III Code recommends that strategic management (the Municipal Council in this case) should establish an ICT Charter (Figure 1: b). Furthermore, this ICT Charter will outline the decision-making rights and accountability framework for the Governance of ICT that would enable the desirable culture in the use of ICT within the municipality.

Supporting the above mentioned King III Code, are COBIT 5 key elements.

This section is linked to Section 3: Legislation. These elements form the basis of proper ICT Governance and should therefore be left in this section. If there exist certain principles/elements that you wish to add, you may add them under their own heading.

Figure 6.2: Example of Modification to the CGICT Charter Document

Upon completion of modifying the CGICT Charter document, the representatives then worked through the Process-Goal Exercise as if they were completing the exercise for their individual local government entity. This resulted in providing the representative with a list of COBIT 5 Processes to be implemented over a certain period of time, as discussed in Section 5.5.6 and depicted in Figure 6.3.

	A	B	C	D
1	wbs	name	duration	Reason
2		CORE PROCESSES		
3	1	EDM01.1: Evaluate the governance system	5months	NA
4	2	EDM01.2: Direct the governance system	4months	NA
5	3	EDM01.3: Monitor the governance system	1month	NA
6	4	EDM02.1: Evaluate value optimisation	2y	NA
7	5	EDM02.2: Direct value optimisation	1y	NA
8	6	EDM02.3: Monitor value optimisation	1.5y	NA
9	7	EDM03.1: Evaluate risk management	10w	NA
10	8	EDM03.2: Direct risk management	6m	NA
11	9	EDM03.3: Monitor risk management	1y	NA

Figure 6.3: Example of Process-Goal Exercise Outcome

After completing the Process-Goal Exercise, the same modification process was followed for the ICT Plan document as with the CGICT Charter, which resulted in the representative having a unique ICT Plan document. As a result, the entire process of modifying documents (CGICT Charter and ICT Plan) and completing the Process-Goal exercise demonstrated the implementation of F-CGICT. This entire process was conducted as part of the practical hands-on session.

Upon completion of the practical hands-on session, a survey in the form of a questionnaire was conducted amongst the 24 representatives. The questionnaire consisted of seven statements that were made by the researcher. After considering each statement, the representatives had to indicate on a Likert scale whether they *'strongly disagree'*, *'disagree'*, *'agree'*, or *'strongly agree'* with the statements. Figure 6.4 represents a sample screenshot of the first statement.

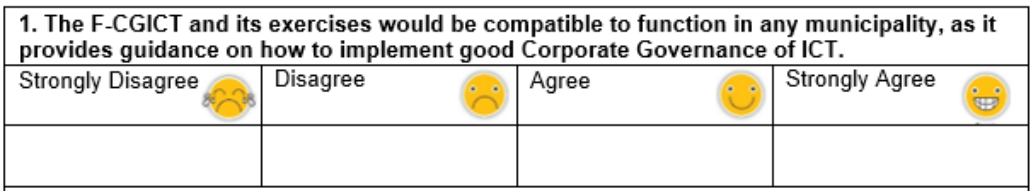


Figure 6.4: Example of Likert Scale in Questionnaire

By completing the questionnaire, this tested F-CGICT's ability in conforming to the identified core aspects of *relevancy*, *usability*, *scalability*, and *simplicity*. Table 6.1 represents the mapping of the core aspects with the seven statements from the questionnaire. Furthermore, the questionnaire presented the representatives with three further open-ended questions. These open-ended questions aimed to determine whether there was anything lacking from F-CGICT, whether anything could be improved, and lastly if there was anything which stood out. Attached as Appendix B.2 is the full questionnaire.

After completion of the questionnaire, the responses were collected in order to do an analysis thereof. The results that stemmed from the analysis aim to show that F-CGICT conforms to the core aspects.

Table 6.1: Workshop Questionnaire Structure

Core Aspect	Question	Statement
Relevancy	2	F-CGICT can be used to cover the basis of Corporate Governance of ICT in any municipality
	7	In general, the topic of CGICT is comprehensively covered throughout F-CGICT
Usability	1	F-CGICT and its exercises would be compatible to function in any municipality, as it provides guidance on *how* to implement good CGICT
Scalability	4	F-CGICT allows CGICT to scale to the financial and resource capacity of a municipality
	6	F-CGICT can be equally successful in both larger and smaller municipalities
Simplicity	3	It is possible to complete the exercises in this F-CGICT without extensive guidance or knowledge about the subject area
	5	A person with limited technical ability would be able to successfully complete the exercises

* Note: Questionnaire is attached to Appendix B.2

6.3 Data Analysis and Results

Taking into consideration the responses from the questionnaire, the outcome of each core aspect (*relevancy*, *usability*, *scalability*, and *simplicity*) is discussed individually. The first result focuses on the conformance to the core aspect of *relevancy*.

6.3.1 Results on Aspect of Relevancy

As discussed in Section 3.7, it is important to ensure that all components in F-CGICT are relevant to local government. Anything not related to local government was excluded from F-CGICT. In so doing, the core aspect of *relevancy* was incorporated into F-CGICT.

As per Table 6.1, two questions (questions 2 and 7) were presented to the representatives of local government. Based on the responses, the represen-

tatives felt that the core aspect of *relevancy* was incorporated satisfactorily. Figure 6.5 depicts the results pertaining to the core aspects of *relevancy*.

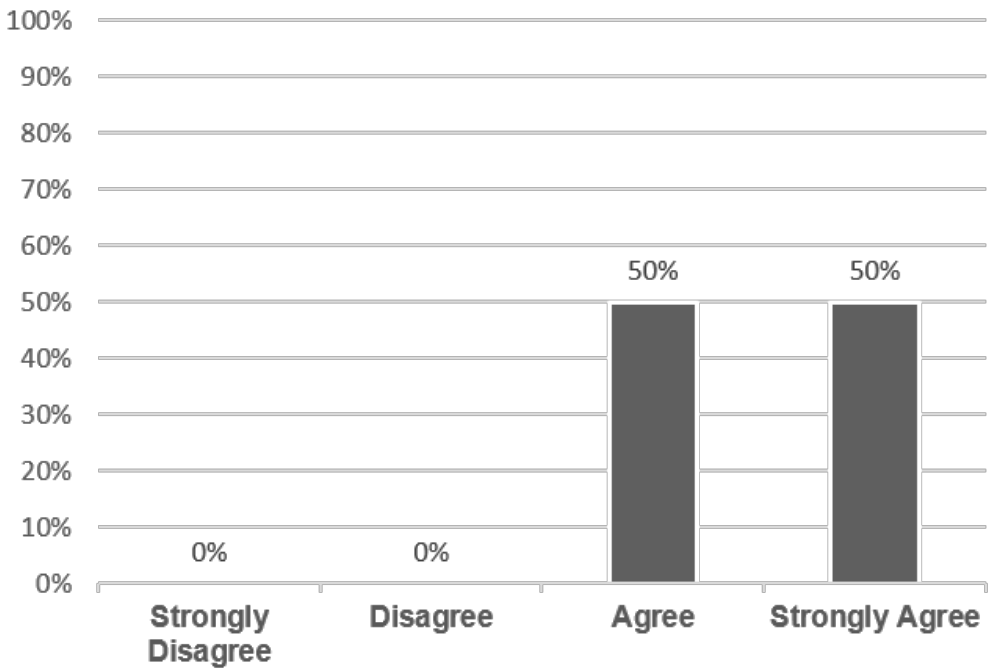


Figure 6.5: Results for Aspect of Relevancy

As seen in Figure 6.5, 50% of the representatives agreed, while another 50% strongly agreed with F-CGICT's ability to conform to the core aspect of *relevancy*. Thus, it can be argued that F-CGICT successfully incorporated this aspect.

6.3.2 Results on Aspect of Usability

Considering Table 6.1, the next core aspect that is validated is the core aspect of *usability*. As discussed in Section 3.7, *usability* aims to provide local government with a single integrated approach in implementing good CGICT. In essence, F-CGICT should guide local government with *how* to implement good CGICT. With this in mind, Figure 6.6 depicts the results on the core aspect of *usability*.

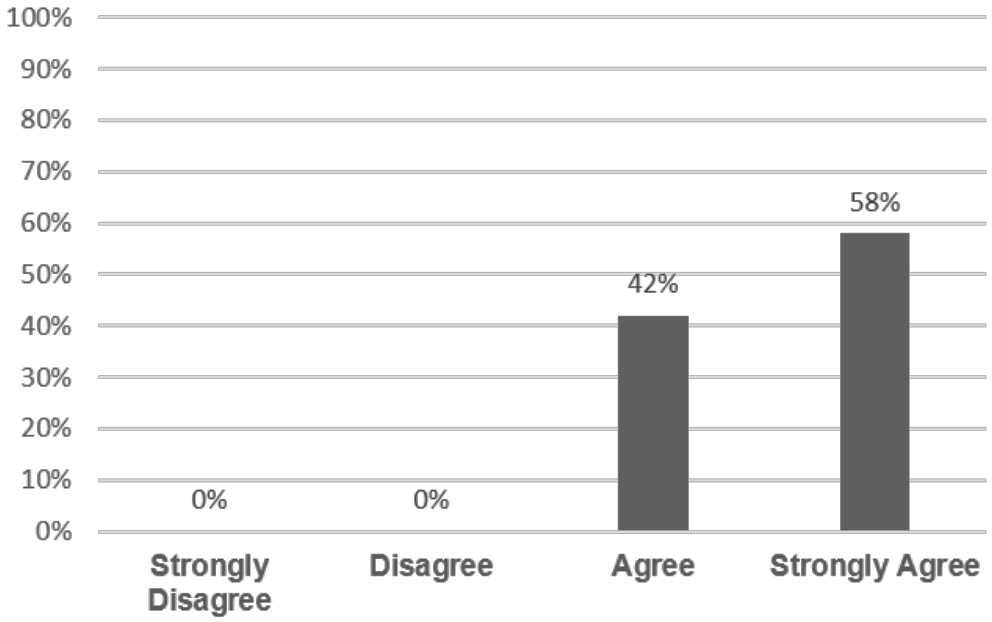


Figure 6.6: Results for Aspect of Usability

In response to the questions on whether F-CGICT is usable, 42% of the representatives agreed, and 58% strongly agreed with the statement, as depicted in Figure 6.6. Thus, it can be deduced that the representatives from local government fully agree with the inclusion of the core aspect of *usability*. Furthermore, the representatives agree that F-CGICT provides guidance on *how* to implement good CGICT.

6.3.3 Results on Aspect of Scalability

The third aspect that is validated in the questionnaire is the core aspect of *scalability*. This core aspect is critical to the success of CGICT in local government. This is due to the fact that little to none of the previously developed frameworks (CGICTPF, SALGA Document, and MCGICTP) for CGICT can be scaled to fit the local government entity's unique operating environment. Therefore, F-CGICT incorporated the core aspect of *scalability* in an attempt to address this shortcoming. The results for the core aspect of *scalability* are represented in Figure 6.7.

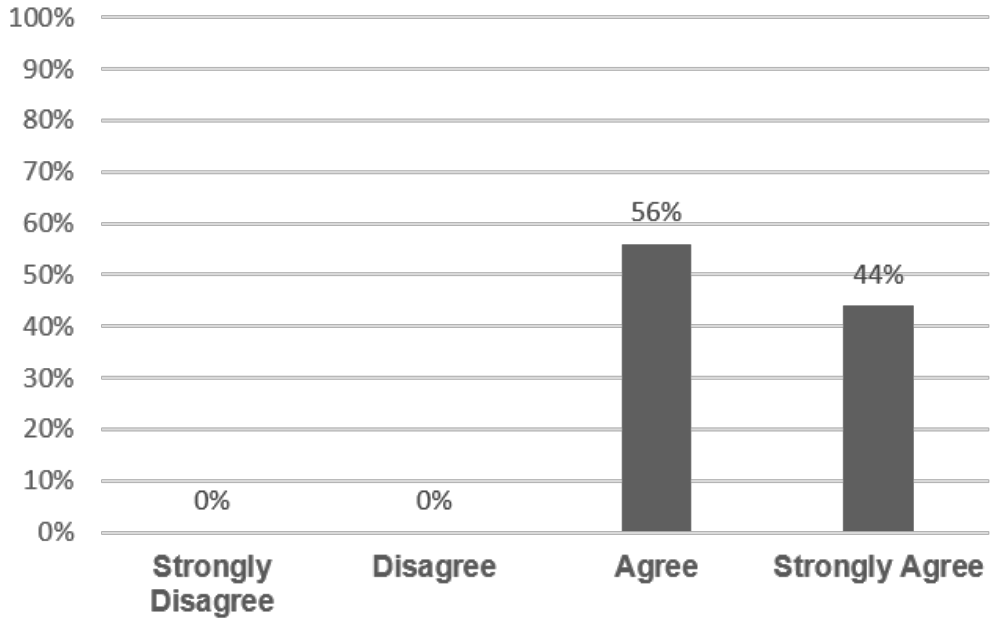


Figure 6.7: Results for Aspect of Scalability

The questionnaire examined whether F-CGICT was scalable in any local government entity (small local municipalities to larger local municipalities). As per Figure 6.7, 56% of the representatives agreed, whereas 44% strongly agreed with the statement. Thus, it can be submitted that F-CGICT is scalable due to all the representatives fully agreeing on the incorporation of the core aspect of *scalability*.

6.3.4 Results on Aspect of Simplicity

As a final validation, the questionnaire validates the incorporation of the core aspect of *simplicity*. This core aspect aims to guide local government with implementing good CGICT in a simplistic but structured manner. It is vital that the core aspect of *simplicity* be incorporated, as the previously developed frameworks (CGICTPF, SALGA Document, and MCGICTP) for CGICT were too complex (discussed in Section 3.7).On that note, Figure 6.8 depicts the results for the core aspect of *simplicity*.

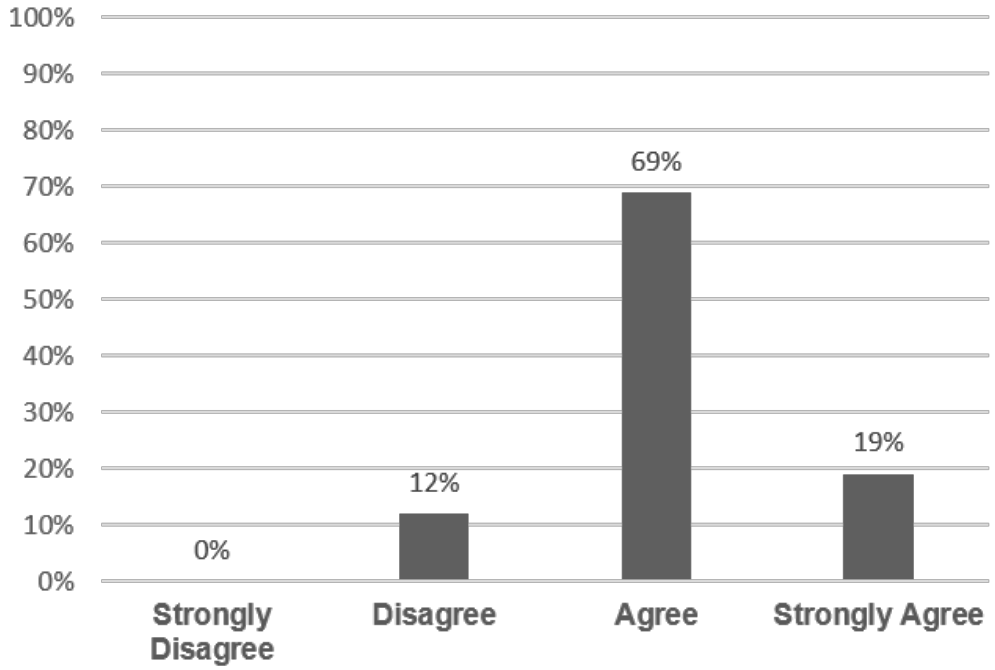


Figure 6.8: Results for Aspect of Simplicity

It is clear that the majority of the representatives agreed with the fact that F-CGICT is simplistic in nature, as seen in Figure 6.8. Only a small percentage of 12% disagreed with the statement on *simplicity*. This is most probably because a few of the 24 representatives stemmed from local government functions other than ICT and Governance, as mentioned previously. These representatives might have little understanding regarding the concept of CGICT, or ICT in general. Nonetheless, the majority (88%) still fully agreed that the core aspect of *simplicity* has been satisfactorily incorporated into F-CGICT.

Considering all the foregoing, it is important to provide the findings based on the conformance to the four core aspects (*relevancy*, *usability*, *scalability*, and *simplicity*).

6.4 Findings

Taking into consideration the results of each of the core aspects, Figure 6.9 represents the summative outcome of the questionnaire. The first three core aspects of *relevancy*, *usability*, and *scalability* were incorporated suc-

cessfully. This is evident in that 100% of the representatives fully agreed with F-CGICT's ability to conform to these three core aspects. The only core aspect where a few of the representatives did not agree is the aspect of *simplicity*. However, it was highlighted previously that some of the representatives stemmed from municipal functions such as internal auditing, governance, amongst others, and were most probably not too familiar with the ICT-related discipline.

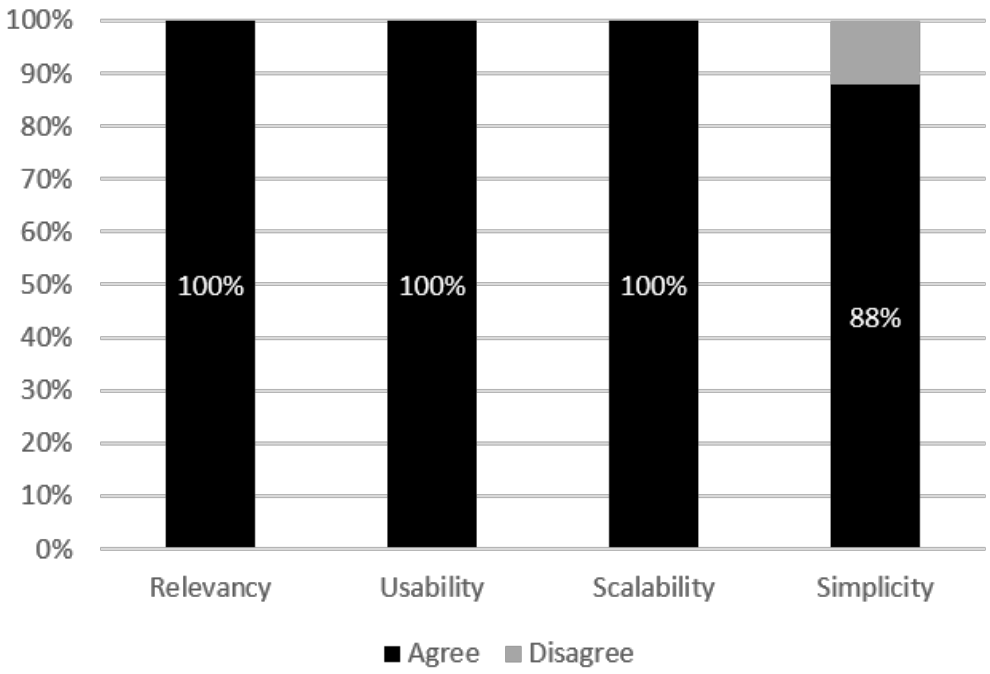


Figure 6.9: Findings on Outcome of Questionnaire

As mentioned previously, the questionnaire included three open-ended questions. These open-ended questions aimed to determine whether there was anything lacking from F-CGICT, whether anything could be improved, and lastly if there was anything which stood out. From the open-ended questions, it was found that some of the respondents mentioned that it was difficult to say whether it was simplistic, since they would have to implement it to be convinced. This is evident in the 12% who disagreed with the statement on *simplicity*. Accordingly, a negative comment on F-CGICT was as follows:

> *"Only after implementation of F-CGICT would it be possible to say whether it was simplistic."*

Notwithstanding the aforementioned, the majority of the open-ended questions yielded positive feedback, since F-CGICT considers the full scope of CGICT. Some of the positive comments were the following:

> *"Great ease of use when it comes to completing the tool-set." (Process-Goal Exercise - see Section 5.5.6)*

> *"F-CGICT is detailed and covers what is most needed and lacking in municipalities."*

> *"F-CGICT provides detailed guidance on how to implement the CGICT. This will also assist with compliance to legislation."*

> *"Very good framework [F-CGICT] that will assist a lot."*

Taking into account the above-mentioned comments, it can be contended that the representatives felt that F-CGICT would definitely help local government with achieving good CGICT. In essence, the overall feedback received from the 24 representatives was overwhelmingly positive in nature. As a result, the feedback attested to the fact that F-CGICT conforms to the four core aspects of *relevancy*, *usability*, *scalability*, and *simplicity*.

6.5 Conclusion

With a finalised F-CGICT from the previous chapter's output, the unique integrated research approach required a final phase to be completed. This phase (Phase 4) constitutes the validation of F-CGICT. As a result, a validation process in the form of a two-day workshop was completed. The validation process requires that the researcher reflect on F-CGICT's ability to conform to the four core aspects (*relevancy*, *usability*, *scalability*, and *simplicity*). Therefore, this chapter discussed the complete validation process, or in this case the two-day workshop.

Keeping the foregoing in mind, a total of 24 representatives from local government attended the two-day workshop. During this time, a theoretical background presentation was done to inform the representatives of *what*

must be done to implement good CGICT in local government. Essentially, this session discussed the conceptual architecture, as per Section 5.5. Upon completion of the theoretical background presentation, a practical hands-on exercise session was done. In contrast, this session focused on discussing the supporting tool-set, as per Section 5.5.6. Furthermore, the practical hands-on exercise showcased the process model, as per Section 5.5.6. This process model was followed to demonstrate the implementation of F-CGICT in a practical manner. After completing the practical hands-on exercise, a questionnaire was handed to the 24 representatives of local government. The questionnaire aimed to validate F-CGICT's ability to conform to the four core aspects (*relevancy*, *usability*, *scalability*, and *simplicity*).

Based on the results of the questionnaire, it was found that all four core aspects were satisfactorily incorporated into F-CGICT. This was evident in that 100% of the representatives agreed that F-CGICT conforms to the first three core aspects (core aspect of *relevancy*, *usability*, and *scalability*). Furthermore, a majority of 88% agreed with F-CGICT's ability to conform to the fourth and final core aspect of *simplicity*.

Notwithstanding the above, it can be asserted that F-CGICT conforms to the four core aspects of *relevancy*, *usability*, *scalability*, and *simplicity*. Upon completion of the validation process, not only Phase 4 but also the whole unique integrated research approach has been completed. With that said, it is necessary to reflect on the findings of this study. The following chapter will conclude this study.

Chapter 7

Conclusion

With a final validated framework towards good Corporate Governance of ICT in local government, this chapter aims to conclude the study. Therefore, this chapter will summarise the findings throughout the study. Moreover, a discussion will follow on how the research objectives were met, followed by a summative conclusion of the research contribution of this study. As a final remark, this chapter will conclude by providing suggestions for future research.

7.1 Introduction

It is now apparent that a final framework for good Corporate Governance of ICT (CGICT) in local government was developed, called *'F-CGICT'*. On that note, the penultimate chapter validated the ability of F-CGICT to conform to the core aspects of *relevancy*, *usability*, *scalability*, and *simplicity*. After the validation process, which was the final phase of the unique integrated research approach, it was found that F-CGICT conforms to these four core aspects. Nonetheless, it is important to reflect on the findings of the complete study.

This chapter will commence with a discussion on a summary of the findings made throughout this study. Accordingly, it is important to confirm that all research objectives were met. In meeting the research objectives, various research contributions have been produced. Each of the research contributions will be discussed, after which various suggestions for future research are made. Nonetheless, as a start, it is important to consider the findings of

this study in a summative manner.

7.2 Summary of Findings

It is clear that ICT is a core element to the success of any well-run modern enterprise, which includes local government in general. On that account, it is of absolute importance that local government manage and govern ICT in a holistic manner. To do so, local government should seek to implement good CGICT. It is evident that the majority of local government is facing challenges in this regard.

From the discussion in Chapter 2, it is clear that CGICT is a critical enabler to the achievement of all strategic objectives. Furthermore, ample guidance is provided in the form of best practices and standards.

By using the various best practices and standards (King III Report, COBIT 5, and ISO/IEC 38500), contextualised guidance was provided to local government. This guidance was in the form of various frameworks for CGICT (CGICTPF, SALGA document, and MCGICTP), which were contextualised to fit the unique operating environment of local government, as discussed in Chapter 3. Subsequently, the Auditor-General pointed out that local government is facing challenges with the implementation of these CGICT frameworks. This is not only due to these frameworks being too complex but also to the existence of a *'gap'* between *what* must be done to implement good CGICT and *how* this good CGICT should be implemented. Even though the best practices and standards, and CGICT frameworks provide information on *what* must be done to implement good CGICT, there still exists a need with respect to *how* to achieve it.

To address this need of *how* to implement good CGICT, a research approach was identified to develop an artefact in the form of a framework. With this in mind, Chapter 4 further elaborates on a unique integrated research approach that was defined within the scope of the design-oriented information systems (IS) research paradigm. Ultimately this unique integrated research approach aims to produce a framework towards good CGICT in local government, and in that way addressing the problem at hand.

By using the unique integrated research approach, Chapter 5 discussed the development of a framework towards good CGICT in local government,

called F-CGICT. Each component of F-CGICT was developed in collaboration with a local government stakeholder, as required by the unique integrated research approach.

Upon completion of developing F-CGICT, the unique integrated research approach required that F-CGICT be validated for conformance to the core aspects of *relevancy*, *usability*, *scalability*, and *simplicity*. To do so, Chapter 6 discussed the validation process, which was in the form of a two-day workshop. During this workshop, a survey in the form of a questionnaire was conducted amongst 24 representatives from 22 different local government entities. After conducting the questionnaire, data from the various responses was gathered and analysed. The results suggested that F-CGICT fully conforms to all four core aspects. Consequently, F-CGICT provides satisfactory guidance for local government with the implementation of good CGICT.

7.3 Meeting the Objectives

This study aimed to address a real-world problem identified in local government. In light of that, Chapter 1 stated that the primary objective of this study is to develop a framework to aid local government. Also, the framework aims to guide local government with implementing good CGICT in a logical, structured manner. Accordingly, it was mentioned that the framework aims to empower municipal councils in effectively directing and controlling ICT within their local government.

To achieve the primary objective, Chapter 1 identified various secondary objectives that addressed the real-world problem collectively. These secondary objectives included the following:

1. To investigate recognised best practices with regard to good CGICT
2. To identify related government policy documents regarding good CGICT
3. To critically analyse the best practices and standards, and related government policy documents so as to formulate criteria on which good CGICT is built, after which a framework will be developed

To *"investigate recognised best practices and standards with regard to good CGICT"*, Chapter 2 led a discussion on contemporary Corporate Governance

and how ICT forms part of the greater Corporate Governance realm. Subsequently, best practices and standards were investigated by means of a literature review. In doing so, the foundation was built as to what must be done to implement good CGICT.

After addressing the first secondary objective, it was necessary to *"identify related government policy documents regarding good CGICT"*, in order to see what local government has at its disposal. By means of semi-structured interviews with relevant stakeholders, Chapter 3 discussed various CGICT framework documents. These CGICT frameworks attempt to guide local government with implementing good CGICT.

Nonetheless, this led to the third secondary objective, which is to *"critically analyse the best practices and standards, and related government policy documents so as to formulate criteria on which good CGICT is built, after which a framework will be developed"*. With Chapter 4 defining the research approach, it was found that best practices and standards, and the current local government CGICT framework documents lack in guidance on *how* to implement good CGICT. As a result, Chapter 5 discusses criteria (see Section 5.3) that were identified which should be incorporated in developing a framework for CGICT. Taking the criteria into consideration, Chapter 5 discussed the development and finalisation of F-CGICT, which was validated in Chapter 6.

