IT GOVERNANCE IN TANZANIAN PUBLIC SECTOR ORGANISATIONS

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IT governance in Tanzanian public sector organisations

Edephonce Ngemera Nfuka
To my Loving wife, Clementina, and daughters, Bel and Della.
Abstract

In many public sector organisations, the use of Information Technology (IT) has become important for sustaining and extending public service delivery. This has caused there to be a critical dependency on IT, which calls for a specific focus on effective IT governance. Accordingly, the success factors for effective IT governance must be determined and adhered to if an organisation wishes to increase the contribution of IT towards achieving its objectives. Much research has been carried out on IT governance effectiveness and the necessary success factors, but not with a focus on organisations from a developing country such as Tanzania. The context in these organisations is characterised by IT resources, knowledge and culture constraints as well as by an increasing level of IT investment and applications.

In this research, we analyse how IT governance practices are implemented in Tanzanian public sector organisations (TaPSOs) and benchmark their levels of maturity. Furthermore, we analyse and identify the critical success factors (CSFs) that contribute to effective IT governance in TaPSOs. Subsequently, we analyse the effects of these CSFs on IT governance performance and develop and evaluate a CSFs framework for implementing effective IT governance in TaPSOs.

We find weak IT governance practices, especially in terms of processes. This was also pointed out by the lower level of IT governance maturity in TaPSOs in contrast to public sector organisations in developed countries. Furthermore, we find that the identified CSFs have a significant effect on IT governance performance in TaPSOs. In addition, the designed CSFs framework is found to be important for providing guidelines to be used by IT and business management personnel for implementing effective IT governance. This CSFs framework for implementing effective IT governance in TaPSOs consists of the IT governance focus areas, CSFs, activities, roles, IT resources and environment in which it should be implemented. In contrast to existing frameworks from the research literature, the designed CSFs framework offers a holistic view by focusing on the five IT governance focus areas.
Sammanfattning

För många offentliga organisationer har användning av informationsteknologi (IT) blivit avgörande för att kunna upprätthålla och utöka sina utbud av offentliga tjänster. Detta har resulterat i ett kritiskt beroende av IT som i sin tur kräver en specifik form av IT-governance samt framgångsfaktorer anpassade till detta. En stor mängd forskning har bedrivits kring IT-governance och framgångsfaktorer för offentlig sektor, dock inte med fokus på utvecklingsländer, som Tanzanias offentliga organisationer (Tanzanian public sector organisations, TaPSOs). Kännetecknande för TaPSO:s kontext är å sidan begränsningar gällande existerande IT-resurser, kunskap och kultur, å andra sidan en pågående ökning av IT-investeringar och applikationer.

I vår forskning har vi dels analyserat hur arbetspraktiker inom IT-governance är implementerade i TaPSOs, dels utvärderat dessa praktikers mognadsnivå med hjälp av benchmarking. Vi har också analyserat och identifierat kritiska framgångsfaktorer (KFF) för effektiv IT governance vid TaPSOs. Vidare så har vi undersökt vilken effekt som identifierade KFF:er har på IT governance. Slutligen har vi utvecklat och utvärderat ett KFF-ramverk för att implementera effektiv IT-governance vid TaPSOs.

Resultatet från vår forskning indikerar att det finns bristande arbetspraktiker inom IT-governance för TaPSOs, särskilt inom området processhantering. Detta accentueras också av den utvärdering som vi genomfört och som visar på lägre mognadsnivåer hos IT-governance vid TaPSOs i jämförelse med offentliga sektor hos utvecklade länder, men även internationellt. Vår forskning indikerar vidare att de KFF:er som vi identifierat signifikant har ökat effektiviteten hos IT-governance. Forskningen indikerar också att det utformade KFF-ramverket är viktigt för att kunna erbjuda riktlinjer så att effektiv IT governance ska kunna implementeras vid TaPSOs av IT- och verksamhetsansvariga. I kontrast till existerande ramverk har det designade KFF-ramverket en holistisk syn genom att fokusera på fem fokusområden: KFF:er, aktiviteter, roller, IT-resurser och den omgivning i vilken KFF:erna ska implementeras.
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2 Tanzania Revenue Authority
3 Medical Stores Department
4 Prime Minister’s Office – Regional Administration and Local Government
5 President Office – Public Service Management
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List of abbreviations