As a result of the above, the achievement of the three secondary objectives collectively addressed the primary objective of developing a framework (F-CGICT) for good CGICT in local government. Furthermore, F-CGICT guides local government with implementing good CGICT in a logical, structured manner. Accordingly, F-CGICT empowers municipal councils in effectively directing and controlling ICT within their local government.

7.4 Summary of Contributions

This study produced three research outputs that collectively represent the entire research contribution. Each of the three research outputs will be discussed individually.

7.4.1 Research Contribution: The Artefact

The first research output was an artefact in the form of a framework. This framework, called F-CGICT (as per Figure 7.1), was discussed extensively in Chapter 5. F-CGICT consists of two major parts. The first one is *Part A* - the conceptual architecture (discussed in Section 5.5) and secondly is *Part B* - the supporting tool-set (discussed in Section 5.5.6).

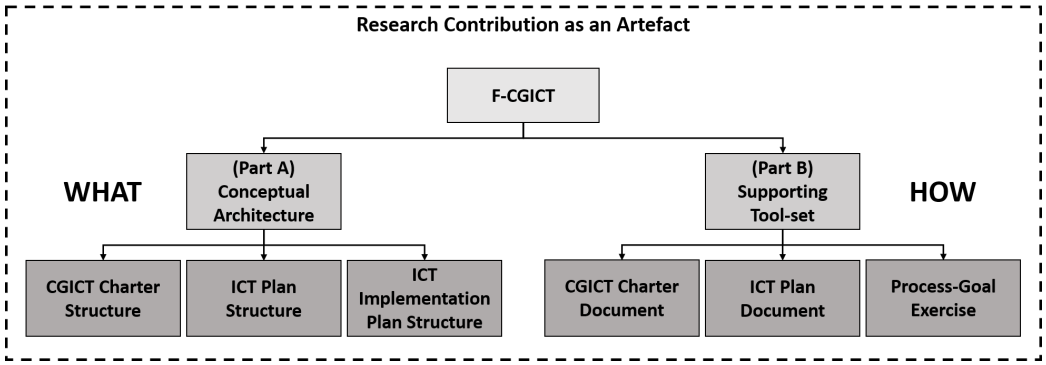


Figure 7.1: Outline of Research Contribution

Concerning *Part A*, the conceptual architecture provides guidance on *what* must be done in order to implement good CGICT in local government. To do so, three underlying components were created, as depicted in Figure 7.1. First, a CGICT Charter structure was created to guide local government with the creation of a CGICT Charter document (discussed in Section 5.5.3). Secondly, an ICT Plan structure was created to guide local government with the creation of an ICT Plan document (discussed in Section 5.5.4). Lastly, an ICT Implementation Plan structure was created to guide local government with developing an ICT Implementation Plan (discussed in Section 5.5.5).

Concerning *Part B*, the supporting tool-set provides guidance on *how* to implement good CGICT in local government. With this in mind, three underlying components were identified to aid local government with implementation of good CGICT. First, a generic CGICT Charter document was developed (attached to Appendix C.3) in order to provide local government entities with a CGICT Charter document to be tailored to its unique environment. Secondly, a generic ICT Plan document was also developed (attached to Appendix C.4) in order to provide local government entities with an ICT

Plan document to be tailored to its unique environment. Lastly, a Process-Goal Exercise was developed, which enables local government entities to identify COBIT 5 Processes applicable to its unique operating environment (discussed in Section 5.5.6 and attached to Appendix C.1).

Nonetheless, the complete F-CGICT collectively addressed the primary objective of this study. Furthermore, it is important to note that the development of F-CGICT was highly dependent on design-oriented IS research. However, the artefact (F-CGICT) has to adhere to four unique principles to be regarded as design-oriented IS research, as discussed in Chapter 4.

Adherence to Research Paradigm Principles

As discussed in Chapter 4, Österle et al. (2010) describe that for an artefact, or in this case F-CGICT, to be classified as design-oriented IS research, F-CGICT must adhere to the following four principles:

- *Abstraction*: F-CGICT must be applicable to a class of problems. In other words, F-CGICT must be generally applicable, not focused on one single solution, such as during a consultation exercise.
- *Originality*: F-CGICT must substantially contribute to the advancement of the body of knowledge. Österle et al. (2010) clearly state that the body of knowledge of design-oriented IS research is constituted by the scientific literature produced and - to a larger extent - by the experiences and knowledge accumulated in business.
- *Justification*: F-CGICT must be justified in a comprehensible manner and must allow for the validation thereof.
- *Benefit*: F-CGICT must yield benefits - either immediately or in the future - for the respective stakeholder group.

Principle of Abstraction

It is evident that F-CGICT is not tailored to fit one specific local government entity, but in contrast, F-CGICT is applicable to local government in general (any district or local municipality). Moreover, it can also be argued that F-CGICT is not only applicable within the South African context, but it can also be extrapolated to similar instances in the rest of the world.

Thus, it can be said that F-CGICT fully adheres to the principle of *Abstraction*.

Principle of Originality

For F-CGICT to be deemed design-oriented IS research, it is crucial that F-CGICT contribute to the advancement of the body of knowledge. Consequently, F-CGICT is a tailor-made contribution providing local government in general with guidance on *how* to implement good CGICT. Furthermore, the attendees of the workshop support this view by stating that F-CGICT aids local government by addressing the lacking area of CGICT. Chapter 6 highlighted the following supporting statement:

> *"F-CGICT is detailed and covers what is most needed and lacking in municipalities."*

Thus, it can be posited that F-CGICT incorporates and conforms to the principal of *Originality*.

Principle of Justification

The principle of *Justification* requires that F-CGICT be justified in a comprehensible manner. Accordingly, justification is provided by the Auditor-General, in that good CGICT in local government is problematic. This in itself provides the basis on why F-CGICT was produced.

Furthermore, the principle of *Justification* requires that F-CGICT be validated. As discussed in Chapter 6, F-CGICT has been validated in its ability to conform to the core aspects of *relevancy*, *usability*, *scalability*, and *simplicity*. Therefore, it can be submitted that F-CGICT adheres to the principle of *Justification*.

Principle of Benefit

Concerning the last principle, design-oriented IS research requires that F-CGICT yield benefit for the respective stakeholder group, which was, in this case, local government. As seen in Chapter 6, F-CGICT has been deemed of great benefit by the representatives attending the workshop. This is apparent in the numerous positive feedback received during the workshop. The following are some of the comments received, as per Chapter 6:

> *"F-CGICT provides detailed guidance on how to implement the CGICT. This will also assist with compliance to legislation."*

> *"Very good framework [F-CGICT] that will assist a lot."*

Taking the aforementioned into consideration, it can be contended that F-CGICT adheres to the principle of *Benefit*. On that note, it is clear that this study can indeed be classified as design-oriented IS research, as this study fully adheres to the four core principles.

7.4.2 Methodological Contribution

The second research contribution was in the form of a methodological contribution. Chapter 4 discussed the research approach followed in order to conduct this study. During this discussion, it was highlighted that the design-oriented IS research paradigm does not provide comprehensive guidance on how to conduct the intended study. However, the design-oriented IS research paradigm does allow the researcher the freedom to select the most appropriate methodology and/or methods at hand. To identify comprehensive guidance to follow, design-based research has been consulted.

It became clear that both design-oriented IS research and design-based research have similar goals, such as that of producing an artefact to a real-world problem. As such, both methods were integrated in order to produce a unique integrated research approach, which is discussed extensively in Chapter 4.

Notwithstanding the above, the methodological contribution is in the fact that this unique integrated approach can possibly aid other researchers with similar research studies. In essence, the unique integrated research approach could possibly help researchers provide contributions to real-world problems within the same practical environment as this study.

7.4.3 Academic Publications

The final research contribution was in the form of academic publications. As mentioned previously, two academic publications stemmed from this study. Further, a third paper was submitted to the South African Journal of Public Administration and is currently under review.

Concerning the first published paper, an international conference paper was published in the proceedings of the 2015 IST-Africa conference that took place in Lilongwe, Malawi. This paper discussed the preliminary results of the literature review.

The second international conference paper was published in the proceedings of the 2016 IST-Africa conference held in Durban, South Africa. The main topic of this paper was based on the results of Phase 3 of the unique integrated research approach (as discussed in Section 5.4.1).

In view of the above, the two published conference papers are listed below.

- Delport, P. M., Von Solms, R., & Gerber, M. (2015). Good corporate governance of ICT in municipalities. In *IST-Africa Conference, 2015* (pp. 1-10). IEEE.
- Delport, P. M., Von Solms, R., & Gerber, M. (2016). Towards corporate governance of ICT in local government. In *IST-Africa Week Conference, 2016* (pp. 1-11). IIMC.

Taking the above into consideration, these three contributions (the artefact contribution, methodological contribution, and academic publications) collectively served as the research contribution of this study. Nonetheless, it is important to consider any suggestions for future research.

7.5 Future Research

As part of future research, it is suggested that the aspect of *'Risk Management'* be further investigated and elaborated. Currently, the conceptual architecture does allow for the integration of Risk Management (see Section 5.5.1); nevertheless, further research is required to produce a full integration.

As a second suggestion, the conceptual architecture allows for the incorporation of ICT-related policies. The purpose of these ICT-related policies is to dictate acceptable behaviour regarding typical topics, such as managing security and managing continuity (see Section 5.5.1). However, the framework does not include a structure to aid local government with the design and creation of said policies. Future research will be beneficial in this regard.

7.6 Epilogue

This study has investigated the realm of corporate governance and ICT. Even though CGICT is applicable to any well-run modern enterprise, many find it a daunting and complex task. Local government is no exception in this regard. The Auditor-General has made it clear that CGICT should be implemented in local government. Unfortunately, this is not satisfactorily done. Various CGICT frameworks exist which provide ample guidance on *what* local government must do to implement good CGICT. However, the problem is that these frameworks do not provide any guidance on *how* to implement good CGICT.

With the above in mind, this study set off to develop an artefact in the form of a framework (F-CGICT). In providing F-CGICT, the study aimed at addressing the lack of good CGICT in local government. In so doing, this study contributed in the sense that local government should be able to implement good CGICT in a logical but structured manner. As a result, this study achieved its aim of producing a framework for good CGICT that is relevant to local government, usable by local government, scalable to the unique operating environment of local government and simplistic in its implementation.

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Appendix A

Academic Publications

Appendix A includes the academic papers that were written throughout the duration of the study. These papers include two published international conference papers, as well as a journal paper that has been submitted but not yet reviewed. These include the following:

1. IST-Africa 2015
2. IST-Africa 2016
3. South African Journal of Public Administration

A.1 IST-Africa 2015 Publication

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Good Corporate Governance of ICT in Municipalities

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Abstract: Effective service delivery through a municipality in general is important. ICT plays a major role in service delivery. Various best practices and standards indicate that the municipal council must take full responsibility and accountability for the corporate governance of ICT. According to the Auditor General, in the South African context, this is not being done. With this existing lack of responsibility and accountability, the municipal council does not fully support the corporate governance of ICT in a municipality. Through the extensive use of a literature survey and document analysis, guidelines have been defined to address this lack. These guidelines can possibly aid a municipal council in the corporate governance of ICT in municipalities. This not only applies to South Africa, but also to the rest of Africa.

Keywords: Governance, Corporate Governance, Corporate Governance of ICT, Municipalities, Municipal Council

1. Introduction

Information and Communication Technology (ICT) is an important asset in the effective delivery of services in any municipality [2]. ICT hugely affects the delivery of services in a municipality; and therefore it should be governed effectively. A country like South Africa, and similarly many other African countries, is governed at three interrelated spheres. The three spheres are: the national, provincial and local spheres of government [11]. The local sphere of government consists of municipalities, which must be established to cover the whole territory of the Republic [11]. The focus of this paper is on municipalities, which are in the local sphere of government, as mentioned.

Normally, regardless of which country a municipality resides in, the main purpose of the municipality is to provide some series of services to the constituency for which it is responsible [11]. Each municipality would have a mandate, which it is trying to fulfil. Different municipalities' mandates may vary somewhat; however, there would be some similarities. In the case of South Africa, a key mandate of local government (with the support of provincial and national government) is to eliminate the disparities and disadvantages that are a consequence of the policies of the past. It is also a mandate to ensure, as rapidly as possible, the upgrading of services in the previously disadvantaged areas, to ensure that equal services are being provided to all residents [10]. A district municipality must seek to achieve the integrated, sustainable and equitable social and economic development of its area as a whole [7].

In section 152 (1) of the South African Constitution [11], the general objectives of a municipality are listed. As mentioned previously, these objectives may vary slightly – from municipality to municipality. However, the broader objectives remain the same. These objectives are listed in Table 1.

Table 1: List of Local Government Objectives

The objectives of local government are—
(a) To provide democratic and accountable government for local communities;
(b) To ensure the provision of services to communities in a sustainable manner;
(c) To promote social and economic development;
(d) To promote a safe and healthy environment; and
(e) To encourage the involvement of communities and community organisations in the matters of local government.

The above-mentioned objectives are highly dependent on ICT. The use of ICT enables the provision of services to communities in a sustainable manner. The Department of Public Service and Administration, from here on referred to as the DPSA, has adopted nine ICT values, named the ICT House of Values. For the DPSA to achieve the twelve strategic outcomes, as informed by government-wide key priority areas, the DPSA must achieve stakeholder value by making use of the ICT House of Values [3]. Figure 1 graphically demonstrates the nine ICT values, as adopted from the Public Service Corporate Governance of ICT Policy Framework document [3], from here on referred to as the CGICTPF document.

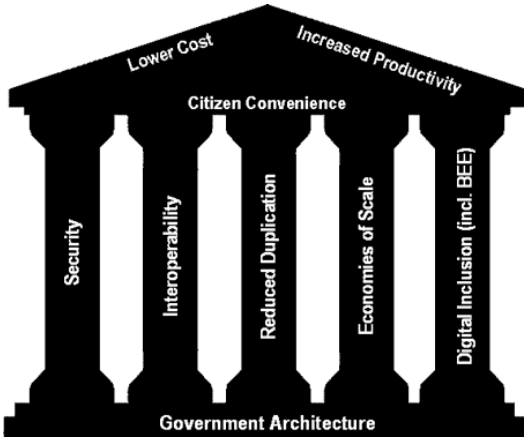

Figure 1: ICT House of Value

ICT plays an important role in the effective service delivery of municipalities, as mentioned earlier. For this reason, it is critical that all ICTs are properly governed. The governance of ICT may be defined as the effective and efficient management of ICT resources, in order to facilitate the achievement of company-strategic objectives [4].

According to the Minister of the DPSA [3], corporate governance of ICT (CGICT), requires that all important ICT decisions should come from the senior political and managerial leadership, and not be delegated to ICT management. This senior political and managerial leadership is typically performed by the municipal council. It is of the utmost importance that the municipal council take on the role, as stated above. This accountability enables the municipality to align its delivery of ICT services – with the municipality's strategic goals. The Presidential Review Commission (PRC) supports this statement, and adds that the management of ICT should be on the same level as the management of all other resources [8].

According to section 160 (1) (a) of the South African Constitution [11], a municipal council makes decisions concerning the exercise of all the powers – and the performance – of all the functions of the municipality. The decision to go ahead has to come from the municipal council. If the major benefits of adopting an ICT Governance Framework are not realised at this level, any implementation attempts would almost certainly fail [10]. These statements clearly show that the responsibility lies with the municipal council to take up the role of overseeing the implementation of CGICT. It is also critically important that the

municipal council should fully support the implementation of CGICT. Without this full buy-in, corporate governance will fail. Unfortunately, since the publication of the PRC report, little has changed with regard to the governance of ICT in the Public Service [3].

In 2013, the consolidated general report on the audit outcomes of local government was released. In this report, the Auditor General reported on the current state of local municipalities during the years 2012 and 2013. The Auditor General reported that the Chief Information Officers (CIO), or similar, are not fulfilling their strategic responsibilities. One issue highlighted is that inadequate accountability structures result in the CIO not being represented at a strategic (executive) management level [1]. The Auditor General reported that 21% of municipalities implemented adequate governance controls, but were found unsustainable; because it was not formally rolled out by management – thus not enforceable [1].

The Auditor General identified six key-risk areas in his ICT audit. One of the six key-risk areas is information security controls [1]. This truly shows that there is a need for attention in this particular area. In addition, the Auditor General reported that municipal managers and the CIO's of municipal entities did not provide assurance – in that they did not: (i) Create strong control environments through their leadership and oversight; (ii) they did not establish policies, procedures and action plans; and (iii) they did not ensure that human resource management, ICT governance, risk management, internal audit units and audit committees were effective [1].

This highlights the fact that the municipal councils are not acting, according to their responsibility. This might be due to the municipal council not being fully aware of the benefits of an ICT Governance Framework. It was reported that 97% of municipalities had ICT governance frameworks defined. However, none of the frameworks were being implemented [1]. One of the root causes identified indicated that district municipalities did not provide adequate guidance and support to the local municipalities under their jurisdiction [1]. This also shows that the full buy-in of the municipal council is – at best – seriously limited.

From the above stated information, one can clearly see that the problem is a lack of full buy-in or support from the municipal council to effectively introduce sound CGICT in most municipalities. In turn, this hinders ICT to deliver value to the individual municipality's strategic goals. The objective of this paper is, therefore, to define a set of guidelines to aid a typical municipal council, in South Africa or the rest of Africa, to effectively govern ICT within its municipality. The research study also aims to eventually empower the municipal councils by providing them with the necessary background, knowledge and the necessary skills; and capacitate the leadership with the required tools and guidance.

This section served as the introduction and provided the general background to the problem. The next section will highlight the approach of the research paper in addressing the identified problem. The paper will then continue to discuss the problem background in the context of municipalities. In the latter parts of this paper, the defined guidelines will be given; after which the paper will be concluded.

2. Methodology

The objective of this paper was addressed through the following methodology. Firstly, a detailed literature review was done. A literature review may form an essential part of the research process; or it may constitute a research study in itself. This paper has utilized a literature review as a critical synthesis of previous research and literature sources. The evaluation of the literature sources leads logically to the research question.

Secondly, a document analysis was used. A document analysis is an investigation method that focuses on the data material and the documents, which already exist. The document analysis involves documents exclusively; thus, no interviews or other survey

materials were required [9]. Mayring identifies four necessary steps to an effective document analysis. The steps are as follows: (i) Clearly defined questions; (ii) definition of documents, stating what a document is; (iii) consideration on the document's relevance for the defined question; and lastly (iv) interpretation of the document, according to the defined question [6]. Following these steps, formed the basis of the document analysis. The relevant documents identified for this particular study were best practices and standards, such as the King III report, the ISO/IEC 38500 standard, and the COBIT 5 framework.

Another general document, such as the CGICTPF document was also identified. Although the CGICTPF document falls within the South African context, it is also applicable to municipalities outside South Africa.

Thirdly, argumentation was used to argue towards addressing the defined problem. By defining the guidelines, the problem of a lack of full buy-in from the municipal council, was addressed.

The paper was primarily based on the literature work in combination with the relevant documentation. This, in turn, led to a case study that is currently ongoing.

This section discussed the approach followed to address the stated problem. The following section will start by putting the relevant information in context with municipalities.

3. Corporate governance of ICT

At this point, it is clear what the problem is, and what the approach of this paper is to address the identified problem. This particular section will be divided into two parts. The first part will commence by discussing the idea of the relevant documents and the best practices that exist concerning good CGICT. The second part will form a relationship between the relevant documents and the best practices, as well as the stated problem, as identified in the introductory section.

3.1 Relevant Documents

According to the Oxford dictionary, a best practice comprises commercial or professional procedures that are accepted or prescribed as being correct or most effective [10]. For the purpose of this paper, the term 'best practices' will include both international, as well as local, best practices. An example, in the South African context, of a best practice is something like the King III report; while the COBIT 5 Framework is an example of an international best practice. Another side to the relevant documentation is standards. A standard, on the other hand, may be defined as one established by an authority (a rule or principle) or by general consent – as a basis of comparison [10]. An example, once again, is the ISO/IEC 38500 standard, in the context of the CGICT. At this point, it is important to note that not only a single application of best practice or standard could guarantee good CGICT [4]; but rather a combination should be used to best introduce good CGICT. Best practices and standards are, therefore, relevant when assisting municipal councils to implement good CGICT. Now that there is a clear understanding of best practices and standards, King III will be used in identifying those good aspects that are core to CGICT.

The King III report was released in September 2009. Chapter 5 is dedicated to CGICT and will be the focus of this discussion. The King III report is widely used in the South African context; and it is applicable to all municipalities. The King III report addresses certain issues, specifically pertaining to the good governance of ICT. King III uses a 'comply or explain' approach. This approach means that there are no legal sanctions for non-compliance [4]. This, however, does not mean that one can simply ignore King III. One has to provide an excellent reason for why one did not comply with King III.

King III makes use of principles and practices. It is clearly stated in the documentation of King III that all principles listed are equally important, and must be implemented in a holistic manner [4]. There are a total of seven principles in King III, chapter 5. This paper, however, will only highlight a few of the principles that are relevant to the problem area.

The first principle states that the board should be responsible for the governance of ICT [4]. In the context of municipalities, the municipal council should be responsible for the governance of ICT. This responsibility is of the utmost importance to ensure proper buy-in and support from the municipal council.

A second principle states that the municipal council should delegate to management the responsibility for the implementation of an ICT governance framework [4]. This clearly implies that there must be an ICT governance framework; and secondly, the ICT framework must be implemented.

A third principle, in combination with the first two principles, states that ICT should be aligned with the performance and sustainability objectives of the municipality [4]. This implies that the municipal council should ensure that ICT adds value to service delivery. If ICT is failing to add value, it is clear that this principle is not in effect.

All three these stated principles is closely related to the Auditor General's report on municipal managers and the CIO's of municipal entities, as stated previously in the introduction section.

The other facet of relevant documents is standards. The ISO/IEC 38500 standard is considered most applicable to the CGICT. In summary, the objective of this particular standard is to provide a framework of principles for municipal councils to use when evaluating, directing and monitoring the use of ICT in a municipality [5]. Like King III, the ISO/IEC 38500 standard is applicable to all government entities, such as municipalities.

The ISO/IEC 38500 standard consists of six principles. All six principles together address good CGICT. Only a few principles, however, will be highlighted from this standard. The principles, in combination with three different tasks, must be performed by the municipal council. The three tasks are: Evaluate, direct and monitor [5]. For each individual principle, all three of these tasks need to be performed. Table 2 shows the extracted principles, together with a brief description, as adapted from the ISO/IEC 38500 standard [5].

Table 2: ISO/IEC 38500 Extracted Principles and Description

Principle Number	Principle Name	Principle Description
1	Responsibility	Individuals/Groups within municipality understand and accept their responsibilities. Those with responsibility for actions, have authority to perform those actions
2	Strategy	Municipality's business strategy takes into account current and future capabilities of ICT – business and ICT alignment
5	Conformance	ICT complies with all mandatory legislation and regulation. Policies and practices are clearly defined, implemented and enforced.

These principles will be used in the next section as the foundation of some solution to address the problem at hand.

In the South African context, an ICT policy framework was designed by the DPSA [3]. As mentioned previously, this policy framework is called the CGICTPF. This policy framework was accepted in 2012 as a legislative requirement to which all municipalities must adhere. This policy framework essentially provides a municipal council with guidelines for establishing a good CGICT [3]. The CGICTPF document is divided into three phases [3]:

- Phase 1: Corporate Governance of ICT environment will be established in municipalities;

- Phase 2: Municipalities will plan and implement business and ICT strategic alignment;
- Phase 3: Municipalities will enter into an iterative process to achieve continuous improvement of Corporate Governance, as well as the Governance of ICT.

One can clearly see that these three phases support the King III principles, as well as the ISO/IEC 38500 standard principles discussed earlier. The CGICTPF document clearly states that the municipal council is accountable for the realisation of the municipality's strategic outcomes [3]. The CGICTPF document further states that this should be done by firstly evaluating current business strategic goals and the future use of ICT. Secondly, directing the preparation and implementation of plans, thus ensuring that the use of ICT meets business needs. Lastly, when plans are implemented, it should be monitored for performance and conformance purposes – ensuring that the municipality's strategic goals are achieved [3]. This statement supports the ISO/IEC 38500 standard and the three different tasks of the municipal council. The following section will discuss these tasks in detail.

The principles, as stated in this sub-section, will be used in the next sub-section to form a relationship with what best practices or standards propose and the problem at hand.

3.2 Relationship Between Relevant Documents and the Problem at Hand

The previous sub-section discussed the goals of best practices and standards. Some of the principles from the related best practices and standards were highlighted. This sub-section will, however, form a relationship between the highlighted principles and the problem in general. This relationship should enable one to assess the municipality with regard to what best practices and standards propose ought to be in place.

As stated earlier, there is not, in general, adequate support from the municipal councils to effectively govern ICT in municipalities. By implementing the identified principles for good governance of ICT, it should assist in addressing this weakness. Furthermore, as mentioned in the earlier sections, the first King III principle highlights the municipal council's responsibility for the governance of ICT [4]. Similarly, the first principle of the ISO/IEC 38500 standard addresses the responsibility aspect of municipal councils in general [5]. In contrast to these stated principles, the Auditor General reported that the CIO's (or similar) are not fulfilling their strategic responsibilities [1]. This is probably due to inadequate accountability structures. In essence, the municipal council is not taking full responsibility and accountability for the governance of ICT. It is, however, also important to know that without the municipal council being fully aware of the importance of CGICT, the municipal council could not assume full responsibility and accountability. In the light of this issue, the municipal council would need to be made aware of its responsibilities.

As mentioned earlier, the Auditor General reported that 21% of municipalities had implemented adequate governance controls, but were unsustainable; because it was not formally rolled out by municipal councils [1]. Once again, the King III principle one is applicable here, stating that the decisions for ICT must come from the municipal council [4].

As stated previously, the Auditor General also reported that 97% of municipalities had ICT governance frameworks defined; however, none of these had been implemented [1]. Thus, the CGICTPF [3] document was used to define some form of governance framework, but unfortunately none of these were fully implemented.

From the above, it is clear that municipalities fall far short of complying with best practices, standards and guiding documents. One of the major problems is that there is not a full buy-in from the municipal council to effectively address the identified principles, in order to implement good CGICT. It is critically important that this problem be adequately addressed.

The next section will identify and discuss some proposals towards better CGICT in municipalities. Guidelines will be given that apply not only to municipalities in the South African context – but also to those all over Africa.

4. Towards Better Corporate Governance of ICT

In the previous section, a relationship between best practices and standards with the stated problem was established. This section will commence by defining guidelines that could assist a municipal council to effectively govern ICT in a municipality.

According to the stated information from the previous sections, it is clear that the municipal council is not taking full responsibility and accountability for ICT. In section 3.2, it was stated that there is little or no buy-in from municipal councils; and this is probably due to municipal councils not being aware of their responsibilities. To address this awareness issue, three steps are suggested. Each step will now be discussed individually.

Firstly, it is necessary to make the municipal council aware of their responsibilities. As mentioned in the first section, the PRC stated that all important ICT-decisions should come from the municipal council [8]. Also, as implied in King III, the municipal council is responsible and accountable for the CGICT [4]. This implies that all important decisions with regard to ICT must be made by the municipal council. In the South African context, this is also stated in the Constitution. It is also important for the municipal council to be aware that ICT must be managed at the same level as other resources, as mentioned in the PRC report [8]. The CIO (or similar roles) should be present at the strategic management level [8]. This would ensure an adequate and accountable structure. A last important responsibility is for the council to perform the three main tasks of CGICT, namely: to evaluate, direct and monitor [5]. These three tasks will be discussed in detail later.

Secondly, after making the municipal council aware of their responsibilities, it is important to understand that these steps are a logical non-complex and simple way for the municipal council to oversee the CGICT. The idea is not to transform the municipal council into ICT specialists. The idea is rather to empower the municipal council to effectively oversee the implementation of CGICT. In order to empower the municipal council, it is critical for them to have an interest in CGICT. This interest would allow the municipal council to realize the benefits that the CGICT holds. An example of interest is, for instance, if the municipal council approved a huge budget for an ICT project, it is good practice to follow up at their next council meeting on how the project is progressing. The municipal council will oversee the approval and progress of this ICT project – in essence, they should monitor it. The actual implementation of an ICT governance framework should be delegated to management on the tactical and operational levels [4].

An effective way to empower the municipal council would be to utilise a question and answer based ICT oversight approach. These questions and answers form the basis of the third and final step. The correct questions are routine questions, and can be asked at every council meeting. For explanation purposes, Figure 2, as adapted from the ISO/IEC 38500 [5] standard and von Solms & von Solms [12], could be used.

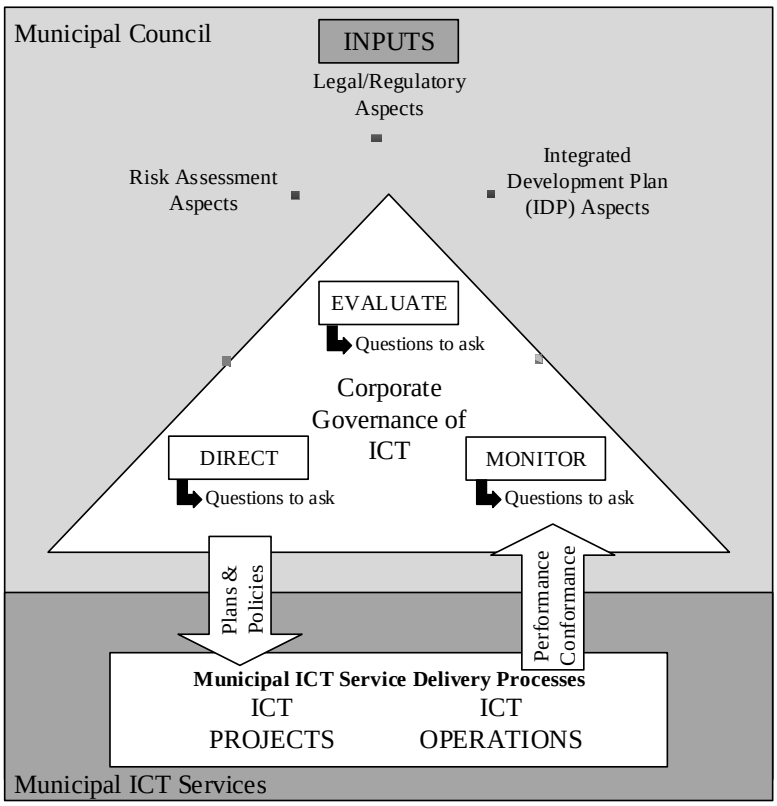

Figure 2: Municipal Responsibility Model for Corporate Governance of ICT

These particular questions can be grouped into the three main tasks of governing ICT, as seen in Figure 2. Normally, the ICT services section should prepare answers to these questions and present them to the municipal council in a non-technical manner. These governance tasks include [5]:

- Evaluating the current and future use of ICT;
- Directing the preparation and implementation of plans and policies to ensure that the use of ICT meets business objectives; and
- Monitoring conformance to policies, and performance against plans.

Within each task, there are specific questions the municipal council has to ask, in order to perform good CGICT. From the top of Figure 2, one can identify three sources of inputs. These will form the external and internal obligations to which the municipality must adhere. The first task is to evaluate. Table 3 lists typical evaluation-oriented questions, which the municipal council should ask in order to oversee ICT:

Table 3: Municipal Questions to Evaluate ICT as Part of Oversight

(i)	What are the major expenses in ICT coming in the near future?
(ii)	Motivate why it is necessary to invest in this ICT asset
(iii)	What are the major risks in implementing this ICT project?
(iv)	What are the main controls related to the legal, regulatory and IDP aspects which must be addressed?

After evaluation, the second task is to direct. Direction should be given to specific ICT projects in the municipal ICT service-delivery process through plans and policies. Table 4 lists typical direction-orientated questions, which the municipal council should ask in order to oversee ICT:

Table 4: Municipal Questions to Direct ICT as Part of Oversight

(i)	Would this ICT project enable the municipality to provide better services?
(ii)	Who plays the role of the CIO (Who bridges the gap between service delivery and ICT aspects?)
(iii)	Are there any substantial proposals from the ICT services that need approval?
(iv)	How can a culture be encouraged for good governance of ICT in the municipality?

As mentioned, the answers or responses to these questions should be prepared by the ICT service department, and preferably presented to the municipal council by the CIO.

After directing, the third task is to monitor the ICT operations in the municipal ICT service-delivery processes in order to oversee performance and conformance. Table 5 lists possible monitor-oriented questions, which the municipal council should ask in order to oversee ICT:

Table 5: Municipal Questions to Monitor ICT as Part of Oversight

(i)	Are all the directives measurable?
(ii)	Is the performance of ICT in accordance with the plans? In other words, is ICT delivering value?
(iii)	Is ICT conforming to the regulatory and legal obligations?
(iv)	Are the delegated responsibilities to management being fulfilled?

Essentially, these questions form the basis of a question-and-answer based ICT oversight approach. Being aware of responsibilities, and using the question-and-answer based ICT oversight approach should empower the municipal council, and could enable them to effectively oversee the governance of ICT. This, in turn, would allow the effective CGICT in municipalities.

5. Conclusion

ICT must add value to a municipality – enabling effective service delivery. The problem was clearly stated as the municipal council not having a full buy-in or support of CGICT in municipalities. With this problem in mind, the objective of the paper was, therefore, to define a set of guidelines to aid a typical municipal council, in South Africa – or the rest of Africa – to effectively govern ICT within municipalities. This objective was addressed in the latter parts of the research paper through the discussion of three steps. The three steps enable the municipal council to oversee CGICT in a logically non-complex manner. The last step referred to a question-and-answer based ICT oversight approach. With this approach, the municipal council would ask certain relevant questions; and the ICT services management team would prepare answers to these questions. These questions, in turn, could empower the municipal council to effectively oversee the CGICT.

Through the use of these steps, the municipal council could be made aware of their responsibilities. If there is an effective accountability structure of the responsibilities, effective CGICT can be implemented in municipalities. This implementation could, in turn, allow ICT to add value to the delivery of services by a municipality. As seen from the ICT House of Values, delivering services is vitally important; therefore, ICT must add value and be governed effectively [3].

Further research includes addressing the problem from a “how” point of view. The question of defining how to implement a CGICT in municipalities will be addressed, allowing municipal councils to follow the defined approach to support the municipal council in governing ICT in municipalities. This paper has primarily focused on a literature review that led into a case study that is still ongoing. Therefore, the data collection is ongoing, as well as the analysis of the findings.

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A.2 IST-Africa 2016 Publication

The second published paper is an international conference paper. The paper titled ***'Towards Corporate Governance of ICT in Local Government'****, was published in the proceedings of the 2016 IST-Africa international conference that took place in Durban, South Africa.*

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Towards Corporate Governance of ICT in Local Government

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Abstract: One of the main objectives of local government is the effective delivery of services. Information and Communication Technology (ICT) plays a major role in this regard. Various best practices and standards indicate the importance of corporate governance of ICT across all types of sectors. According to the Auditor General, in the South African context, there exists a definite lack in implementing corporate governance of ICT. Due to the complexity of the current corporate governance of ICT structure, local government is challenged with implementing sound corporate governance of ICT. Through the extensive use of a literature survey and semi-structured interviews, an architecture is proposed to address this issue of complexity. This architecture can aid local government in the corporate governance of ICT. This not only applies to South Africa, but also possibly to the rest of Africa.

Keywords: Governance, Corporate Governance, Corporate Governance of ICT, Municipalities, Municipal Council, Local Government

1. Introduction

"*Information systems were used as enablers to business, but have now become pervasive in the sense that they are built into the strategy of the business. The pervasiveness of ICT in business today mandates the governance of ICT as a corporate imperative.*" – King III [1].

King III, being a best practice regarding corporate governance of ICT, applies to all enterprises, which include public enterprises and therefore all spheres of government, including local government. As ICT is also core to most forms of service delivery in a typical local government in South Africa [2], it is imperative that the corporate governance of ICT receive the due care that King III mentioned.

In order to understand the full importance of ICT in local government, it is important to firstly consider the South African government itself. The South African government consist of three different government spheres, namely: national, provincial and local sphere. This paper however will only focus on the sphere of local government. Local government typically consist of three different categories of municipalities, each with its own goals and responsibilities. The first category of municipality is called a metropolitan municipality, which is typically the largest of the three. Secondly, there are district municipalities, which are typically smaller than metropolitan municipalities. Lastly, local municipalities are in general the smallest of the three. Although a definite difference exists between the three categories of municipalities in size and capacity, section 152 (1) of the South African constitution clearly describes the objective of local government holistically [3]. With this in mind, the objectives of local government are listed in Table 1.

Table 1: List of Local Government Objectives

The objectives of local government are—
(a) To provide democratic and accountable government for local communities;
(b) To ensure the provision of services to communities in a sustainable manner;
(c) To promote social and economic development;
(d) To promote a safe and healthy environment; and
(e) To encourage the involvement of communities and community organisations in the matters of local government.

To effectively address these above mentioned objectives, the Department of Public Service and Administration (DPSA) has realised that ICT is critical in this regard [2].

Due to ICT being critical, King III suggests that due care should be taken with implementing sound corporate governance of ICT [1]. The Presidential Review Commission (PRC) supports the King III statement; however, in 1998, it added that governance in South Africa is problematic [4]. Since the release of the PRC report, sadly little has changed.

Each financial year, the Auditor General of South Africa is tasked with auditing local government on the state of ICT controls, amongst others. In the 2008/2009 report, the Auditor General identified four control areas within ICT that are not satisfactorily controlled, one of the controls is the corporate governance of ICT. This is alarming and shows that sound corporate governance of ICT in local government is a definite problem. After these findings, the Auditor General recommended in the 2009/2010 report that a government-wide Governance of ICT Framework should be put in place to implement a national ICT strategy based on defined processes and standards [5]. After this recommendation from the Auditor General, the 2010/2011 report was released.

In this 2010/2011 report, the Auditor General reported that little has been done regarding the corporate governance of ICT. He also reported that only 21% of departments implemented governance controls; however, these controls were unsustainable due to not being formally rolled out by management [6]. The fact that so little of local governments implemented governance controls supports the fact that there was an urgent need for a national corporate governance of ICT framework.

Since the need was realised in the previous consolidated reports, the latest report of 2013/2014 was released. This report still shows that little has been done regarding sound corporate governance of ICT [7].

Figure 1 positions the corporate governance of ICT in local government in the 2013/2014 report.

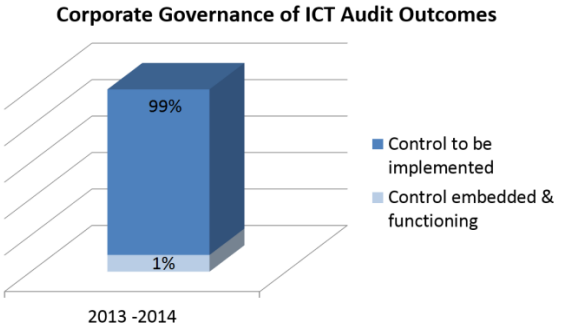

Figure 1: Findings on Governance Controls

It is clear from Figure 1 that there is a definite need for sound corporate governance of ICT implementation in local government. The report shows that 99% of local government has not yet implemented any corporate governance of ICT, whereas 1% of local

government has implemented sound corporate governance of ICT and is functioning effectively.

Notwithstanding the above, a definite problem exists with implementing sound corporate governance of ICT in local government. It is therefore the objective of this paper to aid local government by drafting an architecture, supported by a series of actions, to address sound corporate governance of ICT.

In order to address this objective, the specific research approach will be discussed in the following section.

2. Research Approach

The approach followed to address the problem at hand, is within design-orientated information systems (IS) research. Österle et al, clearly describes that design-orientated IS research aims to develop and provide instructions for actions that are practically applicable [8]. In addition, these practically applicable actions are in the form of delivering an artefact. The proposed architecture represents the delivered artefact. In order to deliver this architecture, design-orientated IS research suggests an iterative approach be used.

This iterative approach was followed where three different cycles were utilised in order to refine the proposed architecture. Throughout the individual cycles, semi-structured interviews were conducted with the relevant role players in the problem area to provide in depth understanding regarding any challenges faced during the construction of the architecture. A semi-structured interview can be defined as a verbal interchange where one person, the interviewer, attempts to provoke information from another person by asking questions. There is a predetermined set of questions, however a semi-structured interview allows the interviewee to deviate from the predetermined questions to an extent [9].

This paper followed the mentioned approach to result in the eventual architecture. In order to understand the architecture, a clear understanding of the corporate governance of ICT is required.

3. Corporate Governance of ICT: Addressing the What

The corporate governance of ICT is defined in the ISO/IEC 38500 standard as the system that direct and control the future use of ICT. Corporate governance of ICT involves evaluating and directing the use of ICT to support the organization and monitoring this use to achieve plans. It also includes any policies and strategies for using ICT within the organization [10]. In order to address sound corporate governance of ICT, various related best practices and standards exist. This section will focus on these related best practices and standards by addressing what must be done to attain sound corporate governance of ICT in local government.

To start off, recognized best practices and standards will be the focus of the following subsection.

3.1 Recognized Best Practices and Standards

Various resources exist to aid organizations with addressing good corporate governance of ICT. These resources include best practices and standards. These best practices and standards are equally applicable to private and public organizations as well as government entities [10].

In the South African context, the King III report is considered a best practice which provides guidance in the form of principles. The King III report was released in September 2009, and for the first time dedicated a whole chapter (Chapter 5) to corporate governance of ICT.

In King III Chapter 5, there are a total of 7 principles. Each principle is considered to be very important not only to organizations, but also government entities such as local government. All 7 principles work on a 'comply or explain' approach. This approach expects local government, in this case, to comply with all 7 principles unless they have an acceptable reason as to why they should not have to comply. For the purpose of this paper, each principle will not be discussed individually, however it is important to know that all 7 principles are equally important and local government should conform to these principles.

Another best practice, although considered an international one, is the COBIT 5 Framework. The main objective of COBIT 5 is to provide a comprehensive framework that aids enterprises, local government in this case, in achieving their objectives for the governance and management of ICT [11]. Similarly to King III, COBIT 5 is also based on 5 principles. The 5 principles holistically address the corporate governance of ICT. For this paper, COBIT 5 was used as the foundation for the proposed architecture.

In combination with best practices, standards also provide guidance on sound corporate governance of ICT. The ISO/IEC 38500 standard is considered to be a leading standard in this regard. The main objective of the ISO/IEC 38500 standard is to provide a framework of principles for Directors to use when evaluating, directing and monitoring the use of ICT in their organizations [10]. In the case of local government, the Municipal Council is responsible for these principles. The Municipal Council of local government must ensure that the process of evaluating, directing and monitoring form part of their everyday responsibility [12]. If this is not the case, corporate governance of ICT may indeed fail.

Both best practices and standards are important in achieving sound corporate governance of ICT. Corporate governance of ICT in local governments has its unique challenges though.

3.2 Corporate Governance of ICT in Local Government

After the Auditor General released the statement emphasizing the need for a government-wide Governance of ICT Framework in the 2009/2010 report, the Department of Public Service and Administration (DPSA) drafted and accepted the Corporate Governance of ICT Policy Framework (CGICTPF), in accordance with the previously mentioned best practices and standards, as the official framework for the governance of ICT in all government institutions [2]. The CGICTPF was accepted by cabinet in early 2013. The CGICTPF aims to guide not only local government but all government entities with the implementation of sound corporate governance of ICT.

The problem however, is evident in an extract from the South African Western Cape provincial circular of 2015. This circular stated the following: "*the Corporate Governance of ICT Policy Framework referred to municipalities by the DPSA was too complex for implementation in local government, as it did not consider the unique operating environment within municipalities*" [13]. While implementation might not pose as big a challenge to the bigger, better-equipped and financially-capable departments of government, the challenge to local government is more difficult to overcome as they have limited resources regarding both finances and skills. The same provincial circular continued to state that a new Municipal Corporate Governance of ICT Policy (MCGICTP) has been adopted by the Department of Co-operative Governance and Traditional Affairs and the goal is for this policy to be adopted as a National Standard. This MCGICTP supposedly is not as complex as its predecessor [13].

The MCGICTP is aimed to cater for the scalability and uniqueness of the individual local government environment. In order to cater for the uniqueness of local government, the MCGICTP uses a phased approach through which sound corporate governance of ICT is implemented. Since the release of this MCGICTP however, the 2013/2014 Auditor General

report was released which supported the statement from the provincial circular, that the MCGICTP is aimed to be implemented in all local governments starting in the year 2015 and 2016 [7].

The creation of the MCGICTP is definitely a step in the right direction, however according to key role players in implementing corporate governance of ICT in local government, the MCGICTP is feared to follow the footsteps of its predecessor, the CGICTPF.

The problem however is that similar to the CGICTPF, the MCGICTP describes the corporate governance of ICT from a 'what' must be done perspective. This implies that local government is responsible for determining the 'how' it must be done perspective. In order to aid local government in addressing the 'how' perspective, the proposed architecture will focus to not only simplify but also provide guidance towards good corporate governance of ICT.

4. Corporate Governance of ICT: Addressing the How

In the previous sections, it was highlighted that the Auditor General identified four control areas within ICT that are not satisfactorily controlled within local government. These four control areas are; ICT Governance, Security Management, User Access Management and ICT Service Continuity [7]. Due to these four control areas being collectively critical to the effective corporate governance of ICT, each individual control must be addressed appropriately. Consequently, there is a bigger ongoing project which aims to collectively address the four identified control areas. This paper however, contributes to this bigger project by addressing the aspect of ICT Governance.

In order to interpret the proposed architecture, it is required to position this paper within the bigger ongoing project. The following subsection will introduce a brief overview of the bigger ongoing project in the form of a conceptual architecture.

4.1 Conceptual Architecture: Positioning

By using the COBIT 5 Framework as the foundation and incorporating best practices and standards, the conceptual architecture is depicted in Figure 2. Figure 2 clearly shows the two main parts on the left hand side, namely: Governance and Management. For the purpose of this paper, Governance will be the focus.

The MCGICTP clearly states that each local government is individually responsible for the creation and acceptance of a corporate governance of ICT Charter [14]. This Charter document, as described by the MCGICTP, should guide the creation and maintenance of effective enabling governance structures, processes and practices. ICT should also clarify the governance of ICT-related roles and responsibilities towards achieving the municipality's strategic goals [14]. This Charter is an essential part towards sound corporate governance of ICT and will be discussed more in depth later on.

In Figure 2, the Charter document is contained within the Governance section. This Charter is an actual document that contains the mandate of the individual local government. This mandate is in the form of high level statements of what must be done regarding corporate governance of ICT. These high level statements will overflow into the Management section and provide input into the ICT Plan (ICTP). The ICTP is based on the different COBIT 5 processes. Within COBIT 5, there exist a total of 37 processes. Each process aims to address a specific area towards sound corporate governance of ICT. Depending on the goals of the organization, local government in this case, different processes will be selected and holistically be implemented. With this in mind, the ICTP will house which processes of COBIT 5 is applicable to the individual local government. From the ICTP, different issue specific policies will be developed. As shown in Figure 2 above,

there should be various policies, however there is currently only four main policies, which addresses the four control areas as identified by the Auditor General. There exist room for further policies and is represented by the blocks containing question marks. These policies will then overflow into specific COBIT 5 activities. These COBIT 5 activities describe specific activities which must be completed in order to address the previously applicable 37 processes. These COBIT 5 activities will address the actual 'how' of implementing sound corporate governance of ICT.

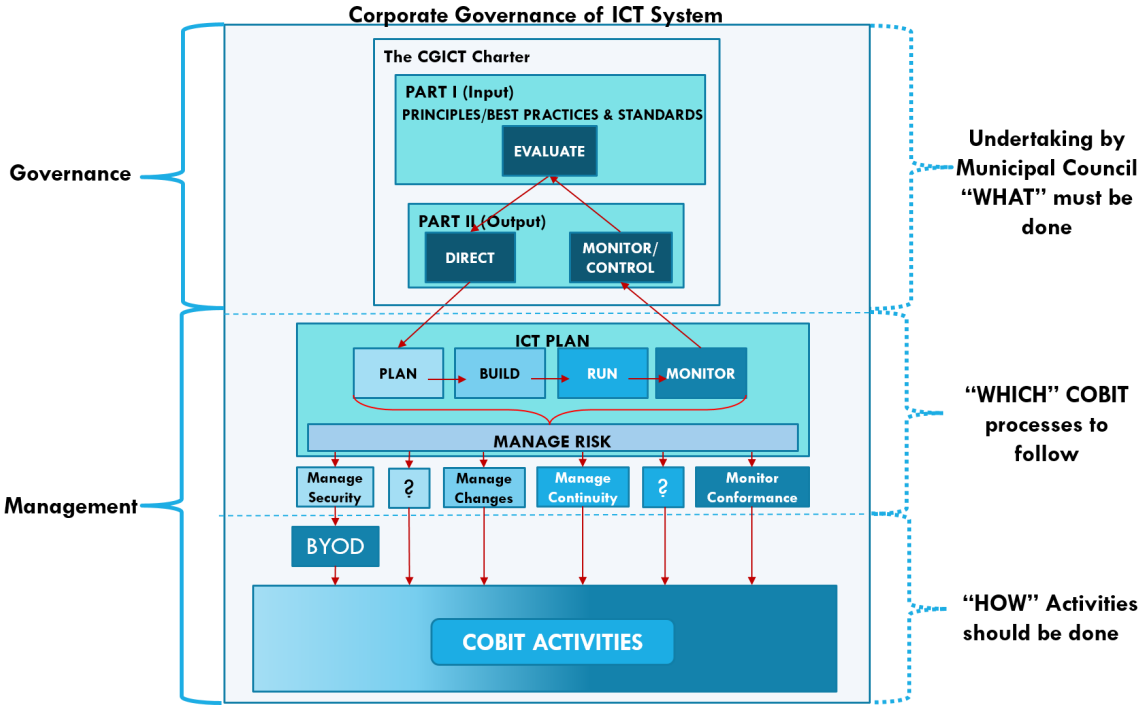

Figure 2: Conceptual Architecture: Positioning

This conceptual architecture is used at this stage to position this paper and is not the main focus of this paper.

From the above, the focus will now move to the proposed architecture which addresses the Charter.

4.2 Proposed Architecture: The Charter

The first draft of the corporate governance of ICT Charter architecture, here after referred to as the architecture, was based on literature as represented by the first cycle of the research approach. Following the first draft, the second cycle started with the drafted architecture and was presented, with the aid of semi-structured interviews, to key role players at a district municipality. In these semi-structured interviews, certain improvements were suggested. After the semi-structured interviews, the suggested changes were incorporated and the architecture was refined. With this refined architecture, the third cycle started with the architecture presented to the key role players. At the end of the third cycle, a final refined architecture was constructed. This final architecture consists of two parts. Part One which is the input and Part Two the output, the output being the physical Charter document. Figure 3 clearly shows the final refined architecture's two individual parts. These two parts collectively represent the creation of a local government Charter.

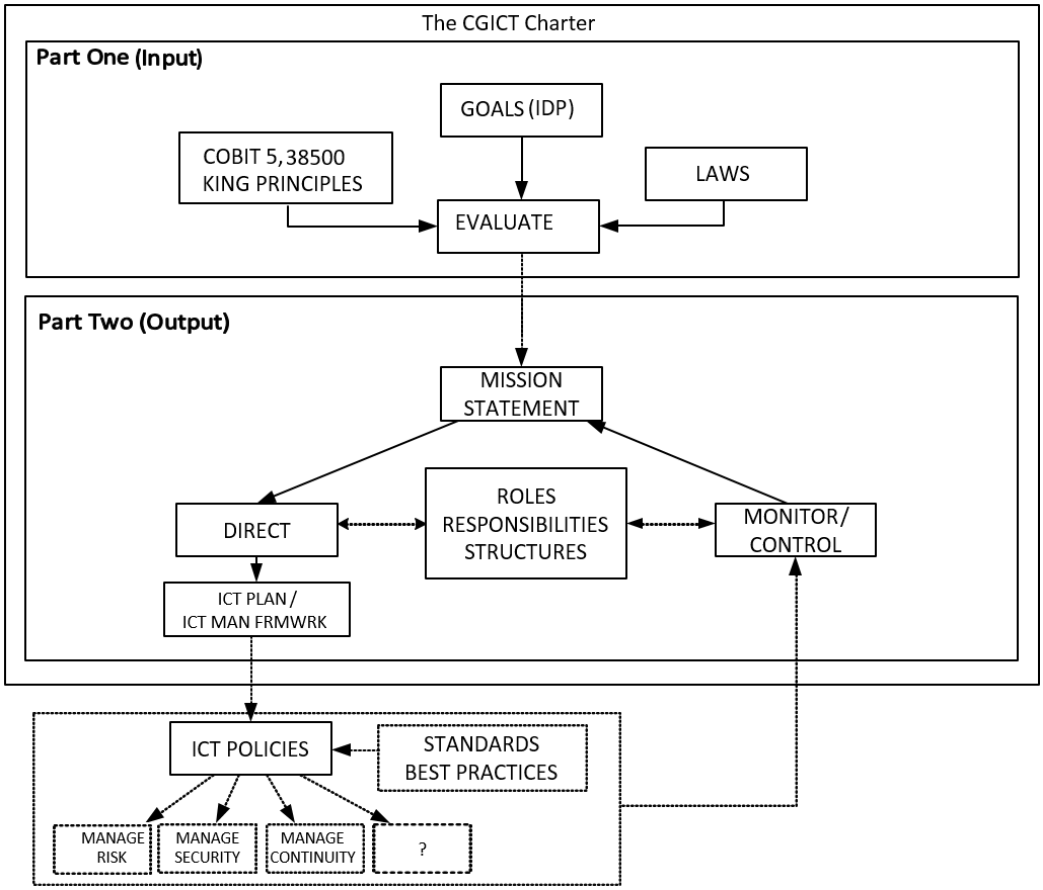

Figure 3: Proposed Architecture: The Charter

Part One will start off with Evaluate, and can be described as evaluating the current and future use of ICT [10]. Evaluation has three drivers, the first driver is from best practices and standards. Local government must conform to these best practices and standards. Secondly, the Integrated Development Plan (IDP) must be evaluated. The IDP can be described as the principal strategic planning instrument which guides and informs all planning and development, and all decisions with regard to planning, management and development in local government [15]. The IDP can be considered to be high level, or

strategic goals of the individual local government. Lastly, it is important to evaluate any related legislation that is applicable to local government. The complete Evaluation process provides the necessary input that is required to create the Charter.

Part One will provide input and lead into Part Two. Part Two is considered the output or physical Charter document. The first step of Part Two is to extract information from Evaluate, to produce the Mission Statement of the individual local government.