BSC  Balanced Scorecard
CEMIPS  Capacity Building on Effective Management of ICT in the Public Sector in Tanzania
CEO  Chief Executive Officer
CIO  Chief Information Officer
COBIT  Control Objectives for Information and related Technology
CSFs  Critical Success Factors
HDI  Human Development Index
ICT4D  ICT for Development
IT  Information Technology
ITGI  Information Technology Governance Institute
ITIL  IT Infrastructure Library
MDAs  Ministries, Departments and Agencies
MoFEA  Ministry of Finance and Economic Affairs
MSD  Medical Stores Department
MTEF  Medium-Term Expenditure Framework
PLS  Partial Least Squares
PMO-RALG  Prime Minister's Office-Regional Authority and Local Government
PO-PSM  President's Office-Public Service Management
SEM  Structural Equation Modelling
SPIDER  Swedish Program for ICT in Developing Regions
SWOT  Strength, Weakness, Opportunity and Threat
TCRA  Tanzania Communication Regulatory Authority
TRA  Tanzania Revenue Authority
TaPSOs  Tanzanian Public Sector Organisations
1. Introduction

This thesis investigates Information Technology (IT) governance in Tanzanian Public Sector Organisations (TaPSOs) from the perspective of a developing country. In this first chapter, we present the background, research problem and research goal, purpose and questions. Moreover, we briefly describe the included and related publications and outline the structure of the thesis.

1.1 Background

Many organisations today rely on IT and continue to make significant IT investments to enable their strategic and operational practices (Duffy, 2002a; Weill & Ross, 2004; ITGI, 2006, 2007a; Bowen et al., 2007). Among these are public sector organisations, which are defined as a part of economic and administrative life that deals with government service delivery (Lane, 1995; OECD, 2006). These organisations are vital for the socio-economic development of a country and the prosperity of its people and thus efforts to sustain and improve its public service delivery are commendable.

Over the years, the use of IT in these public sector organisations has become critical to sustaining and improving public service delivery (Brown, 2003; Amaravadi, 2005; Ali & Green, 2007; UN, 2010). This is because of the increased IT application of and dependency on a more efficient and cost-effective public service delivery. It is also because of a continued effort to embrace e-government\(^8\) (Weerakkody et al., 2009), which is vital for efficient, responsive and accountable government.

However, the application of IT and its management in these organisations involves an array of organisational, technical, political, legal and cultural concerns. These concerns include more bureaucracy and lower managerial autonomy (Lane, 1995; Nicoll, 2005) and thus less freedom to act as and when they see fit. Others are wider accountability and expectations (Liu & Ridley, 2005; Sethibe et al., 2007) and the difficulties in setting and measuring IT performance and contribution to business goals. Furthermore, han-

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\(^8\) e-Government refers to the use of IT to exchange information and services with citizens, businesses and other arms of government (Rowaisi, 2007).
dling intra- and inter-organisational relationships and synergies is complex (Weill & Ross, 2004; NARA, 2005; Imran & Gregor, 2005) and there are difficulties in IT support for service quality and economies of scale. Similarly, changing legislature, ministerial requirements and the more frequent rollout of top management (Liu & Ridley, 2005; Sethibe et al., 2007) need well-established focuses and mechanisms to allow continuity. Moreover, complex legal, regulatory and cultural change requirements (Lane, 1995; NARA, 2005) lead to difficulties in embedding the optimal application of IT.

Apart from public sector concerns, the application of IT and its management also has concerns with regard to successful IT integration and its effect on the business. These include IT/business alignment, runaway IT projects, value delivery, risk control and the optimal use and performance of resources. For example, in a survey conducted by Luftman and Ben-Zvi (2010), the top 10 management concerns included IT/business alignment, business productivity and cost reductions. This also applies to Peterson (2001) and Schwarz and Hirschheim (2003) in terms of the coordination of IT resources for optimal use, and Ali and Green (2007) in terms of runaway IT projects. Similarly, in ITGI (2007a) and ITGI and PwC (2006a, 2008), concerns ranged from low return on IT investment and inadequate controls to not having a view of IT performance. Altogether, these concerns imply the need for IT governance to ensure that IT is aligned with the business to optimise its application and deliver business value.