From the produced Mission Statement, it is important that direction is given in the form of the Direct step. According to the ISO/IEC 38500, Direct can be described as directing the preparation and implementation of plans and policies to ensure that the use of ICT meets business objectives [10]. In order to Direct, one has to consider the related roles and responsibilities of related parties. Typically a RACI (Responsible, Accountable, Consult, Inform) chart is used to delineate roles and responsibilities of who has to do what.

The next step is to take what is being directed from the top, and link it with specific COBIT 5 processes. Depending on the direction given, each local government would have to apply different processes. These COBIT 5 processes would then be combined into the ICTP. The ICTP would list the identified COBIT 5 processes on a high level, due to the processes still being part of the Governance section.

After the ICTP has been established, Different ICT policies would be created on a tactical level. Figure 3 shows that these policies exit the Charter block, this is due to these policies exiting the Governance section and stepping over into the Management section. These ICT policies would carry the full support from the strategic top level.

In Figure 3, the control areas, represented by the different ICT policies, are currently listed as identified by the Auditor General. More policies would definitely be added later on, this is represented by the question mark in one of the policy blocks.

In order to conform to the requirements of the corporate governance of ICT, the next step should be Monitor, also known as Control. According to the ISO/IEC 38500, Monitor can be described as monitoring conformance to policies, and performance against plans [10]. In this step, it is important to monitor the local government to check adherence to everything that is being directed. Without this monitoring function, it would not be possible to determine if an individual local government is conforming to everything that was evaluated in the first step. In order to effectively execute this step of Monitor, Roles and Responsibilities also need to be defined. This in turn will support an effective reporting structure which conforms to the principle of sound corporate governance of ICT.

After this last step of Monitor, the Charter document will consist of what the local government evaluated, what direction is given in order to conform to the Mission Statement, and lastly how the necessary reporting structure should look in order to monitor for conformance.

By following the holistic approach of the proposed architecture, local government should be able to conform to the Evaluate, Direct and Monitor approach as dictated in the ISO/IEC 38500 standard. Accordingly, it is important to introduce a possible structure of such a Charter.

4.3 Possible Structure of Charter

As mentioned previously, Part Two of Figure 3 represents the output of a physical Charter document. This Charter document will be drafted from inputs received from Part One. The focus will now move towards a possible structure of the Charter in combination with high level statements the Charter will contain.

The high level statements are derived from two different sources, namely: literature and the MCGICTP. Both these sources describe what a Charter is, and what it should contain. According to the first source, the IT Governance Network, a Charter is defined as: "*The*

outline of the decision-making rights and accountability for IT governance that will enable the desirable culture in the use of IT within the company by requiring IT management to provide timely information, to comply with direction and to conform to the principles of good governance" [16]. From the definition above, it is clear that there must be a statement regarding the desirable culture, which is linked with a mission statement. Secondly, roles and responsibilities must be clearly defined in order to address the decision-making rights and accountability. Lastly, there must be a definite statement regarding the monitoring structure in order to monitor for conformance to what is being directed.

According to the second source, the MCGICTP, a Charter should guide the creation and maintenance of effective enabling governance structures, processes and practices. ICT should also clarify the governance of ICT-related roles and responsibilities towards achieving the local government's strategic goals [14]. It is clear that both these definitions of a Charter are very similar, however both must be used in order to draft a possible Charter structure. Figure 4 depicts the possible structure of such a Charter.

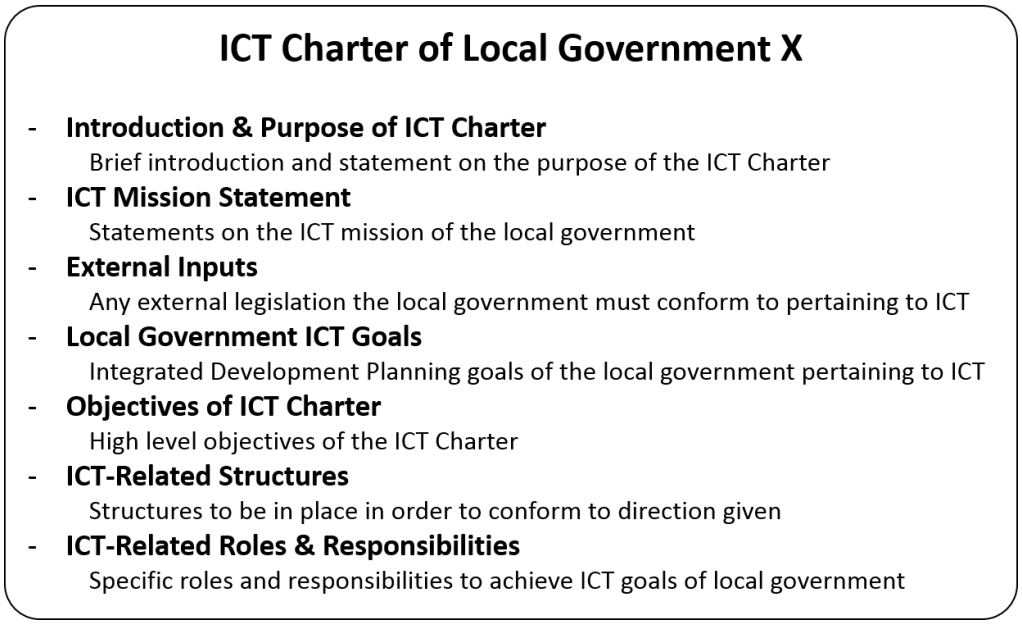

Figure 4: Possible Structure of the Charter

The name of the local government will be placed at the beginning of the Charter, followed by a brief introduction and purpose of the document. This statement will typically describe that the Charter represents the mandate of the local government, and is supported by the highest level of authority in the local government, typically the Municipal Council.

The next part of the Charter will be the local government mission statement. Typically, this statement describes what the local government's mission is in order to accomplish effective service delivery to the community. This statement can be generic to some extent, however may also contain individual requirements within the local government.

The next part will address the external inputs to the Charter. This is legislation and best practices and standards that play a major role regarding the achievement of local government strategic goals.

Following the inputs, are the individual IDP goals of the local government, which should be in a summarised format. It is important to list them in the Charter, as direction is given in order to achieve these goals. These goals are determined by each individual local government as dictated, in the South African context, by the Constitution.

The objective of the Charter should be stated next, as it highlights how it will address good governance principles pertaining to ICT, and any other important Charter objectives.

The second last statement is regarding the ICT-related structures that should exist within the local government. These structures typically contain the structures of the ICT Steering Committee, the Municipal Council, Municipal Manager, IT Department, Audit Committee and Risk Committee. There should also be mention of the members that form part of these structures. These structures should be in place in order to holistically address the corporate governance of ICT in local government.

The last statement is regarding the ICT-related roles and responsibilities that must clearly be defined within the Charter in order to ensure accountability and achievement of strategic goals. Within this statement, clear definition should be given to the reporting structure and how conformance is monitored with what is being directed.

Notwithstanding that the statements were listed individually, all these statements together support the mandate of the local government. This Charter provides the direction for the local government in order to achieve the set out strategic goals.

5. Conclusion

It is critical that ICT provide value to local government in order to meet their objectives. In order for ICT to provide value to local government, sound corporate governance of ICT is imperative. This is also supported by various best practices and standards dictating that ICT must be governed at a strategic level, not only in organizations but also government entities.

According to the Auditor General, this is not being done. After the need for a government-wide Governance of ICT Framework was realised, the DPSA drafted and released the CGICTPF. This was deemed to be too complex to implement. In 2015, the Department of Co-operative Governance and Traditional Affairs communicated that the MCGICTP will be used to guide local government towards sound corporate governance of ICT. This statement is supported by the newest consolidated report from the Auditor General, adding that local government will be audited for conformance to the MCGICTP.

Although this new document addressed the complexity and scalability issue with implementing corporate governance in local government, the document also focussed on a ‘what’ must be done perspective. This raised the need for some assistance towards local government, in aiding them on the ‘how’ it must be done perspective.

This paper addressed the how perspective by proposing an architecture, including a possible structure of a Charter, that aims to assist local government towards sound corporate governance of ICT which is based on best practices and standards. By first providing a conceptual architecture, this paper was positioned, as seen in Figure 2. After positioning the focus of this paper, the governance side was addressed by discussing the proposed architecture, after which a possible structure of the Charter was discussed.

The main focus of the proposed architecture, is creating a local government Charter that reflects the possible structure as depicted in Figure 4. This Charter would dictate specific direction, together with a monitoring structure on how to check that the local government conforms to what was initially evaluated. By adopting this proposed architecture, local government in South Africa and possibly the rest of Africa, should be able to conform to the three main corporate governance of ICT tasks, namely: Evaluate, Direct and Monitor as dictated in the ISO/IEC 38500.

Further research is currently being done to provide municipalities with practical tools which aim to assist with the creation of the Charter and supporting documents. This practical tool is in the process of development and will be workshopped in the near future with various local government representatives. This practical tool is being developed by using the theoretical aspects in this paper and therefore not only applies to local government in South Africa, but also to the rest of Africa.

Acknowledgement

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A.3 Journal of Public Administration (Submitted)

The journal paper titled ***'A Framework towards the Corporate Governance of ICT in Local Government in South Africa'****, has been submitted to the South African Journal of Public Administration in 2016. This paper was written to showcase the complete study and is currently in the review process.*

A Framework towards the Corporate Governance of ICT in Local Government in South Africa

Abstract

ICT has become critical and pervasive in enterprises across all sectors. Due to this critical nature and the pervasiveness of ICT, local government should accept the responsibility for implementing sound corporate governance of ICT (CGICT). Without sound CGICT, ICT is unable to support local government in the achievement of their strategic goals. Further, without the achievement of strategic goals, local government would not be able to serve the interests of the community. It is therefore imperative for local government to adopt a CGICT framework, in order to properly govern ICT and support the needs of the community. Unfortunately, past attempts towards sound CGICT in local government in South Africa, have yielded little to no success. The aim of this paper is to report on research undertaken, in order to assist local government with a relevant, usable, scalable and simplistic framework for self-implementation of sound CGICT.

Introduction

ICT has long been a core element of the success of any organization (Von Solms & Von Solms, 2008). This has caused ICT to become pervasive, in the sense that ICT now is 'built' into the strategy of most organizations (King, 2009) (Van Grembergen & De Haes, 2009). ICT, being integrated into the strategy of organizations, demands that it should be properly governed. The Corporate Governance of ICT (CGICT) allows ICT to be of greater value in achieving these organizations' strategic goals (ISO & IEC, 2008).

The King III Report (2009), a leading best-practice document, provides principles which should be followed, in order to achieve sound CGICT. The King III Report not only applies to enterprises within the private sector, but also to those within the public sector, which includes all levels of government (King, 2009). This paper focuses on the local government level, which typically consists of three types of municipalities. These three

types are: metropolitan municipalities, district municipalities and local municipalities. There are definitive differences between these three types of municipalities pertaining to their financial and administrative capabilities. Section 152 (1) of the South African Constitution (1996) summarises the overarching objectives of local government. Table 1 clearly lists these objectives.

Table 1: Overarching Local Government Objectives

The objectives of local government are—
(a) To provide democratic and accountable government for local communities;
(b) To ensure the provision of services to communities in a sustainable manner;
(c) To promote social and economic development;
(d) To promote a safe and healthy environment; and
(e) To encourage the involvement of communities and community organizations in the matters of local government.

The objectives of local government are highly dependent on ICT for their success. This has been realised and communicated by the Department of Public Service and Administration (DPSA) (2012); and thus it also implies that The King III Report should undoubtedly be adhered to.

In 1998, the Presidential Review Commission (PRC) released a report on the state of governance in South Africa. The report pointed out that the state of governance is inadequate (South Africa. Office of the President, 1998); and this statement is supported by the annual Auditor-General's audit report on ICT controls (The Auditor-General of South Africa, 2009), amongst others. More or less ten years after the PRC report, in the 2008/2009 financial year audit report, the Auditor-General reported that little has changed regarding the state of CGICT controls in South Africa (The Auditor-General of South Africa, 2009).

In the 2009/2010 audit report, the Auditor-General stressed the need for a government-wide governance of ICT framework (The Auditor-General of South Africa, 2011). The Auditor-General also raised the need for roles and responsibilities to be clearly defined (The Auditor-General of South Africa, 2011). Shortly after this statement, the 2012/2013 audit report was released. In this report, the Auditor-General reported that only 3% of local government had implemented CGICT controls (The Auditor-General of South Africa, 2013).

This root cause, as identified by the Auditor-General, is that there exists a lack of internal expertise to appropriately design and implement CGICT controls, amongst others (The Auditor-General of South Africa, 2013). Without this expertise, CGICT in local government would surely remain unchanged. The 2013/2014 audit report indicates that only 1% of local government has implemented CGICT controls (The Auditor-General of South Africa, 2014).

Currently, local government is facing challenges regarding the design and implementation of CGICT. This is due not only to a lack of internal expertise, but also to the complexity of implementing sound CGICT. With the lack of expertise, there comes a lack of accountability. This is evident; since municipal councils are not taking the full accountability for CGICT (Delport, Von Solms, & Gerber, 2015).

The purpose of this paper is therefore, to aid local government with the implementation of CGICT, within their unique operating environment. A framework will be provided with a supporting toolset, which aims to address the issues of relevancy, usability, scalability and simplicity.

In order to address the above-mentioned issues, the rest of the paper will be structured as follows: Firstly, the research design is discussed, after CGICT has been defined in terms of best practices and standards. The paper will continue to highlight the situation of CGICT within local government in general. Lastly, the paper will discuss the envisaged framework and supporting toolset, after which the paper will be concluded.

The Research Design

Österle et al. (2010), clearly described that design-oriented IS research aims to develop and provide instructions for actions that are practically applicable. The contribution has to be practically applicable; as the identified problem situation is situated within a practical environment of local government. In order to develop a practically applicable contribution, in the form of a framework, design-oriented IS, research uses cycles in which the envisaged framework is refined until acceptable, whilst working in collaboration with the key role-players in local government. Through the use of this research approach, four cycles were used to refine the envisaged framework. The first cycle included a literature study, in order to draft the envisaged framework. The framework was refined throughout cycles 2, 3 and 4, while collaborating with ICT managers from a district municipality, until an acceptable framework had been presented. The envisaged framework was validated over a two-day workshop in which 24 attendees participated.

In order to understand the contribution, a clear understanding is needed regarding a framework. According to Tomhave (2005), a framework is defined as: "*a fundamental construct that defines assumptions, concepts, values, and practices, and that includes guidance for implementing itself*". With this definition in mind, it can be added that the framework in this paper, refers to a high-level graphical representation of elements and relationships. The operational and/or detailed functioning of the elements enhances the static nature of the graphical representation into a dynamic framework. The dynamic nature of the framework, which is supported by a toolset, would allow local government to implement CGICT in practice.

With this in mind, the concept of CGICT must be understood fully. The following section will discuss this concept, which forms the basis of the envisaged framework.

Corporate Governance of ICT: A 'What' Perspective

CGICT has long been essential – not only in the private sector – but also in local government, as pointed out by the Auditor-General (2014). It is therefore essential that a formal definition be provided, in order to shape one's thoughts on the envisaged framework.

Corporate Governance of ICT

Although various definitions exist for the CGICT, the ISO/IEC 38500 (2008) clearly defines CGICT as: "*the system by which the current and future use of I[C]T is directed and controlled.*" It continues to add that CGICT involves not only evaluating the ICT needs, but also directing the use of ICT, in order to support the organization, which in this case is local government. After direction has been provided, the use of ICT must then be monitored, which facilitates the achievement of objectives. CGICT should also include the strategy and policies for using ICT within an organization (ISO & IEC, 2008). It is clear from the definition that CGICT has three definite tasks, on which it should focus.

Firstly, the task of 'evaluating' should be conducted by the governing body, in this case the municipal council, where the current and future use of ICT in local government is evaluated by taking into consideration any internal or external pressures that might influence local government (ISO & IEC, 2008).

Secondly, the task of 'direction' enables the municipal council to provide strategic direction in the use of ICT within local government. The task of direction also requires the municipal council to: "*assign responsibility for, and direct preparation and implementation*

of plans and policies" (ISO & IEC, 2008). The plans will give direction for any investment in ICT projects; while the policies will dictate acceptable ICT-related behaviour within local government.

Lastly, the task of 'monitoring' would enable the municipal council to follow up on what was initially directed, in other words the performance in the context of the ICT plans (ISO & IEC, 2008). For instance, the follow up on the progress of any ICT projects, as well

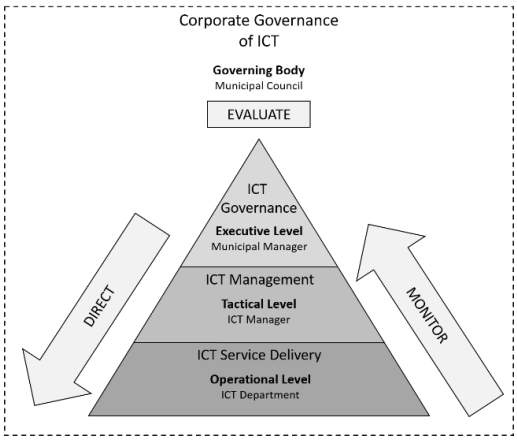

Figure 1: Corporate Governance of ICT Tasks

as how the ICT-related behaviour correlates to the established policies.

These three tasks collectively provide the foundation of CGICT; and they are graphically represented in Figure 1, which is adapted from Coertze and Von Solms (2014).

Notwithstanding the above, there is another term to consider, namely ICT governance.

ICT Governance

ICT governance is sometimes misunderstood; however, it forms an essential part of CGICT. There exist many definitions regarding ICT governance; however, the following definition represents the view of this paper: "*ICT Governance is the set of responsibilities and practices exercised by the board and executive management – with the goal of providing strategic direction, and ensuring that the objectives are achieved*" (ITGI, 2003). ICT governance is very similar to CGICT; however, it remains a subset of CGICT; and it might in some cases, overlap with CGICT (Van Grembergen & De Haes, 2009) (Coertze & Von Solms, 2014). The difference exists in that CGICT refers to governance-related tasks in a collective view (Coertze & Von Solms, 2014), spanning across the whole of the organization (enterprise), which stemmed from the organization's objectives; whereas ICT

governance enables the execution of the strategic direction that flows from CGICT, including the individual responsibilities.

As shown in Figure 1, three main responsibility levels exist, namely: The Executive level; the Tactical level; and the Operational Level. Within each level, a unique role-player should take ownership of that specific level. For example, on the Executive level, the municipal manager typically takes ownership for ICT governance. On the Tactical level, the ICT manager will typically take responsibility for ICT management. Lastly, on the Operational level, the ICT department takes ownership for ICT service delivery. All these levels are encompassed by the CGICT, and should be performed by the governing body, represented by the municipal council. More details regarding each level will be given at a later stage.

Considering the different levels and encompassing CGICT, best practices and standards collectively address these elements by providing important principles for sound CGICT.

Recognized Best Practices and Standards

One of the very first documents to consider, being a best practice, is the previously mentioned King III Report. The King III Report (2009) provides various principles that dictate behaviour towards CGICT. In the local government context, the principles dictate the responsibility of the municipal council. It is important that the municipal council consider the King III principles; as the essence of the principles states that the municipal council remains ultimately accountable for the CGICT (King, 2009).

Also, the ISO/IEC 38500 (2008), which is a high-level standard that provides "*guiding principles for directors of organizations on the effective, efficient, and acceptable use of Information Technology (IT) within their organizations.*" This standard is a very high-level document, providing only guiding principles and practices of what should be done, in order to achieve sound CGICT. This raises the issue of usability, where the municipal council would not be able to implement CGICT by simply following this standard; as it lacks detailed implementation steps. It is also important to note that, similar to The King III Report, this standard addresses not only the CGICT; but it also overlap onto the Executive level of ICT governance, as is shown in Figure 1.

In combination with the first two documents, COBIT 5 tries to enable ICT to be governed and managed in a holistic manner for the entire enterprise, in this case local government (ISACA, 2012). COBIT 5 is a very detailed document providing municipal councils with ample information and processes regarding not only CGICT and ICT

governance, but also ICT management. Thus, many standards, best practices and guidelines exist to assist and guide enterprises when introducing sound CGICT. These documents differ in their complexity and the levels of detail. For example, the King III Report and ISO/IEC 38500 primarily state the principles of CGICT; whereas COBIT 5 provides a lot of detail.

Within the local government environment, these standards and best-practice documents raise further issues. As mentioned earlier, various sized municipalities exist within local government. Each of these municipalities varies in its financial and administrative capabilities. This results in the notion that, what is attainable for one municipality might not necessarily be attainable for the next. Due to the amount of detail that COBIT 5 provides, the level of complexity might surpass the financial and administrative capability of the various municipalities, or local government in general. This creates an issue of not only scalability, but also simplicity.

COBIT 5 in itself is not easily scalable to cater for the unique operating environment of local government; neither is it simplistic enough for local government, in general, to implement with their own resources. This statement is supported by the Local Government Circular: C5 of 2015, which stated that previously developed frameworks for CGICT were too complex, and were not scalable; because the frameworks tried to implement the complete COBIT 5 framework (Parker, 2015). The multiple identified issues consequently, produced a difficult obstacle for local government to overcome, while trying to achieve sound CGICT.

From the above, it is clear that, even with the guidance of best practices and standards, local government is still challenged with attaining sound CGICT. These challenges are due to a ‘gap’, originating from the multiple identified issues of relevancy, usability, scalability and simplicity, which exist between best practices and standards, and fully implemented CGICT. The existence of the gap, as illustrated in Figure 2, is primarily due to best practices and standards mainly addressing ‘what’ must be done, in order to achieve CGICT. There is a definite need for ‘how’ local government can achieve or implement CGICT.

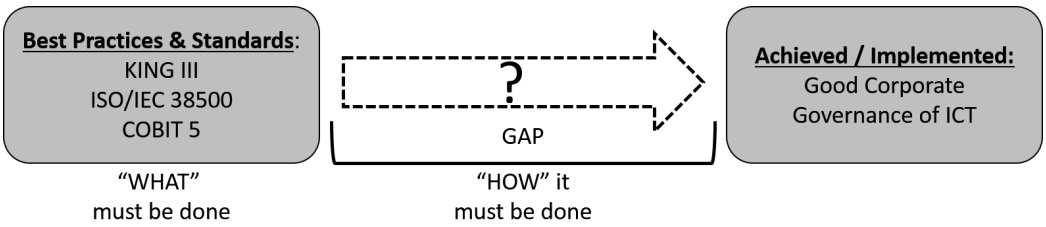

Figure 2: Addressing the Gap

In order to address the identified gap, a number of frameworks and policies were developed by the DPSA, amongst others; but these also lacked in addressing the above-mentioned issues.

Corporate Governance of ICT in Local Government

It is clear that CGICT is deemed very important, by not only best practices and standards, but by the DPSA itself. In chapter 6 of the PRC's report (1998) on the state of governance in South Africa, the DPSA's vision was stated as: *"I[C]T will be aligned with Government Business Goals; and [it] will be a change agent to create a responsive, result-oriented, value-added Public Service."* In order to achieve this vision, the DPSA suggested the Corporate Governance of ICT Policy Framework (CGICTPF) in 2012.

Corporate Governance of ICT Policy Framework

As mentioned previously, in the 2009/2010 audit report, the Auditor-General stressed the need for a government-wide governance of ICT framework (The Auditor-General of South Africa, 2011). This led to the development of the CGICTPF, which was drafted in December 2012. The purpose of the CGICTPF was to institutionalise CGICT as an important part of corporate governance in government departments (Department: Public Service and Administration, 2012). It also provides the political and executive leadership with principles and practices with which they should comply.

The CGICTPF (2012) used a three-phased approach, in which all the departments of government should implement CGICT, as shown in the following statement in the CGICTPF: *"This CGICTPF is applicable to all spheres of government, organs of State and public enterprises"*. This, however, created a challenge for local government; since the smaller district and local municipalities do not have the appropriate financial and administrative capability for the successful implement of the CGICTPF. This is supported by the Local Government Circular: C5 of 2015, which stated that the CGICTPF is deemed too complex; since it does not take into account the unique operating environment of local

government, particularly district and local municipalities (Parker, 2015). In addition, the CGICTPF is too complex; because it focuses on all the spheres of government, in a general sense, and not specifically on local government. In combination with the complexity of CGICTPF, it only provides spheres of government with information and guidance on 'what' must be done, in order to implement CGICT, thereby leaving out guidance on 'how' to implement CGICT.

In alignment with the CGICTPF, the South African Local Government Association (SALGA) used the same principles as the CGICTPF in developing a more detailed document, focusing only on local government. This document is called: "*A Municipal Guide / Roadmap to Successful ICT Governance*" (Salga, 2012), hereafter referred to as the SALGA document.

A Municipal Guide / Roadmap to Successful ICT Governance: SALGA

The first draft of the SALGA document was developed in March 2012, after which adaptations were made, ensuring the alignment with the CGICTPF. The final version was released in June 2012 (Salga, 2012). In this final version, clear differentiation is made between the different municipalities' financial capacities; however, the document does not give directions on how the different municipalities should implement CGICT. Similar, to the CGICTPF, the SALGA document provides the principles and practices pertaining to local government as a whole. This, however, creates a problem regarding scalability, as 30% of local municipalities fall into the "*Poor resources and low-capacity*" category (Salga, 2012).

This means that these local municipalities have very limited financial resources as well as limited skills for the implementation of CGICT, or in this case, the SALGA document. It is due to this limited capacity, that local government, specifically district and local municipalities require a more scalable approach, which could guide them in implementing CGICT.

In terms of a metropolitan municipality in general, the SALGA document is more implementable because of its higher financial resources and capacity. However, in the case of district and local government, the SALGA document, as with the CGICTPF, is deemed too complex; as it does not cater for the unique operating environment. The SALGA document, similar to the CGICTPF, does not provide local government with any guidance on 'how' to implement CGICT.

After realising that the CGICTPF, as well as the SALGA document, was too complex, the Western Cape Department of Local Government led in the development of a new policy, focusing on municipalities and their unique operating environment. This new policy is called the Municipal Corporate Governance of ICT Policy (MCGICTP).

Municipal Corporate Governance of ICT Policy

The newly developed MCGICTP was drafted in January 2015 with the assistance of the DPSA and SALGA, amongst others (Department: Western Cape Local Government, 2015). After the release of the MCGICTP, the Auditor-General communicated in the 2013/2014 audit report that the MCGICTP would be implemented from the 2015/2016 financial year, over the next five years (The Auditor-General of South Africa, 2014). This is further supported by the Local Government Circular: C5 of 2015, adding that the MCGICTP is following the process of being adopted as a national standard (Parker, 2015).

The question at this stage is, however: How does the MCGICTP compare with the previously mentioned CGICTPF? In terms of a high-level comparison, one can easily argue that these two documents are remarkably alike. In terms of the approach to CGICT, the MCGICTP also makes use of the same three-phased implementation approach, as does the CGICTPF (Department: Western Cape Local Government, 2015). The same objectives, in each phase, are being addressed in the MCGICTP as with the CGICTPF.

To a large extent, one can argue that the CGICTPF has been taken and modified to fit within the local government environment. Consequently, it can be argued that the same issues will arise with the implementation of the MCGICTP, as they did with the CGICTPF.

With this in mind, the issue of scalability is not being addressed satisfactorily. Also, the provision of any guidance on ‘how’ to implement CGICT, is still lacking.

The CGICTPF and the SALGA Document and the MCGICTP

From Figure 2, all three documents discussed above (CGICTPF, SALGA, MCGICTP) were attempts at addressing the gap on how to implement and achieve good CGICT. However, it can be argued that these documents were providing guidance, similar to best practices and standards, on ‘what’ must be done, in order to achieve good CGICT. The difference between the best practices and standards and these three mentioned documents is in the focus that has shifted from an enterprise environment over to a governmental or municipal environment, by providing guidance on what must be done in a local government context.

Consequently, it has the effect of still not fully addressing the gap in Figure 2, as presented in Figure 3.

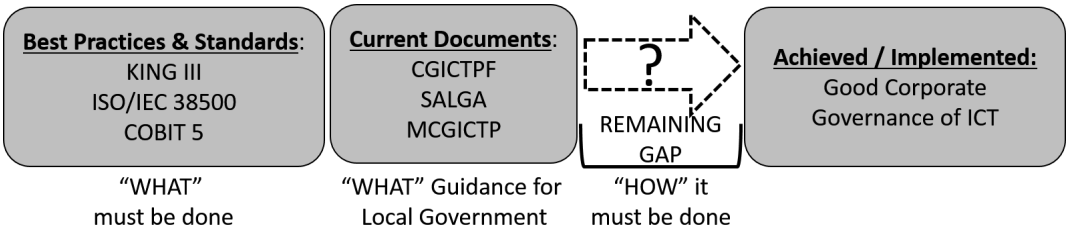

Figure 3: Addressing the Remaining Gap

Therefore, it may be concluded that the CGICT has been well defined, and that the government has made certain efforts to formalize CGICT. However, due to resource restrictions, CGICT up to now has not been successfully implemented, as reported by the Auditor-General (2014). It is clear that there still exists a gap, which must be addressed appropriately, in order to achieve good CGICT in municipalities. It is, therefore, essential that more power be placed in local government's hands – not only to address the remaining gap – but also enabling them to help themselves and not be solely dependent on third parties.

The rest of this paper will, therefore, focus on using both best practices and standards, as well as the three mentioned documents to formulate a toolset, which will aid local government with the implementation of CGICT. Consequently, the remaining gap of 'how' CGICT should be implemented is addressed in a structured manner.

Corporate Governance of ICT: A 'How' Perspective

When talking about CGICT, it can be argued that local government has a fair understanding of 'what' must be done, in order to achieve good CGICT. As mentioned earlier, the Auditor-General (2014) advised local government to implement the MCGICTP. The problem, however, is, that local government is facing challenges, stemming from the issues of relevancy, usability, scalability and simplicity, when it comes to 'how' they should implement the MCGICTP. It is therefore essential that there is clarity on how local government should implement various elements of the MCGICTP; thus, the focus of this paper is to assist local government on how to implement sound CGICT.

In order to address implementation from a how perspective, this research made use of the four cycles mentioned earlier in the research design.

In the first cycle, it was necessary to conduct an extensive literature survey, in order to draft an initial conceptual architecture. The conceptual architecture was then refined

through various cycles until it was considered acceptable by the various role players in local government. The conceptual architecture will provide the overview of the 'how' perspective.

Conceptual Architecture

Various literary sources provide criteria regarding an effective CGICT framework. The first criterion, which is stated by COBIT 5, is a differentiation between the two different activities, namely: Governance and Management (ISACA, 2012). This is supported by Tricker's (1994) viewpoint on governance activities and a management triangle. Figure 1, largely, represents this view. In order to understand the two different activities, one has to consider the three well-known management levels, which comprise the second criterion.

Von Solms and Von Solms (2006) point out that the three well-known management levels are a core principle to the direct-control cycle, which is the basis of this conceptual architecture. These three management levels are: The Strategic; the Tactical; and the Operational. Typically, the Strategic level, or in this case the Executive level, will perform the various related Governance activities, as described by COBIT 5 and Tricker. Therefore, the change-over from Governance to Management occurs with the start of the Tactical level, which typically performs the Management activities (Coertze & Von Solms, 2014).

A third criterion is contained in the ISO/IEC 38500 (2008) standard, stating that CGICT includes the two main tasks of directing and monitoring, as pointed out earlier. This is supported by the King III Report (2009), indicating that CGICT includes the aspect of directing and controlling, or monitoring in this case, of the organization. Both ISO/IEC 38500 and the King III Report are represented by Von Solms and Von Solms (2006), in a comprehensive model, called the direct-control cycle.

The fourth and final criterion represents the five focus areas, which form the basis of any approach to addressing ICT governance effectively. Posthumus, Von Solms and King (2010) have provided an overview of the five focus areas, called the Penta Bottom Line, which was extracted from various sources, namely: COBIT 4.1 (IT Governance Institute, 2007), the King III Report (2009) and Nolan & McFarlan (2005). The Penta Bottom Line describes that one has to consider strategic alignment, value delivery, risk management, resource management, and lastly performance measurement, when trying to achieve good CGICT, as this is the basic outcomes, which CGICT tries to address.

By taking into account the four main criteria, the following conceptual architecture was created. This conceptual architecture, however, is a general representation of the mentioned criteria. Figure 4 represents the general conceptual architecture for CGICT.

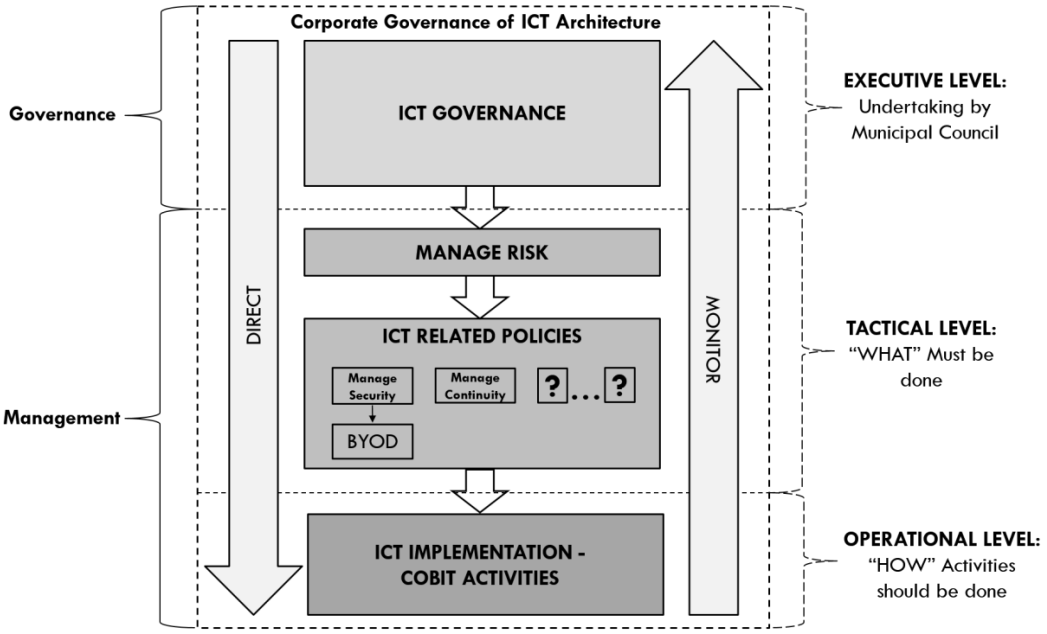

Figure 4: Conceptual Architecture

The first criterion is clear from Figure 4, Governance on top, followed by Management. Regarding the second criterion, the three well-known management levels are also taken into consideration. The direct and monitor steps were incorporated into the conceptual architecture, as identified by the third criterion. Lastly, the conceptual architecture takes into consideration the fourth criterion; it addresses the Penta Bottom Line.

Combining the four mentioned criteria, the conceptual architecture represents the general tasks of CGICT. The dashed line on the outside border of the conceptual architecture represents the encompassing CGICT's definition. The first block represents normal ICT Governance activities, including the strategic alignment, which is fulfilled by the executive level of management. Accordingly, a proper risk-management approach should be followed, in order to address good CGICT (King, 2009).

After the risk management, specific ICT-related policies should follow, dictating behaviour regarding typical topics, such as ICT security, ICT continuity, Bring Your Own Device (BYOD) and other ICT-related policies, which are represented by the question marks. Both the risk management and the ICT-related policies typically fall under the tactical level of management.

From the mentioned policies, it is important to 'flow' into an ICT implementation level. This is typically at the operational level, where the implementation takes place of whatever was directed by the executive management (Coertze & Von Solms, 2014). After the implementation has been done, it is important to monitor and report back to executive management.

Largely, this conceptual architecture represents the working of CGICT; however, it is necessary to place the conceptual framework in context with local government and the MCGICTP.

Conceptual Architecture – Local Government Context

The MCGICTP clearly states that various elements need to be implemented, in order to achieve CGICT. This paper, however, will focus on only three main elements, which will be discussed in detail. The three elements are, namely: the *Corporate Governance of ICT Charter*; the *ICT Plan;* and the *ICT Implementation Plan*. Figure 5 represents the conceptual architecture, which is combined with the three main elements, in order to position CGICT within the local government context.

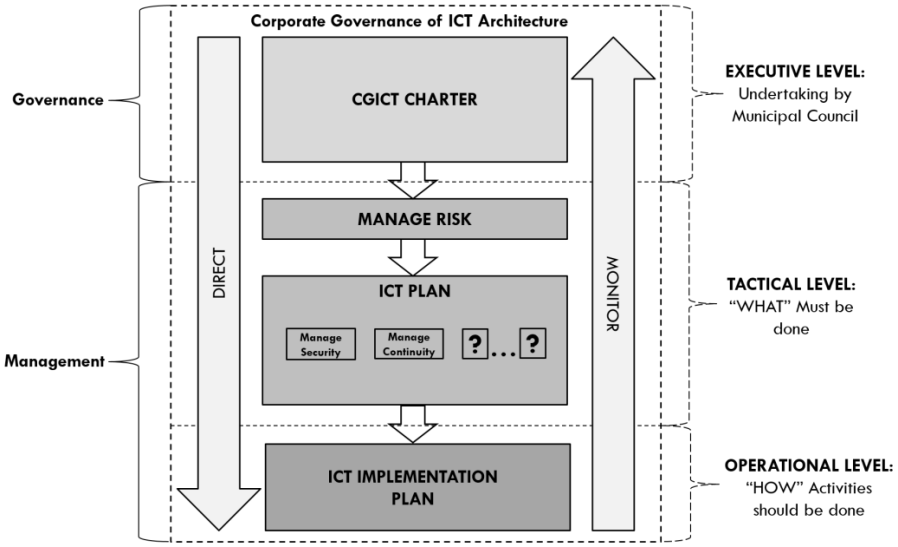

Figure 5: Conceptual Architecture – Local Government Context

As seen in Figure 5, ICT Governance is replaced with a *Corporate Governance of ICT Charter*, hereafter referred to as the *Charter*. On this level, the *Charter* will address the ICT Governance activities. On the tactical level, however, ICT-Related Policies are replaced by an *ICT Plan*. This *ICT Plan* will contain the various ICT-related policies. On the

operational level, however, an *ICT Implementation Plan* is introduced, which contains the various COBIT 5 activities, in order to achieve CGICT.

In order to fully address the 'how' perspective, it is necessary to discuss the three main elements individually.

Element One: The Corporate Governance of ICT Charter

According to the MCGICTP (2015), each local government is individually responsible to create and accept a Charter. Therefore, this first element addresses the creation of a Charter.

A Charter can be defined as: *"The outline of the decision-making rights and accountability for IT governance that would enable the desirable culture in the use of IT within the company, by requiring IT management to provide timely information, to comply with direction and to conform to the principles of good governance"* (IT Governance Network, 2009). Accordingly, the MCGICTP (2015) provides direction on what the Charter must address. It states that the Charter should guide the creation and maintenance of effective enabling governance structures, processes and practices.

ICT should also clarify the governance of ICT-related roles and responsibilities in achieving the local government's strategic goals. Essentially, the Charter provides a local government with a mandate.

By combining the definition and the direction from the MCGICTP, Figure 6 provides a graphical representation of the proposed Charter.

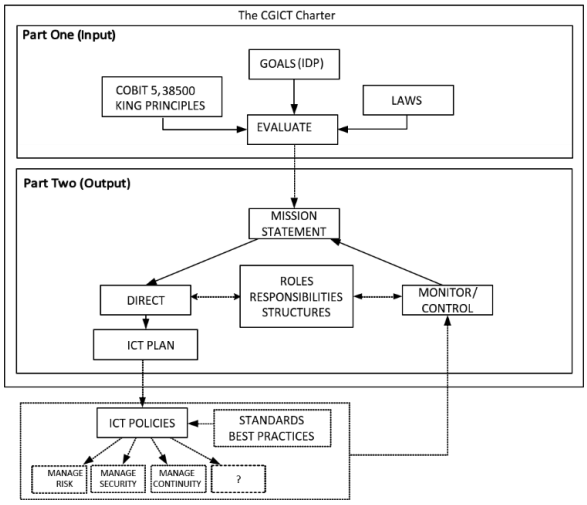

Figure 6: The Corporate Governance of ICT Charter

The Charter contains two main parts. *Part One* forms the input, and *Part Two* the output, the output being the physical document. Considering these two parts, *Part One* will

start with evaluating the current and future needs of ICT, which is the starting step of CGICT. In order to evaluate, various aspects must be considered.

Firstly, it is important to consider the best practices and standards, as discussed earlier. It is important that the Charter should use the principles of these best practices and standards.

Secondly, it is important to take into consideration the unique goals of the local government. These goals are contained within the Integrated Development Planning (IDP) of local government. The IDP can be described as the principal strategic planning instrument, which guides and informs all planning and development, and all decisions with regard to the planning, management and development in local government (Local Government, 2000). The IDP can be seen as the strategic goals of local government; and it should include the contribution of ICT, in order to achieve these goals.

Lastly, the relevant legislation, pertaining to local government needs to be evaluated and taken into consideration. These three aspects together comprise the evaluation process, which is part of CGICT and essential to *Part Two*, the Charter document.

The input from the evaluation in *Part One* is extracted to formulate a *Mission Statement*. From this mission statement, it is crucial that the executive management level provide direction of what needs to be done, thereby forming the *Direct* step of CGICT. In order to direct, one has to consider the related roles and responsibilities of the related parties. A Typical RACI (Responsible, Accountable, Consult, Inform) chart is used to provide the details concerning the roles and responsibilities.

The following step is to implement the direction that is given from the top, and to provide a plan on how to achieve what was initially directed. This plan is called the *ICT Plan;* and it typically functions on the tactical management level, which will be discussed later.

After the ICT Plan has been established, various ICT policies would be created at the tactical management level. From Figure 6, it is clear that these policies do not form part of the Charter block. This is due to these policies exiting the Governance section and forming part of the Management section. It is important to note that the various ICT policies should carry the full support of the executive management level (Delport, von Solms, & Gerber, 2016).

The final part of the Charter, *Monitor or Control*, is important; and it forms the basis of CGICT. Once direction is given, it is of absolute importance to monitor for conformity to the direction given; since it is difficult to manage what one cannot monitor (Von Solms &

Von Solms, 2008). Supporting the step of monitoring, there are the roles and responsibilities, which need to be in place. Consequently, an effective reporting structure is created, which is critical to good CGICT.

After the *Monitor* step, the Charter document will consist of the local government's evaluation of the situation, the direction given, in order to conform to the Mission Statement; and lastly how the necessary reporting structure should look, in order to monitor for conformity. The Charter forms part of the executive management level, and will provide the input into the next level, which is the tactical management level containing the ICT Plan.

Element Two: The ICT Plan

The second element from the MCGICTP is called the ICT Plan. As dictated by the MCGICTP, phase one of the implementation requires local government to create an ICT Management Framework. It is argued that the term 'ICT Management Framework' is inappropriate at this level; and therefore the term 'ICT Plan' will be used in this context.

The ICT Plan can be defined as providing guidance on what must be done for the creation and maintenance of effective enabling governance structures, processes and practices, as dictated by the Corporate Governance of ICT Charter. The ICT Plan will also clarify the governance of ICT-related roles and responsibilities in achieving the municipality's strategic goals, as dictated by the Corporate Governance of ICT Charter (Department: Western Cape Local Government, 2015).

Although very similar to the definition of the Charter, the ICT Plan will essentially support the Charter, by providing more detail on certain areas. Figure 7 clearly shows the structure of the ICT Plan.

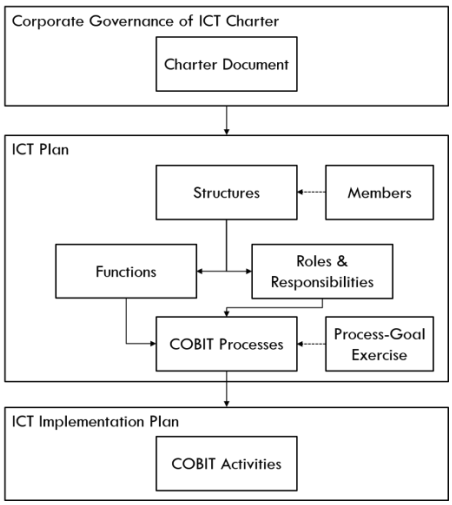

Figure 7: ICT Plan

The main input into the ICT Plan, stems from the Charter. The ICT Plan in itself is also a physical document, which contains various elements. Firstly, as seen from the definition, the ICT Plan should mention various *Structures* that should be in place, regarding ICT. Forming part of these structures, there are various *Members*. To give an example, if an Audit Committee exists in local government, it needs to be clarified who is part of the Audit Committee.

Secondly, flowing from the structures, it is essential to state what the various *Functions* are of each structure. Accordingly, the functions should be supported by the *Roles & Responsibilities* of each function. It would, for instance, state what the functions are regarding the Audit Committee, as well as who is responsible for what.

Lastly, it is important to state what *COBIT 5 Processes* should be completed, together with who is responsible for them, in order to achieve sound CGICT. In order to determine what *COBIT 5 Processes* are applicable, local government would have to complete a *Process-Goal Exercise*, which is part of the developed toolset. This will be discussed later.

After identifying all the related COBIT 5 Processes, it is important make use of the various activities within COBIT 5, in order to implement the processes on the operational management level, which is the third and final element of the MCGICTP.

Element Three: The ICT Implementation Plan

The third element, which needs to be addressed, is called the ICT Implementation Plan. This element functions on the operational management level, and contrary to the first two elements, is not an actual document. The ICT Implementation Plan, however, provides the

basis on which the actual implementation of various COBIT 5 activities takes place. Together with the implementation, it also forms the link with monitoring for conformity.

The ICT Plan should enable a reporting structure, in which executive management, the municipal council in this case, can monitor the progress of CGICT-related activities. With this in mind, the MCGICTP (2015) clearly states, that the Governance of ICT within a municipality should be implemented, based on an approved implementation plan. Local government should, therefore, have an ICT Implementation Plan.

An ICT Implementation Plan can be defined as a list of processes, which have to be implemented, on an operational level, in a timely fashion, in order to achieve sound CGICT in local government. Based on this definition, Figure 8 provides a graphical representation of the ICT Implementation Plan.

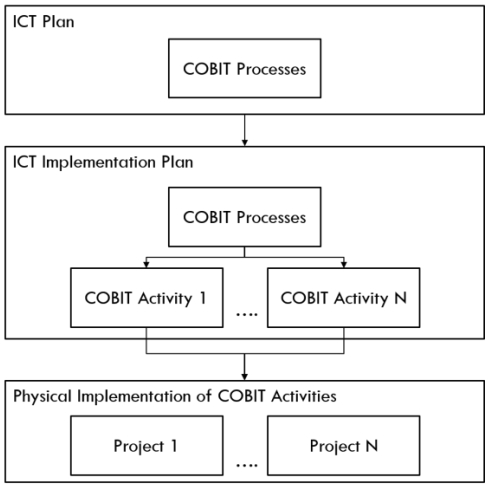

Figure 8: ICT Implementation Plan

After identifying the main COBIT 5 Processes in the ICT Plan, the list of COBIT 5 Processes will be used as an input into the ICT Implementation Plan. Each COBIT 5 process contains one or more COBIT 5 activities. Each COBIT 5 activity will translate into a project, which should physically be implemented.

In order to assist with the implementation of these projects, one can make use of a project planner. This would allow an effective reporting mechanism, from which a report could be queried, allowing one to measure and monitor the progress. By using this type of reporting mechanism, the municipal council would be able to monitor the implementation of the ICT Plan.

In order to assist a municipality in initiating and implementing the Charter, the ICT Plan and the ICT Implementation Plan, a supporting toolset has been developed and validated to assist in this regard. This toolset thus aims to assist with the ‘how’ aspect.

Supporting Toolset

As mentioned earlier, local government will make use of a Process-Goal Exercise, as depicted in Figure 7, in order to identify the relevant COBIT 5 Processes. This Process-Goal Exercise was developed, in order to produce a practical toolset, which aims to aid local government with the implementation of CGICT. After refinement, through various cycles involving a municipality, the final toolset was developed by taking into consideration the issues of relevancy, usability, scalability and simplicity. This toolset allows local government to choose various COBIT 5 Processes, which support their unique operating environment. Figure 9 represents the working of the Process-Goal Exercise.

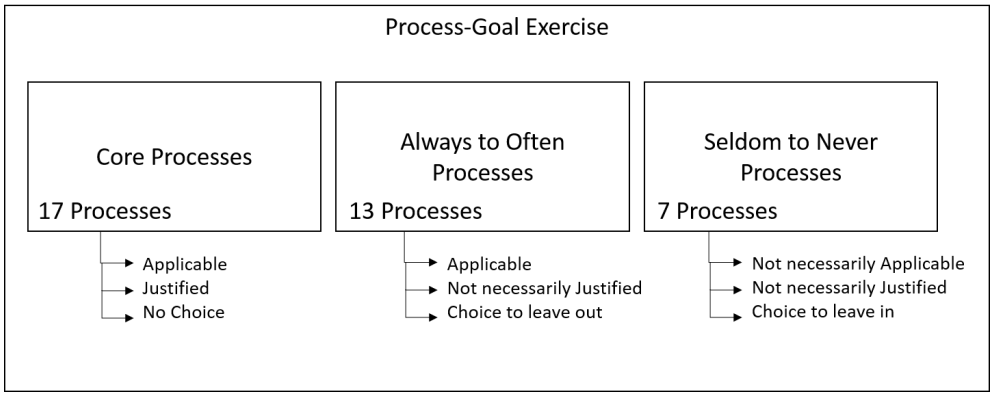

Figure 9: Toolset Categories

COBIT 5 has a total of 37 main processes. In order to determine which processes are applicable to a particular local government, the 37 processes were divided into three main categories. As seen in Figure 9, the three categories are as follows: *Core Processes*, *Always-to-Often Processes* and *Seldom-to-Never Processes*. The reason behind the 17 processes in the *Core Processes* category is substantiated from the literature, best practices and standards, as well as the legislation. Consequently, it is not only applicable to local government, but also justified. Local government has no choice but to accept these 17 principles as a bare minimum.

Regarding the 13 *Always-to-Often Processes* category, all processes are applicable from a best practice and standards perspective; however, if there is any reason why local government would not be able to achieve this, then they have to provide a reason for why it should be omitted. One such reason might be that the local government has a limited financial and administrative capability; and therefore it is best left out.

The last category contains 7 *Seldom-to-Never Processes*. These processes are not necessarily applicable nor justifiable; and therefore, they can be left out by default. If a

local government chooses to accept and implement one of these processes, they would have to provide a justification for this action.

By using this method, local government can select processes to implement what are relevant to them, usable in their environment, scalable, as well as simplistic enough to implement. In order to make use of the toolset, the following process model should be followed.

Process Model

In order to make use of the toolset, one has to follow the process model, as shown in Figure 10.

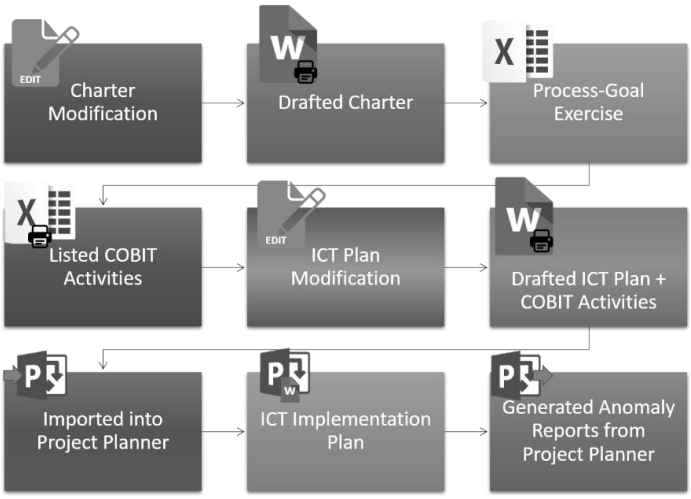

Figure 10: Process Model for Implementation of Framework

A Charter, with generic content, has been developed, according to Figure 6 (Delport et al., 2016). Local government will be presented with this generic Charter, which they would be able to modify, according to their unique environment. After modification, the local government would be in possession of a draft Charter, which can be printed.

The next step is to complete the Process-Goal Exercise, in order to determine which COBIT 5 Processes are applicable to their environment. After the exercise has been completed, they should have a list of applicable COBIT 5 Processes that are specific to their unique environment.

The next step is to use a generic ICT Plan, similar to the modification of the generic Charter, and to modify it, according to their unique needs. After modification, the local government would then once again be presented with a drafted ICT Plan combined with the applicable COBIT 5 Processes and activities.

It is important to note at this stage that a project-planner software, e.g. Microsoft Project, should be used as the basis of the next step, which is the ICT Implementation Plan. All the COBIT 5 activities should be imported into the project planner software, in order to create various individual, but related projects.

After all projects have been created, the particular local government would then be able to generate anomaly reports. These anomaly reports provide executive management with the ability to measure progress and to check conformity to that which was initially directed.

By following this process model, local government would be able to implement this framework for CGICT in a simplistic and scalable manner.

The above-mentioned toolset and process model were used, and validated, according to the previously identified issues of relevancy, usability, scalability and simplicity. The validation was done in a practical workshop with 24 representatives of local government.

Validation

In order to validate the framework, a practical workshop was held over two days. A total of 24 representatives from various local governments were present. The workshop ran over a period of two days, which consisted of a theoretical background presentation, after which a practical hands-on exercise was done. The 24 representatives were given a generic Charter, and a generic ICT Plan, as well as the Process-Goal Exercise, in which they had to work through the process model, in order to validate the framework.

After the practical hands-on session, a survey in the form of a questionnaire was conducted amongst the 24 attendees. The questionnaire tested the framework's ability to address the previously identified issues of relevancy, usability, scalability and simplicity. In order to test these issues, statements were made, in which the respondents had to indicate whether they 'strongly disagree', 'disagree', 'agree' or 'strongly agree' with the statement.

At the end of the questionnaire, open-ended questions were asked, in order to see whether there was anything lacking from the toolset, anything which could be improved; and lastly, if there was anything which stood out. The following were the results of the questionnaire.

Results of the Questionnaire

Regarding the issues of relevancy, usability and scalability, all 24 respondents agreed, the majority strongly agreed, that the framework addresses these issues. Regarding the issue of

simplicity, however, 18 of the 24 respondents agreed that the framework addresses this issue. The other 6 respondents disagreed.

From the open-ended questions, it was found that some of the respondents said it was difficult to say whether it was simplistic; since they would have to implement it to be convinced. In addition, the majority of the open-ended questions provided positive feedback; since the framework considers the full scope of CGICT; and that it would definitely help local government with achieving sound CGICT. It must be noted that some of the attendees stemmed from municipal functions, like finance, internal auditing, etc. and were consequently not too familiar with the ICT function.

The overall feedback received from the 24 respondents was very positive in nature; and it, therefore, complemented the framework proposed in this paper.