Although there are various IT governance definitions (Simonsson & John-
son, 2005), one of the most prevalent is defined as an “integral part of enterprise governance. It has potential to provide the leadership, organizational structures and processes that ensure that the enterprise’s IT sustains and extends the enterprise’s strategies and objectives” (ITGI, 2003). Being an integral part of enterprise governance also means it is part of the system by which organisations are directed and controlled (OECD, 2004; Parfitt & Tryfonas, 2009). Its potential lies in the fact that the most significant IT issues, currently and in the future, will not be technology-related, but governance-related (Guldentops et al., 2002). For example, although Carr (2003) indicated that IT no longer matters because it is rather becoming a commodity, Weill and Ross (2004) in an IT governance-related study showed a dif-
ferent view. They showed that there is at least a 20% better return on IT investments when effective IT governance is in place, i.e. when IT governance effectiveness is adhered to.

Effective IT governance is defined as “an actively designed set of IT governance mechanisms that encourage behavior consistent with the organisation’s mission, strategy and culture” (Weill & Ross, 2004). Such effective IT governance has also been shown to ensure alignment between IT and business goals (Ali & Green, 2009), which is one of the drivers of IT governance (ITGI, 2003). This also applies to Rau (2004) and Ali and Green (2005), which indicated its contribution to meeting an organisation’s objectives because of, among others, its importance in realising top management support, organisational readiness and stakeholder participation. The importance of effective IT governance has also been shown in IT governance global surveys because of its contribution to business value from IT investment (Steuperaert, 2004; Deloitte, 2005; ITGI & PwC, 2006a, 2008).

The need for effective IT governance is also becoming important in TaPSOs from the perspective of a developing country. This is following a country’s various adjustments to regulatory and commercial policies that, among other things, have led to a converged IT sector (TzITpolicy, 2003; Miller et al., 2004; TCRA, 2010). With these adjustments, TaPSOs in particular have experienced dramatic changes in the demand for, investment in and use of IT in public service delivery (Bakari, 2007; Mutagahywa et al., 2007). This has also been accelerated by the national IT policy development (TzITpolicy, 2003) that was carried out in line with the country’s Vision 2025 (Tanzania, 2010). This policy indicated that the use of IT in the public sector is vital for more efficient and cost-effective public service delivery and Tanzania’s prosperity as a whole. To date, several IT-enabled business applications, including those for land, income tax, education, health, human resources, finance, planning and immigration (Mutagahywa et al., 2007), have been implemented and these are considered to be vital for improvement in public service delivery.

However, effective IT governance-related practices for envisaged improvements are yet to be fully realised along these applications in and across many of these TaPSOs (Miller, 2007; COSTECH, 2007; Nfuka et al., 2009). Also,
like other developing countries, Tanzania is characterised by low human development in contrast to developed countries (CIA, 2010; UNDP, 2010). For example, although the Human Development Index (HDI), which includes life expectancy, gross national income per capita and access to knowledge, had reached 0.398 by 2010, in developed countries it was mostly above 0.8. Such a low HDI value affects socio-economic development endeavours including IT governance processes and outcomes.

This is also amplified by constraints on IT resources. For example, apart from the remarkable increase in mobile penetration with tele-density from 1% in 2000 to 43% in 2009 (TCRA, 2010), IT infrastructure such as computers and Internet accessibility remains low. The available statistics indicate Internet access of 1.6% in contrast to the developed world with more than 60% (IWS, 2010). This also applies to the relatively low access to necessary IT facilities such as computers and associated networks (Mutagahywa et al., 2007). Other constraints are on knowledge and culture, e.g. the awareness of IT potential and leadership competencies to embrace the optimal use of IT (Mhayaya, 2003; Casmir & Yngstrom, 2003; Nfuka et al., 2009; Rusu & Tenga, 2010). These constraints are coupled with citizens’ basic competing needs and priorities such as access to electricity and clean water that entails solid mechanisms to convince, allow and sustain the flow of resources to IT.