Conclusion

ICT is critical for local government to provide sustainable services to the community. It is therefore of absolute importance that sound corporate governance of ICT is implemented, in order to provide value to local government in achieving their goals. This is also supported by best practices and standards, dictating that ICT has to be governed at an executive level, which is – in any case – applicable to all government entities.

In the consolidated reports of the Auditor-General, however, it is reported that this is not being done. After the need for a government-wide governance of ICT framework was realised, the DPSA developed and accepted the CGICTPF. This, however, was found to be too complex; as it did not take into consideration the unique operating environment and the limited resources of local government.

In 2015, it was announced that the MCGICTP was developed; and local government should be able to implement it uniformly. Even though the scalability issue was addressed to some extent, the MCGICTP, once again, only guided local government on ‘what’ they must do to implement corporate governance of ICT. This led to the need in guiding local government on ‘how’ they should implement such corporate governance of ICT.

This paper, therefore, focused on the how perspective, in which it reported on a research project, which aims to assist local government with a relevant, usable, scalable and simplistic framework for the self-implementation of sound corporate governance of ICT.

The paper started off by providing a conceptual architecture, based on the literature, which addressed the various aspects of corporate governance of ICT, in order to formulate the framework. Within this framework, three main elements were identified and discussed,

namely: the Corporate Governance of ICT Charter; the ICT Plan; and the ICT Implementation Plan. Firstly, the Corporate Governance of ICT Charter aims to aid the Executive level with evaluating the needs of ICT, directing the use of ICT and monitoring the performance of ICT within local government. Secondly, from the perspective of a Tactical level, the framework provides an ICT Plan, supported by a toolset, which aims to aid the Tactical level with the planning of the required policies by using COBIT 5 Processes. Lastly, the Operational level is given guidance from the ICT Implementation Plan, in the form of a project plan, in order to implement the framework. Furthermore, the paper continued to combine these three elements within a process model. Local government would be able to follow this process model, in order to implement the complete framework.

The paper ended off by providing the results of a practical hands-on workshop that was held with 24 representatives of local government. This workshop validated the framework on various areas, after which the reporting was done on the overall outcome of the workshop.

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Appendix B

Questionnaires

Appendix B provides detail on the questionnaires used throughout this study. These questionnaires include the following:

1. Semi-structured Interview Topics/Questions
2. Validation Workshop Questionnaire

B.1 Semi-structured Interview Topics/Questions

The semi-structured interview topics/questions were used during Phase 1 of the unique integrated research process. The aim of these topics/questions were to gain an overview of the general ICT environment within local government (see Section 5.2).

Municipal Stakeholder Semi-Structured Interview:

Topics/Questions:

1. What legislation/standards/best practices is the main driver for what you from an IT governance/IT systems/IT security perspective?
2. Which of your municipal manager and/or executive mayors' key performance indicators is directly related to your IT governance challenges?
3. To what extent is IT/IT governance a regular agenda point on municipal council meetings?
4. Do you have an audit and/or risk committee?
5. To what extent does the audit and/or risk committee address IT/IT governance as an agenda point at council meetings?
6. To what extent do you escalate IT/IT governance aspects to the council, possibly via the audit/risk committee? How easy is it to do?
7. Do you have a CIO, or somebody, fulfilling the role of a CIO?
8. Is this person serving on the municipal council, audit or risk committees?
9. What is the typical process followed by the Auditor General during an audit of your municipalities IT?
10. Does the AG use some sort of checklist or compliance list?
11. What relationship exists between district and local municipality regarding IT governance?
12. Are you confident that you know what is required for proper IT systems/IT governance?
13. What type of guidance/tools will be able to assist you towards a better audit report?
14. What skills do you feel is missing or required within the municipality?
15. What courses/training will assist you towards improving?

B.2 Validation Workshop Questionnaire

The validation workshop questionnaire was used during Phase of the unique integrated research process. The aim of this questionnaire was to validate the artefact, or in this case the F-CGICT (see Section 6.2).

Nelson Mandela Metropolitan University
for tomorrow

Framework for Corporate Governance of ICT in Local Government

Thank you for participating in the workshop session for the Framework for Corporate Governance of ICT in local government (F-CGICT). Please be so kind as to choosing an answer to the following statements, so we can further improve on the exercises you have completed today.

1. F-CGICT and its exercises would be compatible to function in any municipality, as it provides guidance on how to implement good Corporate Governance of ICT.			
Strongly Disagree	Disagree	Agree	Strongly Agree
2. F-CGICT can be used to cover the basis of Corporate Governance of ICT in any municipality.			
Strongly Disagree	Disagree	Agree	Strongly Agree
3. It is possible to complete the exercises in F-CGICT without extensive guidance or knowledge about the subject area.			
Strongly Disagree	Disagree	Agree	Strongly Agree
4. F-CGICT allows CGICT to scale to the financial and resource capacity of a municipality.			
Strongly Disagree	Disagree	Agree	Strongly Agree
5. A person with limited technical ability would be able to successfully complete the exercises.			
Strongly Disagree	Disagree	Agree	Strongly Agree
6. F-CGICT can be equally successful in both larger and smaller municipalities.			
Strongly Disagree	Disagree	Agree	Strongly Agree
7. In general, the topic of Corporate Governance of ICT is comprehensively covered throughout F-CGICT.			
Strongly Disagree	Disagree	Agree	Strongly Agree

8. What have you found to be particularly good and/or useful about F-GCICT ?

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9. In what aspects, in your opinion, is F-GCICT lacking?

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10. In your opinion, what aspects about F-GCICT can be improved?

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Appendix C

Framework for CGICT in Local Government

Appendix C provides more detail on the excerpts from the entire F-CGICT. These excerpts were provided to the representatives from local government during the validation workshop. This was done in order to demonstrate the working of the F-CGICT. These excerpts includes the following:

1. The Process-Goal Exercise
2. Guidance on Using Supporting Tool-set
3. Generic Corporate Governance of ICT Charter Document
4. Generic ICT Plan Document

C.1 Process-Goal Exercise

The Process-Goal Exercise allows local government to select various COBIT 5 Processes according to the needs of their unique operating environment. By completing the exercise in Microsoft Excel, local government will be provided with a list of relevant COBIT 5 Processes (see Section 5.5.6).

CORE PROCESSES – (Applicable & Justified)				
Process	**Sub-Process**	**Applicability & Justification**	**Will you Have this Process?**	**Reason if "NO"**
EDM01: Ensure Governance Framework Setting and Maintenance	EDM01.1: Evaluate the governance system	MCGICTP Principle 3/ KING III 5.1.6,5.3	YES	Each Process is applicable because it is a Core Process
	EDM01.2: Direct the governance system		YES	Each Process is applicable because it is a Core Process
	EDM01.3: Monitor the governance system		YES	Each Process is applicable because it is a Core Process
EDM02: Ensure Benefits Delivery	EDM02.1: Evaluate value optimisation	KING III 5.2, 5.4	YES	Each Process is applicable because it is a Core Process
	EDM02.2: Direct value optimisation		YES	Each Process is applicable because it is a Core Process
	EDM02.3: Monitor value optimisation		YES	Each Process is applicable because it is a Core Process
EDM03: Ensure Risk Optimisation	EDM03.1: Evaluate risk management	MCGICTP Principle 6/ KING III 5.5, 5.7	YES	Each Process is applicable because it is a Core Process
	EDM03.2: Direct risk management		YES	Each Process is applicable because it is a Core Process
	EDM03.3: Monitor risk management		YES	Each Process is applicable because it is a Core Process
EDM04: Ensure Resource Optimisation	EDM04.1: Evaluate resource management	National KPA3: Municipal Financial Viability and Management/ MCGICTP Principle 5/ KING III 5.6	YES	Each Process is applicable because it is a Core Process
	EDM04.2: Direct resource management		YES	Each Process is applicable because it is a Core Process
	EDM04.3: Monitor resource management		YES	Each Process is applicable because it is a Core Process
EDM05: Ensure Stakeholder Transparency	EDM05.1: Evaluate stakeholder reporting requirements	MCGICTP Objective (1.7) f and g(p.11)	YES	Each Process is applicable because it is a Core Process
	EDM05.2: Direct stakeholder communication and reporting		YES	Each Process is applicable because it is a Core Process
	EDM05.3: Monitor stakeholder communication		YES	Each Process is applicable because it is a Core Process
APO01: Manage the IT Management Framework	APO01.1: Define the organisational structure	MCGICTP Objective (1.7) e (p.11)/ KING III 5.1.6, 5.7/ National KPA4: Municipal Transformation and Institutional Development	YES	Each Process is applicable because it is a Core Process
	APO01.2: Establish roles and responsibilities		YES	Each Process is applicable because it is a Core Process
	APO01.3: Maintain the enablers of the management system		YES	Each Process is applicable because it is a Core Process
	APO01.4: Communicate management objectives and direction		YES	Each Process is applicable because it is a Core Process
	APO01.5: Optimise the placement of the IT function		YES	Each Process is applicable because it is a Core Process

CORE PROCESSES – (Applicable & Justified)				
Process	**Sub-Process**	**Applicability & Justification**	**Will you Have this Process?**	**Reason if "NO"**
	APO01.6:Define information (data) and system ownership		YES	Each Process is applicable because it is a Core Process
	APO01.8: Maintain compliance with policies and procedures		YES	Each Process is applicable because it is a Core Process
APO02: Manage Strategy	APO02.1: Understand enterprise direction	MCGICTP Objective (1.7) b (p.11)/ MCGICTP Principle 4/ KING III 5.2	YES	Each Process is applicable because it is a Core Process
	APO02.2: Assess the current environment, capabilities and performance		YES	Each Process is applicable because it is a Core Process
	APO02.3: Define the target IT capabilities		YES	Each Process is applicable because it is a Core Process
	APO02.4: Conduct a gap analysis		YES	Each Process is applicable because it is a Core Process
	APO02.5: Define the strategic plan and road map		YES	Each Process is applicable because it is a Core Process
	APO02.6: Communicate the IT strategy and direction		YES	Each Process is applicable because it is a Core Process
APO06: Manage Budget and Costs	APO06.1: Manage finance and accounting	MCGICTP Principle 5/ Municipal Systems Act section 4(2)(a)	YES	Each Process is applicable because it is a Core Process
	APO06.3: Create and maintain budgets		YES	Each Process is applicable because it is a Core Process
	APO06.4: Model and allocate costs		YES	Each Process is applicable because it is a Core Process
	APO06.5: Manage costs		YES	Each Process is applicable because it is a Core Process
APO07: Manage Human Resources	APO07.1: Manage Human Resources	MCGICTP Objective (1.7) e (p.11)/ National KPA4: Municipal Transformation and Institutional Development/ Municipal Systems Act section 4(2)(g)	YES	Each Process is applicable because it is a Core Process
	APO07.2: Identify key IT personnel		YES	Each Process is applicable because it is a Core Process
	APO07.3: Maintain the skills and competencies of personnel		YES	Each Process is applicable because it is a Core Process
	APO07.4: Evaluate employee job performance		YES	Each Process is applicable because it is a Core Process
	APO07.5: Plan and track the usage of IT and business human resources		YES	Each Process is applicable because it is a Core Process
	APO07.6: Manage contract staff		YES	Each Process is applicable because it is a Core Process
APO12: Manage Risk	APO12.1: Collect data	MCGICTP Objective (1.7) d (p.11)/ MCGICTPF Principle 6/ KING III 5.5/ Auditor General 2013-14	YES	Each Process is applicable because it is a Core Process
	APO12.2: Analyse risk		YES	Each Process is applicable because it is a Core Process

CORE PROCESSES – (Applicable & Justified)				
Process	**Sub-Process**	**Applicability & Justification**	**Will you Have this Process?**	**Reason if "NO"**
	APO12.3: Maintain a risk profile		YES	Each Process is applicable because it is a Core Process
	APO12.4: Articulate risk		YES	Each Process is applicable because it is a Core Process
	APO12.5: Define a risk management action portfolio		YES	Each Process is applicable because it is a Core Process
	APO12.6: Respond to risk		YES	Each Process is applicable because it is a Core Process
APO13: Manage Security	APO13.1: Establish and maintain an ISMS	MCGICTP Phase 1 (2.4 p.18)/ KING III 5.6/ Auditor General 2013-14/ Municipal Systems Act section 4(2)(i)	YES	Each Process is applicable because it is a Core Process
	APO13.2: Define and manage an information security risk treatment plan		YES	Each Process is applicable because it is a Core Process
	APO13.3: Monitor and review the ISMS		YES	Each Process is applicable because it is a Core Process
BAI09: Manage Assets	BAI09.1: Identify and record current assets	MCGICTP Principle 4/ KING III 5.6	YES	Each Process is applicable because it is a Core Process
	BAI09.2: Manage critical assets		YES	Each Process is applicable because it is a Core Process
	BAI09.3: Manage the asset life cycle		YES	Each Process is applicable because it is a Core Process
	BAI09.4: Optimise asset costs		YES	Each Process is applicable because it is a Core Process
	BAI09.5: Manage licences		YES	Each Process is applicable because it is a Core Process
DSS04: Manage Continuity	DSS04.1: Define the business continuity policy, objectives and scope	MCGICTP Objective (1.7) e (p.11)/ Municipal Systems Act section 4(2)(d)&(f)/ Auditor General 2013-14/ KING III	YES	Each Process is applicable because it is a Core Process
	DSS04.2: Maintain a continuity strategy		YES	Each Process is applicable because it is a Core Process
	DSS04.3:Develop and implement a business continuity response		YES	Each Process is applicable because it is a Core Process
	DSS04.4: Exercise, test and review the BCP		YES	Each Process is applicable because it is a Core Process
	DSS04.5: Review, maintain and improve the continuity plan		YES	Each Process is applicable because it is a Core Process
	DSS04.6: Conduct continuity plan training		YES	Each Process is applicable because it is a Core Process
	DSS04.7: Manage backup arrangements		YES	Each Process is applicable because it is a Core Process
	DSS04.8: Conduct post-resumption review		YES	Each Process is applicable because it is a Core Process

CORE PROCESSES – (Applicable & Justified)				
Process	**Sub-Process**	**Applicability & Justification**	**Will you Have this Process?**	**Reason if "NO"**
DSS05: Manage Security Services	DSS05.1: Protect against malware	MCGICTP Phase 1 (2.4 p.18)/ KING III 5.6/ Auditor General 2013-14/ Municipal Systems Act section 4(2)(i)	YES	Each Process is applicable because it is a Core Process
	DSS05.2: Manage network and connectivity security		YES	Each Process is applicable because it is a Core Process
	DSS05.3: Manage endpoint security		YES	Each Process is applicable because it is a Core Process
	DSS05.4: Manage user identity and logical access		YES	Each Process is applicable because it is a Core Process
	DSS05.5: Manage physical access to IT assets		YES	Each Process is applicable because it is a Core Process
	DSS05.6: Manage sensitive documents and output devices		YES	Each Process is applicable because it is a Core Process
	DSS05.7: Monitor the infrastructure for security-related events		YES	Each Process is applicable because it is a Core Process
DSS06: Manage Business Process Controls	DSS06.1: Align control activities embedded in business processes with enterprise objectives	MCGICTP Phase 1 (2.4 p.18)/ KING III 5.6/ Auditor General 2013-14/ Municipal Systems Act section 4(2)(i)	YES	Each Process is applicable because it is a Core Process
	DSS06.2: Control the processing of information		YES	Each Process is applicable because it is a Core Process
	DSS06.3: Manage roles, responsibilities, access privileges and levels of authority		YES	Each Process is applicable because it is a Core Process
	DSS06.4: Manage errors and exceptions		YES	Each Process is applicable because it is a Core Process
	DSS06.5: Ensure traceability of information events and accountabilities		YES	Each Process is applicable because it is a Core Process
	DSS06.6: Secure information assets		YES	Each Process is applicable because it is a Core Process
MEA01: Monitor, Evaluate and Assess Performance and Conformance	MEA01.1: Establish a monitoring approach	MCGICTP Objective (1.7) b (p.11)/ MCGICTPF Principle 1&2/ KING III 5.2/ Municipal Systems Act section 4(2)(d) & (f)/ Part of Performance Management Process	YES	Each Process is applicable because it is a Core Process
	MEA01.2: Set performance and conformance targets		YES	Each Process is applicable because it is a Core Process
	MEA01.3: Collect and process performance and conformance data		YES	Each Process is applicable because it is a Core Process
	MEA01.4: Analyse and report performance		YES	Each Process is applicable because it is a Core Process
	MEA01.5: Ensure the implementation of corrective actions		YES	Each Process is applicable because it is a Core Process

CORE PROCESSES – (Applicable & Justified)				
Process	**Sub-Process**	**Applicability & Justification**	**Will you Have this Process?**	**Reason if "NO"**
MEA03: Monitor, Evaluate and Assess Compliance with External Requirements	MEA03.1: Identify external compliance requirements	MCGICTP Objective (1.7) g (p.11)/ MCGICTPF Principle 5/ KING III 5.4/ Municipal Systems Act section 4(2)(j)	YES	Each Process is applicable because it is a Core Process
	MEA03.2: Optimise response to external requirements		YES	Each Process is applicable because it is a Core Process
	MEA03.3: Confirm external compliance		YES	Each Process is applicable because it is a Core Process
	MEA03.4: Obtain assurance of external compliance		YES	Each Process is applicable because it is a Core Process
Total of: 17 processes				

ALWAYS - OFTEN (Applicable BUT NOT Necessarily Justified)						Note
Process	**Sub-Process**	**Applicability**	**Justification**	**Will you have this Process?**	**Reason if "NO"**	
APO01: Manage the IT Management Framework	APO01.7:Manage continual improvement of processes	MCGICTP Objective (1.7) e (p.11)/ KING III 5.1.6, 5.7/ National KPA4: Municipal Transformation and Institutional Development	Admin & Financial Capability	YES		
APO03: Manage Enterprise Architecture	APO03.1: Develop the enterprise architecture vision	MCICTP Phase 2 (2,4 p.18)	Admin & Financial Capability	YES		
	APO03.2: Define reference architecture			YES		
	APO03.3: Select opportunities and solutions			YES		
	APO03.4: Define architecture implementation			YES		
	APO03.5: Provide enterprise architecture services			YES		
APO06: Manage Budget and Costs	APO06.2: Prioritise resource allocation	MCGICTP Principle 5/ Municipal Systems Act section 4(2)(a)	Admin & Financial Capability	YES		
APO08: Manage Relationship	APO08.1: Understand business expectations	MCGICTP Objective (1.7) c (p.11)/ MCGICTP Principle 5/ KING III 5.4/ National KPA3: Municipal Financial Viability and Management	Admin & Financial Capability	YES		
	APO08.2: Identify opportunities, risk and constraints for IT to enhance the business			YES		
	APO08.3: Manage the business relationship			YES		
	APO08.4: Co-ordinate and communicate			YES		
	APO08.5: Provide input to the continual improvement of services			YES		
APO09: Manage Service Agreements	APO09.1: Identify IT services	MCGICTP Principle 4/ KING 5.2	Admin & Financial Capability	YES		
	APO09.2: Catalogue IT-enabled services			YES		
	APO09.3: Define and prepare service agreements			YES		
	APO09.4: Monitor and report service levels			YES		
	APO09.5: Review service agreements and contracts			YES		
APO10: Manage Suppliers	APO10.1: Identify and evaluate supplier relationships and contracts	MCGICTP ICT Steering Com Mandate (p.16) /KING 5.4	Admin & Financial Capability	YES		
	APO10.2: Select suppliers			YES		

ALWAYS - OFTEN (Applicable BUT NOT Necessarily Justified)						
Process	**Sub-Process**	**Applicability**	**Justification**	**Will you have this Process?**	**Reason if "NO"**	**Note**
	APO10.3: Manage supplier relationships and contracts			YES		
	APO10.4: Manage supplier risk			YES		
	APO10.5: Monitor supplier performance and compliance			YES		
BAI01: Manage Programmes and Projects	BAI01.1: Maintain a standard approach for programme and project management	MCGICTP ICT Steering Com Mandate (p.16) /KING 5.4	Admin & Financial Capability	YES		
	BAI01.2: Initiate a programme			YES		
	BAI01.3: Manage stakeholder engagement			YES		
	BAI01.4: Develop and maintain the programme plan			YES		
	BAI01.5: Launch and execute the programme			YES		
	BAI01.6: Monitor, control and report on the programme outcomes			YES		
	BAI01.7: Start up and initiate projects within a programme			YES		
	BAI01.8: Plan projects			YES		
	BAI01.9: Manage programme and project quality			YES		
	BAI01.10: Manage programme and project risk			YES		
	BAI01.11: Monitor and control projects			YES		
	BAI01.12: Manage project resources and work packages			YES		
	BAI01.13: Close a project or iteration			YES		
	BAI01.14: Close a programme			YES		
BAI04: Manage Availability and Capacity	BAI04.1: Assess current availability, performance and capacity and create a baseline	MCGICTP Objective (1.7) e (p.11)/ Municipal Systems Act section 4(2)(g)/ National KPA1&3	Admin & Financial Capability	YES		
	BAI04.2: Assess business impact			YES		
	BAI04.3: Plan for new or changed service requirements			YES		
	BAI04.4: Monitor and review availability and capacity			YES		
	BAI04.5: Investigate and address availability, performance and capacity issues			YES		
BAI06: Manage Changes	BAI06.1: Evaluate, prioritise and authorise change requests	MCGICTP Charter Structure (p.16)	Admin & Financial Capability	YES		
	BAI06.2: Manage emergency changes			YES		

ALWAYS - OFTEN (Applicable BUT NOT Necessarily Justified)						Note
Process	**Sub-Process**	**Applicability**	**Justification**	**Will you have this Process?**	**Reason if "NO"**	
	BAI06.3: Track and report change status			YES		
	BAI06.4: Close and document the changes			YES		
BAI08: Manage Knowledge	BAI08.1: Nurture and facilitate a knowledge-sharing culture	MCGICTP Objective (1.7) e, f (p.11)/ KING III 5.1/ National KPA4: Municipal Transformation and Institutional Development	Admin & Financial Capability	YES		
	BAI08.2: Identify and classify sources of information			YES		
	BAI08.3: Organise and contextualise information into knowledge			YES		
	BAI08.4: Use and share knowledge			YES		
	BAI08.5: Evaluate and retire information			YES		
DSS01: Manage Operations	DSS01.1: Perform operational procedures	MCGICTP Principle 4/ Municipal Manager Mandate (p.14)/ MCGICTP Phase 3/ KING III 5.1	Admin & Financial Capability	YES		
	DSS01.2: Manage outsourced IT services			YES		
	DSS01.3: Monitor IT infrastructure			YES		
	DSS01.4: Manage the environment			YES		
	DSS01.5: Manage facilities			YES		
DSS02: Manage Service Requests and Incidents	DSS02.1: Define incident and service request classification schemes	MCGICTP ICT Steering Com Mandate (p.16)/ MCGICTP Phase 2/ KING III 5.6/ Auditor General 2013-14	Admin & Financial Capability	YES		
	DSS02.2: Record, classify and prioritise requests and incidents			YES		
	DSS02.3: Verify, approve and fulfil service requests			YES		
	DSS02.4: Investigate, diagnose and allocate incidents			YES		
	DSS02.5: Resolve and recover from incidents			YES		
	DSS02.6: Close service requests and incidents			YES		
	DSS02.7: Track status and produce reports			YES		
DSS03: Manage Problems	DSS03.1: Identify and classify problems	MCGICTP ICT Steering Com Mandate (p.16)/ MCGICTP Phase 2/ KING III 5.6/ Auditor General 2013-14	Admin & Financial Capability	YES		

ALWAYS - OFTEN (Applicable BUT NOT Necessarily Justified)						Note
Process	**Sub-Process**	**Applicability**	**Justification**	**Will you have this Process?**	**Reason if "NO"**	
	DSS03.2: Investigate and diagnose problems			YES		
	DSS03.3: Raise known errors			YES		
	DSS03.4: Resolve and close problems			YES		
	DSS03.5: Perform proactive problem management			YES		
MEA02: Monitor, Evaluate and Assess the System of Internal Control	MEA02.1: Monitor internal controls	National KPA4: Municipal Transformation and Institutional Development/ KING III 5.1	Admin & Financial Capability	YES		
	MEA02.2: Review business process controls effectiveness			YES		
	MEA02.3: Perform control self-assessments			YES		
	MEA02.4: Identify and report control deficiencies			YES		
	MEA02.5: Ensure that assurance providers are independent and qualified			YES		
	MEA02.6: Plan assurance initiatives			YES		
	MEA02.7: Scope assurance initiatives			YES		
	MEA02.8: Execute assurance initiatives			YES		
Total of: 14 processes						

SELDOM - NEVER(NOT Necessarily Applicable NOR Necessarily Justified)						
Process	**Sub-Process**	**Applicability**	**Justification**	**Will you have this Process?**	**Reason of "YES"**	**Note**
APO04: Manage Innovation	APO04.1: Create an environment conducive to innovation	Reason for Applicability	Admin & Financial Capability	NO		
	APO04.2: Maintain an understanding of the enterprise environment	Reason for Applicability	Admin & Financial Capability	NO		
	APO04.3: Monitor and scan the technology environment	Reason for Applicability	Admin & Financial Capability	NO		
	APO04.4: Assess the potential of emerging technologies and innovation ideas	Reason for Applicability	Admin & Financial Capability	NO		
	APO04.5: Recommend appropriate further initiatives	Reason for Applicability	Admin & Financial Capability	NO		
	APO04.6: Monitor the implementation and use of innovation	Reason for Applicability	Admin & Financial Capability	NO		
APO05: Manage Portfolio	APO05.1: Establish the target investment mix	Reason for Applicability	Admin & Financial Capability	NO		
	APO05.2: Determine the availability and sources of funds	Reason for Applicability	Admin & Financial Capability	NO		
	APO05.3: Evaluate and select programmes to fund	Reason for Applicability	Admin & Financial Capability	NO		
	APO05.4: Monitor, optimise and report on investment portfolio performance	Reason for Applicability	Admin & Financial Capability	NO		
	APO05.5: Maintain portfolios	Reason for Applicability	Admin & Financial Capability	NO		
	APO05.6: Manage benefits achievement	Reason for Applicability	Admin & Financial Capability	NO		
APO11: Manage Quality	APO11.1: Establish a quality management system (QMS)	Reason for Applicability	Admin & Financial Capability	NO		
	APO11.2: Define and manage quality standards, practices and procedures	Reason for Applicability	Admin & Financial Capability	NO		
	APO11.3: Focus quality management on customers	Reason for Applicability	Admin & Financial Capability	NO		
	APO11.4: Perform quality monitoring, control and reviews	Reason for Applicability	Admin & Financial Capability	NO		
	APO11.5: Integrate quality management into solutions for development and service delivery	Reason for Applicability	Admin & Financial Capability	NO		
	APO11.6: Maintain continuous improvement	Reason for Applicability	Admin & Financial Capability	NO		
BAI02: Manage Requirements Definition	BAI02.1: Define and maintain business functional and technical requirements	Reason for Applicability	Admin & Financial Capability	NO		
	BAI02.2: Perform a feasibility study and formulate alternative solutions	Reason for Applicability	Admin & Financial Capability	NO		
	BAI02.3: Manage requirements risk	Reason for Applicability	Admin & Financial Capability	NO		
	BAI02.4: Obtain approval of requirements and solutions	Reason for Applicability	Admin & Financial Capability	NO		
BAI03: Manage Solutions Identification and Build	BAI03.1: Design high-level solutions	Reason for Applicability	Admin & Financial Capability	NO		
	BAI03.2: Design detailed solution components	Reason for Applicability	Admin & Financial Capability	NO		
	BAI03.3: Develop solution components	Reason for Applicability	Admin & Financial Capability	NO		
	BAI03.4: Procure solution components	Reason for Applicability	Admin & Financial Capability	NO		
	BAI03.5: Build solutions	Reason for Applicability	Admin & Financial Capability	NO		
	BAI03.6: Perform quality assurance	Reason for Applicability	Admin & Financial Capability	NO		

SELDOM - NEVER(NOT Necessarily Applicable NOR Necessarily Justified)						
Process	**Sub-Process**	**Applicability**	**Justification**	**Will you have this Process?**	**Reason of "YES"**	**Note**
	BAI03.7: Prepare for solution testing	Reason for Applicability	Admin & Financial Capability	NO		
	BAI03.8: Execute solution testing	Reason for Applicability	Admin & Financial Capability	NO		
	BAI03.9: Manage changes to requirements	Reason for Applicability	Admin & Financial Capability	NO		
	BAI03.10: Maintain solutions	Reason for Applicability	Admin & Financial Capability	NO		
	BAI03.11: Define IT services and maintain the service portfolio	Reason for Applicability	Admin & Financial Capability	NO		
BAI05: Manage Organisational Change Enablement	BAI05.1: Establish the desire to change	Reason for Applicability	Admin & Financial Capability	NO		
	BAI05.2: Form an effective implementation team	Reason for Applicability	Admin & Financial Capability	NO		
	BAI05.3: Communicate desired vision	Reason for Applicability	Admin & Financial Capability	NO		
	BAI05.4: Empower role players and identify short-term wins	Reason for Applicability	Admin & Financial Capability	NO		
	BAI05.5: Enable operation and use	Reason for Applicability	Admin & Financial Capability	NO		
	BAI05.6: Embed new approaches	Reason for Applicability	Admin & Financial Capability	NO		
	BAI05.7: Sustain changes	Reason for Applicability	Admin & Financial Capability	NO		
BAI07: Manage Change Acceptance and Transitioning	BAI07.1: Establish an implementation plan	Reason for Applicability	Admin & Financial Capability	NO		
	BAI07.2: Plan business process, system and data conversion	Reason for Applicability	Admin & Financial Capability	NO		
	BAI07.3: Plan acceptance tests	Reason for Applicability	Admin & Financial Capability	NO		
	BAI07.4: Establish a test environment	Reason for Applicability	Admin & Financial Capability	NO		
	BAI07.5: Perform acceptance tests	Reason for Applicability	Admin & Financial Capability	NO		
	BAI07.6: Promote to production and manage releases	Reason for Applicability	Admin & Financial Capability	NO		
	BAI07.7: Provide early production support	Reason for Applicability	Admin & Financial Capability	NO		
	BAI07.8: Perform a post-implementation review	Reason for Applicability	Admin & Financial Capability	NO		
BAI10: Manage Configuration	BAI10.1: Establish and maintain a configuration model	Reason for Applicability	Admin & Financial Capability	NO		
	BAI10.2: Establish and maintain a configuration repository and baseline	Reason for Applicability	Admin & Financial Capability	NO		
	BAI10.3: Maintain and control configuration items	Reason for Applicability	Admin & Financial Capability	NO		
	BAI10.4: Produce status and configuration reports	Reason for Applicability	Admin & Financial Capability	NO		
	BAI10.5: Verify and review integrity of the configuration repository	Reason for Applicability	Admin & Financial Capability	NO		
Total of: 8 processes						

SELECTED PROCESSES AFTER COMPLETING PROCESS-GOAL EXERCISE			
wbs	name	duration	Reason
NA	CORE PROCESSES	NA	
1	EDM01.1: Evaluate the governance system	5d	NA
2	EDM01.2: Direct the governance system		NA
3	EDM01.3: Monitor the governance system		NA
4	EDM02.1: Evaluate value optimisation		NA
5	EDM02.2: Direct value optimisation		NA
6	EDM02.3: Monitor value optimisation		NA
7	EDM03.1: Evaluate risk management		NA
8	EDM03.2: Direct risk management		NA
9	EDM03.3: Monitor risk management		NA
10	EDM04.1: Evaluate resource management		NA
11	EDM04.2: Direct resource management		NA
12	EDM04.3: Monitor resource management		NA
13	EDM05.1: Evaluate stakeholder reporting requirements		NA
14	EDM05.2: Direct stakeholder communication and reporting		NA
15	EDM05.3: Monitor stakeholder communication		NA
16	APO01.1: Define the organisational structure		NA
17	APO01.2: Establish roles and responsibilities		NA
18	APO01.3: Maintain the enablers of the management system		NA
19	APO01.4: Communicate management objectives and direction		NA
20	APO01.5: Optimise the placement of the IT function		NA
21	APO01.6:Define information (data) and system ownership		NA
22	APO01.8: Maintain compliance with policies and procedures		NA
23	APO02.1: Understand enterprise direction		NA
24	APO02.2: Assess the current environment, capabilities and performance		NA
25	APO02.3: Define the target IT capabilities		NA
26	APO02.4: Conduct a gap analysis		NA
27	APO02.5: Define the strategic plan and road map		NA
28	APO02.6: Communicate the IT strategy and direction		NA
29	APO06.1: Manage finance and accounting		NA
30	APO06.3: Create and maintain budgets		NA
31	APO06.4: Model and allocate costs		NA
32	APO06.5: Manage costs		NA
33	APO07.1: Manage Human Resources		NA
34	APO07.2: Identify key IT personnel		NA
35	APO07.3: Maintain the skills and competencies of personnel		NA
36	APO07.4: Evaluate employee job performance		NA
37	APO07.5: Plan and track the usage of IT and business human resources		NA
38	APO07.6: Manage contract staff		NA
39	APO12.1: Collect data		NA
40	APO12.2: Analyse risk		NA
41	APO12.3: Maintain a risk profile		NA

wbs	name	duration	Reason
42	APO12.4: Articulate risk		NA
43	APO12.5: Define a risk management action portfolio		NA
44	APO12.6: Respond to risk		NA
45	APO13.1: Establish and maintain an ISMS		NA
46	APO13.2: Define and manage an information security risk treatment plan		NA
47	APO13.3: Monitor and review the ISMS		NA
48	BAI09.1: Identify and record current assets		NA
49	BAI09.2: Manage critical assets		NA
50	BAI09.3: Manage the asset life cycle		NA
51	BAI09.4: Optimise asset costs		NA
52	BAI09.5: Manage licences		NA
53	DSS04.1: Define the business continuity policy, objectives and scope		NA
54	DSS04.2: Maintain a continuity strategy		NA
55	DSS04.3:Develop and implement a business continuity response		NA
56	DSS04.4: Exercise, test and review the BCP		NA
57	DSS04.5: Review, maintain and improve the continuity plan		NA
58	DSS04.6: Conduct continuity plan training		NA
59	DSS04.7: Manage backup arrangements		NA
60	DSS04.8: Conduct post-resumption review		NA
61	DSS05.1: Protect against malware		NA
62	DSS05.2: Manage network and connectivity security		NA
63	DSS05.3: Manage endpoint security		NA
64	DSS05.4: Manage user identity and logical access		NA
65	DSS05.5: Manage physical access to IT assets		NA
66	DSS05.6: Manage sensitive documents and output devices		NA
67	DSS05.7: Monitor the infrastructure for security-related events		NA
68	DSS06.1: Align control activities embedded in business processes with enterprise objectives		NA
69	DSS06.2: Control the processing of information		NA
70	DSS06.3: Manage roles, responsibilities, access privileges and levels of authority		NA
71	DSS06.4: Manage errors and exceptions		NA
72	DSS06.5: Ensure traceability of information events and accountabilities		NA
73	DSS06.6: Secure information assets		NA
74	MEA01.1: Establish a monitoring approach		NA
75	MEA01.2: Set performance and conformance targets		NA
76	MEA01.3: Collect and process performance and conformance data		NA
77	MEA01.4: Analyse and report performance		NA
78	MEA01.5: Ensure the implementation of corrective actions		NA
79	MEA03.1: Identify external compliance requirements		NA
80	MEA03.2: Optimise response to external requirements		NA
81	MEA03.3: Confirm external compliance		NA
82	MEA03.4: Obtain assurance of external compliance		NA
	ALWAYS TO OFTEN	NA	

wbs	name	duration	Reason
83	APO01.7:Manage continual improvement of processes		Process Selected - No need for reason
84	APO03.1: Develop the enterprise architecture vision		Process Selected - No need for reason
85	APO03.2: Define reference architecture		Process Selected - No need for reason
86	APO03.3: Select opportunities and solutions		Process Selected - No need for reason
87	APO03.4: Define architecture implementation		Process Selected - No need for reason
88	APO03.5: Provide enterprise architecture services		Process Selected - No need for reason
89	APO06.2: Prioritise resource allocation		Process Selected - No need for reason
90	APO08.1: Understand business expectations		Process Selected - No need for reason
91	APO08.2: Identify opportunities, risk and constraints for IT to enhance the business		Process Selected - No need for reason
92	APO08.3: Manage the business relationship		Process Selected - No need for reason
93	APO08.4: Co-ordinate and communicate		Process Selected - No need for reason
94	APO08.5: Provide input to the continual improvement of services		Process Selected - No need for reason
95	APO09.1: Identify IT services		Process Selected - No need for reason
96	APO09.2: Catalogue IT-enabled services		Process Selected - No need for reason
97	APO09.3: Define and prepare service agreements		Process Selected - No need for reason
98	APO09.4: Monitor and report service levels		Process Selected - No need for reason
99	APO09.5: Review service agreements and contracts		Process Selected - No need for reason
100	APO10.1: Identify and evaluate supplier relationships and contracts		Process Selected - No need for reason
101	APO10.2: Select suppliers		Process Selected - No need for reason
102	APO10.3: Manage supplier relationships and contracts		Process Selected - No need for reason
103	APO10.4: Manage supplier risk		Process Selected - No need for reason

wbs	name	duration	Reason
104	APO10.5: Monitor supplier performance and compliance		Process Selected - No need for reason
105	BAI01.1: Maintain a standard approach for programme and project management		Process Selected - No need for reason
106	BAI01.2: Initiate a programme		Process Selected - No need for reason
107	BAI01.3: Manage stakeholder engagement		Process Selected - No need for reason
108	BAI01.4: Develop and maintain the programme plan		Process Selected - No need for reason
109	BAI01.5: Launch and execute the programme		Process Selected - No need for reason
110	BAI01.6: Monitor, control and report on the programme outcomes		Process Selected - No need for reason
111	BAI01.7: Start up and initiate projects within a programme		Process Selected - No need for reason
112	BAI01.8: Plan projects		Process Selected - No need for reason
113	BAI01.9: Manage programme and project quality		Process Selected - No need for reason
114	BAI01.10: Manage programme and project risk		Process Selected - No need for reason
115	BAI01.11: Monitor and control projects		Process Selected - No need for reason
116	BAI01.12: Manage project resources and work packages		Process Selected - No need for reason
117	BAI01.13: Close a project or iteration		Process Selected - No need for reason
118	BAI01.14: Close a programme		Process Selected - No need for reason
119	BAI04.1: Assess current availability, performance and capacity and create a baseline		Process Selected - No need for reason
120	BAI04.2: Assess business impact		Process Selected - No need for reason
121	BAI04.3: Plan for new or changed service requirements		Process Selected - No need for reason
122	BAI04.4: Monitor and review availability and capacity		Process Selected - No need for reason
123	BAI04.5: Investigate and address availability, performance and capacity issues		Process Selected - No need for reason
124	BAI06.1: Evaluate, prioritise and authorise change requests		Process Selected - No need for reason

wbs	name	duration	Reason
125	BAI06.2: Manage emergency changes		Process Selected - No need for reason
126	BAI06.3: Track and report change status		Process Selected - No need for reason
127	BAI06.4: Close and document the changes		Process Selected - No need for reason
128	BAI08.1: Nurture and facilitate a knowledge-sharing culture		Process Selected - No need for reason
129	BAI08.2: Identify and classify sources of information		Process Selected - No need for reason
130	BAI08.3: Organise and contextualise information into knowledge		Process Selected - No need for reason
131	BAI08.4: Use and share knowledge		Process Selected - No need for reason
132	BAI08.5: Evaluate and retire information		Process Selected - No need for reason
133	DSS01.1: Perform operational procedures		Process Selected - No need for reason
134	DSS01.2: Manage outsourced IT services		Process Selected - No need for reason
135	DSS01.3: Monitor IT infrastructure		Process Selected - No need for reason
136	DSS01.4: Manage the environment		Process Selected - No need for reason
137	DSS01.5: Manage facilities		Process Selected - No need for reason
138	DSS02.1: Define incident and service request classification schemes		Process Selected - No need for reason
139	DSS02.2: Record, classify and prioritise requests and incidents		Process Selected - No need for reason
140	DSS02.3: Verify, approve and fulfil service requests		Process Selected - No need for reason
141	DSS02.4: Investigate, diagnose and allocate incidents		Process Selected - No need for reason
142	DSS02.5: Resolve and recover from incidents		Process Selected - No need for reason
143	DSS02.6: Close service requests and incidents		Process Selected - No need for reason
144	DSS02.7: Track status and produce reports		Process Selected - No need for reason
145	DSS03.1: Identify and classify problems		Process Selected - No need for reason

wbs	name	duration	Reason
146	DSS03.2: Investigate and diagnose problems		Process Selected - No need for reason
147	DSS03.3: Raise known errors		Process Selected - No need for reason
148	DSS03.4: Resolve and close problems		Process Selected - No need for reason
149	DSS03.5: Perform proactive problem management		Process Selected - No need for reason
150	MEA02.1: Monitor internal controls		Process Selected - No need for reason
151	MEA02.2: Review business process controls effectiveness		Process Selected - No need for reason
152	MEA02.3: Perform control self-assessments		Process Selected - No need for reason
153	MEA02.4: Identify and report control deficiencies		Process Selected - No need for reason
154	MEA02.5: Ensure that assurance providers are independent and qualified		Process Selected - No need for reason
155	MEA02.6: Plan assurance initiatives		Process Selected - No need for reason
156	MEA02.7: Scope assurance initiatives		Process Selected - No need for reason
157	MEA02.8: Execute assurance initiatives		Process Selected - No need for reason
	SELDOM TO NEVER	NA	
158	THE PROCESS WAS NOT SELECTED: APO04.1: Create an environment conducive to innovation		Process Selected - No need for reason
159	THE PROCESS WAS NOT SELECTED: APO04.2: Maintain an understanding of the enterprise environment		Process Selected - No need for reason
160	THE PROCESS WAS NOT SELECTED: APO04.3: Monitor and scan the technology environment		Process Selected - No need for reason
161	THE PROCESS WAS NOT SELECTED: APO04.4: Assess the potential of emerging technologies and innovation ideas		Process Selected - No need for reason
162	THE PROCESS WAS NOT SELECTED: APO04.5: Recommend appropriate further initiatives		Process Selected - No need for reason
163	THE PROCESS WAS NOT SELECTED: APO04.6: Monitor the implementation and use of innovation		Process Selected - No need for reason
164	THE PROCESS WAS NOT SELECTED: APO05.1: Establish the target investment mix		Process Selected - No need for reason
165	THE PROCESS WAS NOT SELECTED: APO05.2: Determine the availability and sources of funds		Process Selected - No need for reason
166	THE PROCESS WAS NOT SELECTED: APO05.3: Evaluate and select programmes to fund		Process Selected - No need for reason

wbs	name	duration	Reason
167	THE PROCESS WAS NOT SELECTED: APO05.4: Monitor, optimise and report on investment portfolio performance		Process Selected - No need for reason
168	THE PROCESS WAS NOT SELECTED: APO05.5: Maintain portfolios		Process Selected - No need for reason
169	THE PROCESS WAS NOT SELECTED: APO05.6: Manage benefits achievement		Process Selected - No need for reason
170	THE PROCESS WAS NOT SELECTED: APO11.1: Establish a quality management system (QMS)		Process Selected - No need for reason
171	THE PROCESS WAS NOT SELECTED: APO11.2: Define and manage quality standards, practices and procedures		Process Selected - No need for reason
172	THE PROCESS WAS NOT SELECTED: APO11.3: Focus quality management on customers		Process Selected - No need for reason
173	THE PROCESS WAS NOT SELECTED: APO11.4: Perform quality monitoring, control and reviews		Process Selected - No need for reason
174	THE PROCESS WAS NOT SELECTED: APO11.5: Integrate quality management into solutions for development and service delivery		Process Selected - No need for reason
175	THE PROCESS WAS NOT SELECTED: APO11.6: Maintain continuous improvement		Process Selected - No need for reason
176	THE PROCESS WAS NOT SELECTED: BAI02.1: Define and maintain business functional and technical requirements		Process Selected - No need for reason
177	THE PROCESS WAS NOT SELECTED: BAI02.2: Perform a feasibility study and formulate alternative solutions		Process Selected - No need for reason
178	THE PROCESS WAS NOT SELECTED: BAI02.3: Manage requirements risk		Process Selected - No need for reason
179	THE PROCESS WAS NOT SELECTED: BAI02.4: Obtain approval of requirements and solutions		Process Selected - No need for reason
180	THE PROCESS WAS NOT SELECTED: BAI03.1: Design high-level solutions		Process Selected - No need for reason
181	THE PROCESS WAS NOT SELECTED: BAI03.2: Design detailed solution components		Process Selected - No need for reason
182	THE PROCESS WAS NOT SELECTED: BAI03.3: Develop solution components		Process Selected - No need for reason
183	THE PROCESS WAS NOT SELECTED: BAI03.4: Procure solution components		Process Selected - No need for reason
184	THE PROCESS WAS NOT SELECTED: BAI03.5: Build solutions		Process Selected - No need for reason
185	THE PROCESS WAS NOT SELECTED: BAI03.6: Perform quality assurance		Process Selected - No need for reason
186	THE PROCESS WAS NOT SELECTED: BAI03.7: Prepare for solution testing		Process Selected - No need for reason
187	THE PROCESS WAS NOT SELECTED: BAI03.8: Execute solution testing		Process Selected - No need for reason

wbs	name	duration	Reason
188	THE PROCESS WAS NOT SELECTED: BAI03.9: Manage changes to requirements		Process Selected - No need for reason
189	THE PROCESS WAS NOT SELECTED: BAI03.10: Maintain solutions		Process Selected - No need for reason
190	THE PROCESS WAS NOT SELECTED: BAI03.11: Define IT services and maintain the service portfolio		Process Selected - No need for reason
191	THE PROCESS WAS NOT SELECTED: BAI05.1: Establish the desire to change		Process Selected - No need for reason
192	THE PROCESS WAS NOT SELECTED: BAI05.2: Form an effective implementation team		Process Selected - No need for reason
193	THE PROCESS WAS NOT SELECTED: BAI05.3: Communicate desired vision		Process Selected - No need for reason
194	THE PROCESS WAS NOT SELECTED: BAI05.4: Empower role players and identify short-term wins		Process Selected - No need for reason
195	THE PROCESS WAS NOT SELECTED: BAI05.5: Enable operation and use		Process Selected - No need for reason
196	THE PROCESS WAS NOT SELECTED: BAI05.6: Embed new approaches		Process Selected - No need for reason
197	THE PROCESS WAS NOT SELECTED: BAI05.7: Sustain changes		Process Selected - No need for reason
198	THE PROCESS WAS NOT SELECTED: BAI07.1: Establish an implementation plan		Process Selected - No need for reason
199	THE PROCESS WAS NOT SELECTED: BAI07.2: Plan business process, system and data conversion		Process Selected - No need for reason
200	THE PROCESS WAS NOT SELECTED: BAI07.3: Plan acceptance tests		Process Selected - No need for reason
201	THE PROCESS WAS NOT SELECTED: BAI07.4: Establish a test environment		Process Selected - No need for reason
202	THE PROCESS WAS NOT SELECTED: BAI07.5: Perform acceptance tests		Process Selected - No need for reason
203	THE PROCESS WAS NOT SELECTED: BAI07.6: Promote to production and manage releases		Process Selected - No need for reason
204	THE PROCESS WAS NOT SELECTED: BAI07.7: Provide early production support		Process Selected - No need for reason
205	THE PROCESS WAS NOT SELECTED: BAI07.8: Perform a post-implementation review		Process Selected - No need for reason
206	THE PROCESS WAS NOT SELECTED: BAI10.1: Establish and maintain a configuration model		Process Selected - No need for reason
207	THE PROCESS WAS NOT SELECTED: BAI10.2: Establish and maintain a configuration repository and baseline		Process Selected - No need for reason
208	THE PROCESS WAS NOT SELECTED: BAI10.3: Maintain and control configuration items		Process Selected - No need for reason

wbs	name	duration	Reason
209	THE PROCESS WAS NOT SELECTED: BAI10.4: Produce status and configuration reports		Process Selected - No need for reason
210	THE PROCESS WAS NOT SELECTED: BAI10.5: Verify and review integrity of the configuration repository		Process Selected - No need for reason

C.2 Guidance on Using Supporting Tool-set

The guiding documentation on using the supporting tool-set can be used by local government in order to understand the process of using the entire F-CGICT (see Section 5.5.6).

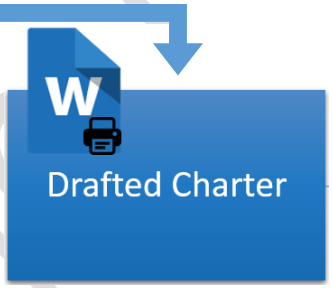
CORPORATE GOVERNANCE OF ICT

Guidance for Using the Tool

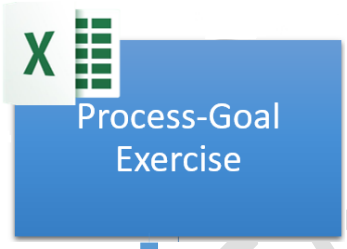
APRIL 25, 2016

NMMU

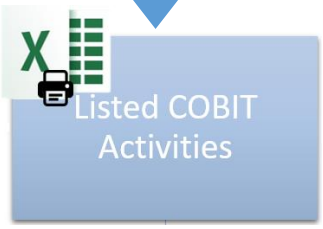
Start off by opening the ***Charter.docx*** document in Microsoft Word. When the document is open, you will have to work through every comment inside the document. The comments in the document will guide you on how to appropriately edit the Charter, so that it is modified to suit your individual needs. When the Charter is modified, make sure to save it.



At this point you will have a drafted Charter document modified according to the needs of your individual municipality. You may print the document at this stage to provide you with a hard-copy of the Charter document.

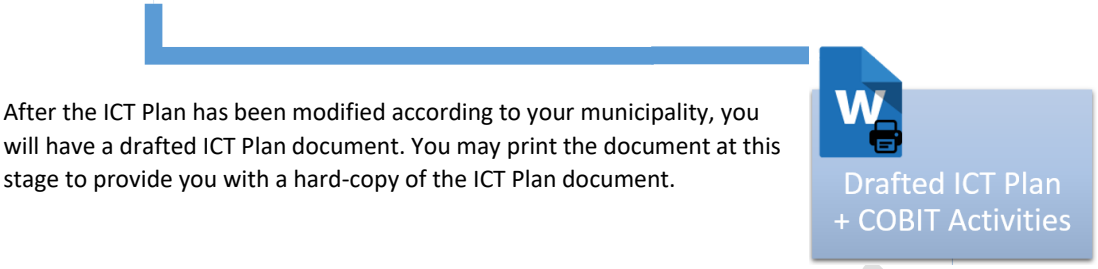


The next step is to open the ***Process-Goal Exercise.xlsx*** in Excel. The purpose of this exercise is to aid the municipality in determining what COBIT 5 processes are needed in order to achieve Corporate Governance of ICT. Go through the whole exercise until you have selected all the relevant processes.



After successfully completing the Process-Goal exercise, you will be provided with a list of all the processes you need to implement in order to achieve Corporate Governance of ICT in the municipality. You will be able to print this list, which forms the basis of the ICT Implementation Plan (More detail in one of the later steps).

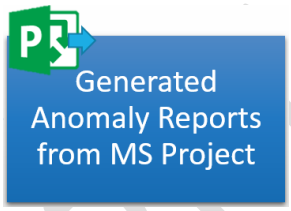
The next step is to open the ***ICT Plan.docx*** document in Microsoft Word. When the document is open, you will have to work through every comment in the document. The comments in the document will guide you in how to appropriately edit the ICT Plan so that it is modified for your individual needs. When the ICT Plan is modified, make sure to save it.



After the ICT Plan has been modified according to your municipality, you will have a drafted ICT Plan document. You may print the document at this stage to provide you with a hard-copy of the ICT Plan document.

At this point, all the COBIT 5 activities that were identified, mentioned in the ICT Plan, will be taken and imported into Microsoft Project. After importing the processes, be sure to check that you edit the duration of each task.

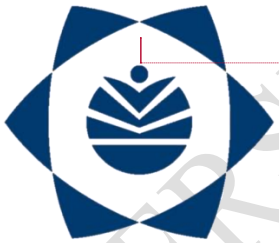
The ICT Implementation Plan is completed at this point. The combination of the previous COBIT Activities list, and the creation of a project in Microsoft Project, creates an ICT Implementation plan. This is essentially the plan of what will be done and when it should be done.



This step forms a continuous step, as it will enable progress to be tracked of every activity. With the progress, one will be able to draw up reports, such as an anomaly reports. In these reports, you will be able to see which processes have not made progress. This would enable the Municipal Council to 'Monitor & Control' the implementation of good Corporate Governance of ICT within the municipality

C.3 Generic Corporate Governance of ICT Charter Document

The generic Corporate Governance of ICT Charter document can be modified by using the internal comments. In doing this, a tailored document can be provided to any local government entity (see Section 5.5.6).



Commented [P1]: Please change the logo to your individual municipality's logo

MUNICIPAL CORPORATE GOVERNANCE OF ICT CHARTER

Draft 1.4

NOVEMBER 29, 2016
XXX MUNICIPALITY

Contents

1 Purpose of Charter

The purpose of this Charter document is twofold; firstly, it will guide the creation and maintenance of effective enabling governance structures, processes and practices as dictated by the Municipal Corporate Governance of ICT Policy. Secondly, the Charter also clarifies the governance of ICT-related roles and responsibilities towards achieving the municipality's strategic goals. In order to achieve this, various best practices, standards and legislation were used.

Commented [pd2]: The purpose of this Charter document will remain the same irrespective of the municipality.

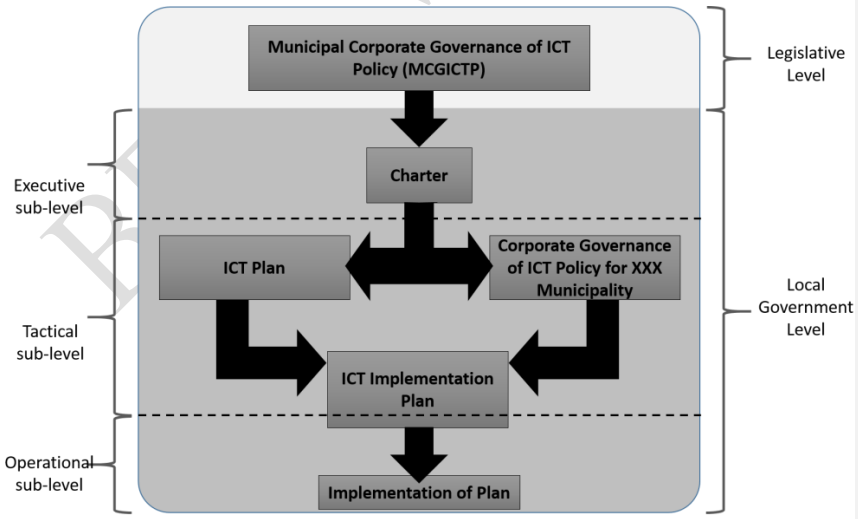
2 Introduction

The Charter depicts how the Municipal Corporate Governance of ICT Policy will be implemented and describes the related structures, processes, functions, accountability, roles and responsibilities, delegations and reporting responsibilities. This Charter has been customised to accommodate Eden Municipality's unique operating environment, whilst ensuring the principles of the Municipal Corporate Governance of ICT Policy are maintained.

In order to understand the Charter and its supported elements, Figure 1 will be used for reference.

Commented [pd3]: This section will remain unchanged for all municipalities. Please change the XXX to the name of your individual municipality

Figure 1: Supporting Elements of Charter



From Figure 1 it is clear that two main levels exist. Firstly, the Legislative Level comprises the Municipal Corporate Governance of ICT Policy, referred to as "a" in Figure 1. This is a legislative document from the Department of Cooperative Governance and Traditional Affairs containing requirements that local government must adhere to. Secondly, Figure 1 shows the Local Government Level. This level comprises of multiple elements which is further divided into sub-levels.

The first sub-level is the Executive sub-level which contains the Charter, referred to as "b" in Figure 1. This Charter receives various inputs from "a" but also flows into the next sub-level

The second sub-level is the Tactical sub-level which receives input from "a" and contains three elements. Firstly, the ICT Plan, referred to as "c" in Figure 1, and secondly the Corporate Governance of ICT Policy for Eden Municipality, referred to as "d" in Figure 1. Both these elements will provide guidance and input for the third element, the ICT Plan, referred to as "e" in Figure 1.

The third sub-level contains the implementation of the combined elements and is called the Operational sub-level. Within this sub-level, the Implementation of Plan, referred to as "f" in Figure 1, is housed and receives input from both "d" an "e" in the Tactical sub-level.

All these elements together address the Corporate Governance of ICT in Eden Municipality.

Commented [pd4]: Figure 1 explains the relationship with the different components that is mentioned in this Charter. This is a generic relationship and should be adapted if necessary. Please change the XXX to your individual municipality name.

3 Legislation

As dictated by the Municipal Corporate Governance of ICT Policy (Figure 1: a), multiple best practices and standards and legislation were used in order to draft this Charter.

3.1 External Inputs

1. ISO/IEC 38500 standard
2. King III Code
3. COBIT 5 processes

3.2 Legislation

1. Municipal Systems Act 2000 (Act 32 of 2000)
2. Municipal Finance Management Act 2003 (Act 56 of 2003)

These best practices, standards and legislation form the basis of the structures needed in order to implement the Corporate Governance of ICT.

Commented [pd5]: Regardless of the size or type of municipality, these are the related documents that has been evaluated in order to draft this Charter. All the mentioned documents are important and should be kept in this section.

4 Scope

This Charter for Corporate Governance of ICT (Figure 1: b) is applicable to Eden Municipality collectively, as stated in the approved Municipal Corporate Governance of ICT Policy (Figure 1: a). The Executive Authority, Accounting Officer and Executive Management are important driving factors in this regard. This Charter is the mandate on how the Governance of ICT will be established in Eden Municipality. Reference is made to the ICT Plan (Figure 1: c) which will address what must be done in order to implement the Governance of ICT.

Commented [pd6]: This section will remain the same for every type and size of municipality. Please change the XXX to your individual municipality name.

5 Key Elements

In order to support the importance of the Charter document, reference is made to King III.

5.1 King III Principles

1. The Municipal Council of local government, is responsible for Information Communication Technology (ICT) Governance.

The King III Code recommends that strategic management (the Municipal Council in this case) should establish an ICT Charter (Figure 1: b). Furthermore, this ICT Charter will outline the decision-making rights and accountability framework for the Governance of ICT that would enable the desirable culture in the use of ICT within the municipality.

Supporting the above mentioned King III Code, are COBIT 5 key elements.

5.2 COBIT Key Elements

1. **Strategic alignment** focuses on ensuring the linkage of business and ICT plans, defining, maintaining and validating the ICT value proposition, and aligning ICT operations with enterprise operations.
2. **Value delivery** is about executing the value proposition throughout the delivery cycle, ensuring that ICT delivers the promised benefits against the strategy, concentrating on optimising costs and proving the intrinsic value of ICT.
3. **Resource management** is about the optimal investment in, and the proper management of, critical ICT resources: applications, information, infrastructure and people. Key issues relate to the optimisation of knowledge and infrastructure.
4. **Risk management** requires risk awareness by senior organisational officers, a clear understanding of the enterprise's appetite for risk, understanding of compliance

requirements, transparency about the significant risks to the enterprise and embedding of risk management responsibilities into the organisation.

5. **Performance measurement** tracks and monitors strategy implementation, project completion, resource usage, process performance and service delivery, using, for example, balanced scorecards that translate strategy into action to achieve goals measurable beyond conventional accounting.

Based from these above mentioned key elements, the objectives of this Charter can clearly be defined below.

Commented [pd7]: This section is linked to Section 3: Legislation. These elements form the basis of proper ICT Governance and should therefore be left in this section. If there exist certain principles/elements that you wish to add, you may add them under their own heading.

6 Objectives of Charter

As dictated by the Municipal Corporate Governance of ICT Policy (Figure 1: a), the objectives of the Charter (Figure 1: b) are as follows:

a) To identify and establish a Corporate Governance of ICT Policy (Figure 1: d) and implementation guideline for the municipality;
b) To embed the Corporate Governance of ICT as a subset of the municipal governance objectives.
c) Create municipal value through ICT enablement by ensuring municipal IDP and ICT strategic alignment;
d) Provide relevant ICT resources, organisational structure, capacity and capability to enable ICT service delivery;
e) Achieve and monitor ICT service delivery performance and conformance to relevant internal and external policies, frameworks, laws, regulations, standards and practices;
f) Implement the governance of ICT in the municipality, based on an approved implementation plan (Figure 1: e).

Regarding the above mentioned objectives, certain structures need to be in place in order to address each objective. These structures need to be in place

Commented [pd8]: All these objectives of the Charter should remain in this document as it comes directly from the Municipal Corporate Governance of ICT Policy document. This section highlight what this Charter is trying to achieve.

7 Structures, Functions, Roles and Responsibilities

The Charter outlines the decision making rights and accountability of ICT governance that will enable the desirable culture in the use of ICT within the municipality. This is achieved by requiring ICT management to provide timely information to comply with direction given by Municipal Council and to conform to the principles of good governance.

Commented [pd9]: This section dictates that there should exist certain structures in your municipality, supported by functions which perform specific roles and responsibilities. It is important that the Charter dictates this, to provide accountability for various role players in your municipality. Do not remove this statement.

7.1 Structures

Specific structures should be established to give effect to the Governance of ICT, and the management of ICT functions.

7.1.1 High Level Structure

The Corporate Governance of ICT has three tiers, and each tier has a process for decisions and reporting, as listed in Table 1.

Commented [pd10]: This section lists a generic "High Level" structure that depicts the decision making rights of the three levels: Executive Authority, Tactical and Process level.

Structure	Position	Responsibility	Process
Executive Authority Level	Mayor/Council and Municipal Manager	Direct and Monitor the Performance of ICT	Annual Municipal Council Meeting
Tactical Level	Municipal Manager/HODs/Assigned councilors.	Supervise, check and act to effectively leverage ICT resources	ICT Steering committee/Head of Department Meetings
Process Level/ Operational Level	Manager: IT/IT department	Activities are preformed, controlled and check in alignment with business objectives	Day to day processes

Commented [pd11]: Table 1 will remain fairly static as it is a generic table based off the Municipal Corporate Governance of ICT Policy and best practices and standards. If there exist additional information for you municipality, please add it in the related space.

Table 1: Three-Tiered Structure

Other structures should also be established that will support the three-tiered structure.

7.1.2 Other Structures

Commented [pd12]: Three main structures is given that support Table 1. If there exist any other related structures, please add them here. If some of the mentioned structures are performed by a single unified structure, please update the name accordingly, followed by their basic responsibility/ function.

1. Municipal ICT Steering Committee/ Risk Committee
   - The establishment of an appropriate ICT steering Committee will ensure that the application, management and review of the organizations ICT strategies and plans are consistent with the goals and objectives of the organisation and will ensure that the department complies with legislation
   - The ICT Steering Committee will advise management on all matters related to ICT

Commented [pd13]: Structure 1 is typically the Municipal ICT Steering Committee. Their typical responsibility/ function is also listed. If more information is required, add the information to the supported structure.

2. Municipal Risk Committee
   - The establishment of an appropriate Municipal Risk Committee will accept the responsibility to perform an oversight role for the identification and mitigation of ICT-related risks

- The Municipal Risk Committee will assist management in carrying out the Corporate Governance of ICT accountabilities and responsibilities

3. ICT Audit Committee
    - The establishment of an appropriate ICT Audit Committee will accept the responsibility to perform management of ICT audit and governance compliance
    - The ICT Audit Committee will assist management in carrying out the Corporate Governance of ICT accountabilities and responsibilities

More detail of the mentioned structures can be found in the supported ICT Plan.

Specific policies and plans need to be established to support the mentioned structures.

7.1.3 Established Policies and Plans

1. Risk Management Policy
2. Internal Audit Plan
3. ICT Plan (Figure 1: c)
4. Portfolio Management Framework
5. ICT Disaster Recovery Plan
6. Data Backup and Recovery policy
7. ICT Service Level Agreement Management policy
8. ICT User Access Management policy
9. ICT Security Controls policy / Appoint CIO
10. ICT Operating System Security Controls policy

According to the Municipal Corporate Governance of ICT Policy (Figure 1: a), the above mentioned structures, including established policies and plans, should be established in order to complete the phases of Corporate Governance of ICT.

7.2 Functions, Roles and Responsibilities

According to the Municipal Corporate Governance of ICT Policy (Figure 1: a), specific functions, roles and responsibilities should exist, regarding the established structures.

These functions, roles and responsibilities are addressed in the ICT Plan (Figure 1: c). The ICT Plan addresses what must be done in order to effectively govern ICT.

Commented [pd14]: Structure 2 is typically the Municipal Risk Committee. Their typical responsibility/ function is also listed. If more information is required, add the information to the supported structure.

Commented [pd15]: Structure 3 is typically the ICT Audit Committee. Their typical responsibility/ function is also listed. If more information is required, add the information to the supported structure.

Commented [pd16]: The Charter should mention that the ICT Plan document supports the Charter by providing detailed information on responsibilities. This statement should be left here in order to create a link between the two documents.

Commented [pd17]: Supporting the above mentioned structures, the Municipal Corporate Governance of ICT Policy states that specific policies should be in place. This section highlights the policies that should be implemented or in the process of implementation. These policies should not be removed, as all the policies are important and cognisance should be taken of them.

Commented [pd18]: These are the critical policies that need to be in place. The Municipal Council has to commit to implementing these policies. If there exist another policy that you feel should be part of the Charter, please add it the list below. If one of these policies is removed, justification should be given followed by an accountability statement of why the policy is not important/ applicable.

Commented [pd19]: This section briefly mentions that each structure has a specific function, role and responsibility. Reference is made to the ICT Plan. If new structures were added to the Charter, please update the ICT Plan accordingly.

7.3 Members

Regarding the structures previously mentioned, specific members need to form part of each structure. The ICT Plan addresses the members of each structure.

All mentioned structures, functions, roles and responsibilities are important to give effect to the Governance of ICT.

Commented [pd20]: This section briefly mentions that each structure has a specific members associated with it. Reference is made to the ICT Plan. If new structures were added to the Charter, please update the ICT Plan accordingly.

8 Framework Policies and Guidelines

Corporate Governance of ICT is a collection of various documents and policies which guides council in decision making, monitoring risks and performance. These are required to ensure that status quo, business direction and management procedures are documented and available. The following policies and documents are required to ensure the governance of ICT and is linked to this Charter document:

Commented [pd21]: This section will stay fairly static, as it provides a basic view of overall Corporate Governance of ICT in your municipality.

Policy	Requirements
Corporate Governance of ICT Charter (This Document) (Figure 1: b)	▪ Accountability of allocated to departments ▪ Business and ICT structures defined ▪ Business and ICT role and responsibilities defined ▪ Business and ICT decision making powers defined ▪ Business and ICT delegations allocated
ICT Plan (Department ICT strategy/ICT Plan/Master Systems Plan/ ICT System Plan/ ICT Management Framework) (Figure 1: c)	▪ Mapping of elements of information plan in ICT plan ▪ Departmental business assurance that ICT understands the business and its processes ▪ Business service delivery and ICT alignment ▪ Current and future ICT status: skills, structure and policies ▪ Multi-year high level ICT implementation roadmap
ICT Implementation Plan/ ICT Management Plan (Figure 1: e)	▪ Detailed ICT implementation roadmap that ▪ reflects annual milestones as derived from the high-level roadmap ▪ Departmental programme and project management plan that reflects ICT projects ▪ Medium term ICT budget requirements

Policy	Requirements
ICT Operational Plan	▪ Owned and developed by IT but executive management must ensure it is aligned to business ▪ ICT operational policies ▪ IT assets, resources, capacity and capability optimised ▪ Applications, information and technology use and management ▪ Management of ICT related business risk
Continuous Improvement Roadmap	▪ Policies revised at least every 3 years (developed by business on a strategic level and IT department on an operational level) ▪ ICT Plan ▪ ICT Implementation Plan ▪ ICT Operational Plan ▪ Roadmap linked to Annual Performance Plans to improve and functionality of: ▪ CGICT system ▪ Business and ICT service delivery alignment ▪ Business management of ICT ▪ Governance of and management of ICT

Table 4: Framework Policies and Guidelines

Commented [pd22]: This table provides information regarding the overall framework of what is needed to achieve Corporate Governance of ICT in your municipality. The first level provides a summary of the Charter (this current document). It is important to not remove statement, however one can add additional information. If some of the names in your municipality are different to the mentioned policies and documents, please change the names in Table 4 accordingly.

9 Evaluation and Review

The review of policies and procedures ensures the adaption to new legislation, executive decision making platforms that may change and maturing of ICT governance. Associated Policies must be reviewed or revised.

The policies must be developed or reviewed by management on a strategic level and IT department on an operational level. This process must be linked on the Improvement Roadmap and Annual Performance Plans.

The Executive Authority Level and Executive Management give their full support, for determining the required processes needed for Corporate Governance of ICT as well as the implementation thereof, as far as possible from an administrative and financial capability.

Commented [pd23]: This section should not be removed as it provides the commitment from the Municipal Council that they stay invested in the process of reviewing policies and related legislation. Furthermore, this section provides a very important statement off support This statement shows that the Executive Authority Level supports the full implementation of Corporate Governance of ICT in your municipality. By giving their full support, they also acknowledge the accountability that remains with them.

_____ _____

Signed Date

C.4 Generic ICT Plan Document

The generic ICT Plan document can be modified by using the internal comments. In doing this, a tailored document can be provided to any local government entity (see Section 5.5.6).

Commented [pd1]: Please change the logo to your individual municipality's logo

ICT PLAN

Draft 1.4

NOVEMBER 29, 2016

XXX MUNICIPALITY

Contents

1 Purpose of ICT Plan

This ICT Plan will provide guidance to what must be done for the creation and maintenance of effective enabling governance structures, processes and practices as dictated by the Corporate Governance of ICT Charter. The ICT Plan will also clarify the governance of ICT-related roles and responsibilities towards achieving the municipality's strategic goals as dictated by the Corporate Governance of ICT Charter.

Commented [pd2]: The purpose of this document will remain the same irrespective of the municipality

2 Introduction

The ICT Plan depicts what XXX Municipality must do to implement the directives given by the Corporate Governance of ICT Charter. This is addressed by giving detailed roles and responsibilities and reporting responsibilities, that supports what must be done. This ICT Plan has been customised to accommodate XXX Municipality's unique operating environment, whilst ensuring the principles of the Municipal Corporate Governance of ICT Policy are maintained.

Commented [pd3]: This section will remain unchanged for all municipalities. Please change the XXX to the name of your individual municipality

3 Scope

This ICT Plan is applicable to XXX Municipality collectively, as stated in the approved Municipal Corporate Governance of ICT Policy. The Executive Authority, Accounting Officer and Executive Management are important driving factors in this regard. This ICT Plan is the mandate of what XXX Municipality will do to implement the Governance of ICT.

Commented [pd4]: This section will remain unchanged for all municipalities. Please change the XXX to the name of your individual municipality

4 Structures, Functions, Roles and Responsibilities

According to the Corporate Governance of ICT Charter, these structures, functions, roles and responsibilities should exist.

4.1 Structures

According to the Corporate Governance of ICT Charter, these are the structures that needs to be established.

Commented [pd5]: Figure 1 explains the different structures, with underlying members, that should exist in support to the Charter. This is a generic structure and should be adapted if necessary. Please change the XXX to your individual municipality name.

Figure 1: Structure – Charter Directive

4.2 Functions, Roles and Responsibilities

Regarding these structures, these are the functions, roles and responsibilities of these established structures.

Commented [pd6]: This section provides information regarding the functions, roles and responsibilities of different stakeholders belonging to the mentioned structures in Figure 1.

4.2.1 The Municipal Council

The Municipal Council must provide political leadership and strategic direction through:

- Determining policy and providing oversight;
- Take an interest in the Corporate Governance of ICT to the extent necessary to ensure that a properly established and functioning Corporate Governance of ICT system is in place in the municipality to leverage ICT as an enabler the municipal IDP;
- Assist the Municipal Manager to deal with intergovernmental, political and other ICT-related Municipal issues beyond their direct control and influence; and
- Ensuring that the municipality's organisational structure makes provision for the Corporate Governance of ICT.

Commented [pd7]: The first function is the Municipal Council. All the responsibilities and roles mentioned here should remain unchanged, as it is based off the King III Code as well as the Municipal Corporate Governance of ICT Policy. Please add other roles and responsibilities of the Municipal Council to this section, should there exist a need.

4.2.2 Municipal Manager

The Municipal Manager must provide strategic leadership and management of ICT through:

- Ensuring alignment of the ICT strategic plan with the municipal IDP;

- Ensuring that the Corporate Governance of ICT is placed on the municipality's strategic agenda;
- Ensuring that the Corporate Governance of ICT Policy Framework, charter and related policies for the institutionalisation of the Corporate Governance of ICT are developed and implemented by management;
- Determining the delegation of authority, personal responsibilities and accountability to the Management with regards to the Corporate Governance of ICT;
- Ensuring the realisation of municipality-wide value through ICT service delivery and management of Municipal and ICT-related risks;
- Ensuring that appropriate ICT capability and capacity are provided and a suitably qualified and experienced Governance Champion is designated;
- Ensuring that appropriate ICT capacity and capability are provided and that a designated official at a Management level takes accountability for the Management of ICT in the municipality; and
- Ensuring the monitoring and evaluation of the effectiveness of the Corporate Governance of ICT system e.g. ICT steering committee.

Commented [pd8]: The second function is the Municipal Manager. All the responsibilities and roles mentioned here should remain unchanged, as it is based off the King III Code as well as the Municipal Corporate Governance of ICT Policy. Please add other roles and responsibilities of the Municipal Manager to this section, should there exist a need.

4.2.3 Municipal ICT Steering Committee

Commented [pd9]: In some cases this Municipal Steering Committee might be replaced by another Committee. Please update the name accordingly

Municipal ICT Steering Committee must assist the Municipal Manager in carrying out his/her Corporate Governance of ICT accountabilities and responsibilities by ensuring the planning, monitoring and evaluation, of the municipalities:

- ICT structures.
- ICT policies.
- ICT procedures, processes, mechanisms and controls regarding all aspects of ICT use (Municipal and ICT) are clearly defined, implemented and enforced.
- ICT Performance Management.
- ICT Change Management.
- ICT Contingency Plans.
- ICT Strategy development.
- Management of ICT Security and Data Integrity.
- The establishment of the municipalities ICT Ethical culture.
- The evaluation, directing and monitoring of ICT specific projects.
- ICT Strategic alignment, in order to align ICT with the IDP (Strategic Objectives).

- ICT Governance compliance.
- ICT Infrastructure Management.
- ICT Security.
- ICT Application Management.
- ICT Value.
- ICT Data availability and integrity.
- ICT Vendor Management.
- The evaluation, directing and monitoring of ICT processes

4.2.4 Risk and Audit Committee

The Risk and Audit Committee has the responsibility of:

- Performing an oversight role for the Identification and Management of ICT audit and governance compliance, and ICT Risks.

4.2.5 Management

Management must ensure that:

- ICT strategic goals are aligned with the municipality's Municipal strategic goals and support the municipal processes;
- Municipal-related ICT strategic goals are cascaded throughout the municipality for implementation and are reported on.

Supporting these functions, roles and responsibilities, is the RACI (Responsible, Accountable, Consulted and Informed) chart. This RACI chart shows the decision powers in relation to the decision topic.

Commented [pd10]: The third function is the Municipal Steering Committee. Most of the responsibilities and roles mentioned here should remain unchanged, as it is based off the King III Code as well as the Municipal Corporate Governance of ICT Policy. If there are certain tasks that is not performed by this Municipal Steering Committee, please remove them. Please also add other roles and responsibilities of the Municipal Steering Committee to this section, should there exist a need.

Commented [pd11]: The forth function is the Risk and Audit Committee, in some cases this Risk and Audit Committee might be replaced by another Committee. Please update the name accordingly. The main responsibility and role is mentioned here and should ideally remain unchanged, as it is based off the King III Code as well as the Municipal Corporate Governance of ICT Policy. Please add other roles and responsibilities of the Risk and Audit Committee to this section, should there exist a need.

Commented [pd12]: The fifth function is Management. Ideally the responsibilities and roles mentioned here should remain unchanged, as it is based off the King III Code as well as the Municipal Corporate Governance of ICT Policy. If there are certain tasks that is not performed by Management, please remove them. Please also add other roles and responsibilities of Management to this section, should there exist a need.

If there exist any other function in this section, please add the related function in this section, with clear description of the function's roles and responsibilities.

Commented [pd13]: If any of the information in Section 4 has changed, please update accordingly in the RACI chart below. This RACI chart was adopted from the Municipal Corporate Governance of ICT Policy, and serves only as an example RACI chart.

Figure 2: RACI Chart for Decisions

Decision Topic	Scope	RACI chart for various committees				
		Council	Audit & Risk Committee	ICT Steering Committee	Business Units	Year
ICT Governance	1. Aligning with existing municipal governance structures.	A	R	R	C & I	2016
	2. Establishing principles, structures, and objectives.	A	R	R	C & I	2015
Organizational Strategy	1. Defining of Municipal goals and objectives through the Integrated Development Plan.	C	A & R	I	C & I	2017
	2. Deciding where and how ICT can enable and support business objectives.	C	A & R	I	C & I	2015
ICT Policies	1. Providing accurate, understandable and approved policies, procedures, guidelines and other documentation to stakeholders.	A	C & I	R	R & I	2015
	2. Developing and rolling - out ICT policies.	A	C & I	R	C & I	2015
	3. Enforcing ICT policies.	C & I	C & I	A & R	A & R	2015
ICT Strategy	1. Generate Understanding current ICT- capabilities.	C	C & I	A & R	C & I	2016
	2. Engaging with Business Units and Executive Management in aligning ICT- strategic planning with current and future municipal needs.	C	C & I	A & R	C & I	2017
	3. Providing for a prioritisation scheme for the ICT objectives that quantifies the business requirements.	A	C	R	C & I	2018
ICT Technology Direction	1. Providing appropriate platforms for municipal applications in line with the defined ICT- architecture and technology standards.	I	C	A & R	C & I	2017
	2. Planning infrastructure architecture.	I	C	A & R	C & I	2015
ICT methods and frameworks	1. Establishing transparent, flexible and responsive ICT- micro structures.	A	C & I	R	C & I	2015
	2. Defining an ICT- process framework.	I	C & I	A&R	C & I	2018
	3. Defining and implementing ICT processes that integrate owners, roles and responsibilities processes in the form of delegations.	A	C & I	R	C & I	2016
ICT Architecture	1. Establishing a forum to guide architecture and verify compliance.	I	C	A&R	C & I	2015
	2. Defining and implementing a technology infrastructure plan, architecture and standards that recognise and leverage technology opportunities.	I	C	A&R	C & I	2016
	3. Establishing the technology infrastructure plan balanced against cost, risk and requirements.	I	C	A&R	C & I	2019
Information Architecture	1. Defining the information architecture, including the establishment of an enterprise data model that incorporates a data classification scheme.	I	C	A&R	I	2017
	2. Ensuring the accuracy of the information architecture and data model.	I	C	A&R	I	2019
	3. Assigning data ownership.	A	C	R	I	2015
	4. Classifying information using an agreed-upon classification scheme.	I	C	A&R	I	2016

4.3 Members

Regarding the structures previously mentioned, these are the typical members of these structures.

Commented [pd14]: Table 3 discusses the members of the different committees that exist within a typical municipality.

STRUCTURE	MEMBERS
ICT STEERING COMMITTEE (Committee of Management)	Designated Members of Management and the ICT Manager. The Chairperson shall be a designated member of the Management of the Municipality duly appointed by the Municipal Manager. Example of Members: Municipal Manager (Chairperson) General Manager: Finance Department General Manager: Corporate Services General Manager: Community Services General Manager: Technical

	General Manager: Mayor's Office General Manager: Planning Economic Development Two councilors as nominated by the Executive Mayor Manager: IT and Business Analyst (where needed)
Audit Committee and Risk Committee	Nominated members of the Audit and Risk committee/s of the municipality and the ICT

Table 3: Corporate Governance of ICT Structures - Members

Commented [pd15]: The listed members are typically part of the ICT Steering Committee. If there are any members that do not form part of this Committee, please remove them. If there is a member that is not listed, please add that member to this list.

Commented [pd16]: Please add the members that belong to the Audit and Risk Committee in this space. It is important to know who is part of this functioning committee.

All mentioned structures, functions, roles and responsibilities are important to give effect to the Governance of ICT.

5 Processes

After the establishment of the mentioned structures. Specific processes from COBIT 5 needs to be implemented. In order to determine which processes to implement, a Process-Goal exercise will have to be completed. By completing this exercise, specific COBIT 5 processes will be identified. Each individual COBIT 5 process has one or more unique activities which must be implemented on the Operational Level, as shown in Figure 1.

Commented [pd17]: This section shows the commitment from the Municipal Council to do a proper Process-Goal exercise in order to identify the processes that the municipality should implement in a specified timeframe.

The identified COBIT 5 processes which has been selected for XXX Municipality, based on the Process-Goal exercise, is in the form of a list. This list can be printed and attached as an Appendix to this document.

Commented [pd18]: Mention is made to the ICT Implementation Plan. This is a physical print out of all the identified processes from the Process-Goal exercise. If need be, the document can also be attached to this ICT Plan policy as an addendum.

_____ _____

Signed Date

LET'S

EDIT

DECLARATION BY LANGUAGE EDITOR

01 December 2016

TO WHOM IT MAY CONCERN

DECLARATION: Language Editing of Dissertation

I hereby declare that I have edited the Master of Information Technology (MIT) dissertation of PETRUS MARTHINUS JACOBUS DELPORT entitled *"**A FRAMEWORK FOR THE CORPORATE GOVERNANCE OF ICT IN LOCAL GOVERNMENT**"* and found the written work to be free of ambiguity and obvious errors. The scope of the edit was from chapter 1 to the end of chapter 7. It is the responsibility of the student to address any comments from the editor or supervisor. Additionally, it is the final responsibility of the student to make sure of the correctness of the dissertation.

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All glory be to Jesus Christ

“I can do all things through Christ which strengthens me.”

Philippians 4:13