1.2 Research problem
In line with the above-mentioned constraints and despite the efforts made to advance IT applications in TaPSOs, IT contribution to public service delivery improvement has been coupled with governance-related concerns such as:

- Fragmented IT initiatives and applications with the loss of synergies and economies of scale in and across organisations (Moyo, 1996; Ndou, 2004; Bakari, 2007).
- A lack of empirical data on which and to what extent IT governance practices have been applied.
- A lack of identified critical areas to which more focus can be directed for success given the IT resources and related knowledge and culture constraints.
• A lack of management support and active involvement of both IT and business personnel in planning, implementing and monitoring IT-enabled business applications (Suluo, 2003; Bakari, 2007; Nfuka et al., 2009).

• A lack of clear coordination, controls and active performance measures in and across organisations for government activities, computerisation and support (Mhayaya, 2003; Bakari, 2007; Nfuka et al., 2009).

• The ineffective use of the available IT professionals and difficulty in holding individuals accountable for their results, thus affecting the optimal use of IT (Abdallah, 2004; Nfuka et al., 2009).

• Difficulties in managing cost-effectively constantly rising IT investment including IT applications and enabling infrastructure. For example, the upgrade of the human capital management systems that manage government employees was estimated to be US$1 million in 2010 (PO-PSM, 2010). This also applies to the implementation of the national fibre optic infrastructure, which is vital for in-country efficient communication and collaboration, at US$170 million (IP, 2010). Furthermore is the national ID system, which is essential for secure and efficient e-government service provision, at US$176 million (Maimu, 2010).

• Difficulties managing increased demand in the responsive public sector and the higher expectation of IT contribution (Miller, 2007; Mutagahywa et al., 2007; Nfuka et al., 2009).

• The lack of a clear guide for IT integration into country development strategies and reform programmes, for instance the public sector reform programme and Tanzania’s poverty reduction and economic growth strategy in which most development efforts are coordinated (Mutagahywa et al., 2007; COSTECH, 2008).

Moreover, these governance concerns are amplified by the low attention paid to best practices for using and managing IT resources cost-effectively (Nfuka et al., 2009). This lowers IT governance performance, which is a rate of effective IT governance (Weill & Ross, 2004), causing negative consequences to the contribution of IT in public service delivery. These negative consequences are significant and relate to each other (Bakari, 2007; Nfuka & Rusu, 2007; Nfuka et al., 2009). For example:

• User frustration that eventually led to the use of the available IT-enabled
applications ineffectively or abandonment of them completely.

- IT investment losses that, given the magnitude of IT applications and enabling infrastructure put in place, amounted to a huge loss of funds, reputation and duplication of efforts. For example, the government’s weakness in streamlining these applications cost US$200 million (Maimu, 2006).
- Poor decision making given the amount of IT-related decisions that take place in TaPSOs uncoordinatedly, which led to lower IT contributions towards business goals.

These governance-related concerns and respective negative consequences are generally found across the five IT governance focus areas: strategic alignment, value delivery, risk management, resource management and performance measurement (ITGI, 2003, 2007a; Buckby et al., 2008).

Altogether they have led to the problem in this research, namely that IT governance in TaPSOs is ineffective.

A number of studies have responded to this problem. Several of these studies have looked at IT governance practices in the public sector including their influence on effective IT governance. However, this was in developed countries (Martin et al., 2005; Warland & Ridley, 2005; Lawry et al., 2007; Ali & Green, 2007). This also applies to the few studies that have indicated critical success factors (CSFs), which are “the limited number of areas in which satisfactory results will ensure a successful competitive performance for individual, department or organisation” (Rockart & Van Bullen, 1986).

The CSFs to consider in this case for effective IT governance in the public sector include the studies of Weill (2004) and Tan et al. (2007).

Moreover, a number of IT governance-related standards and frameworks exist as best practices to minimise such a problem (Larsen et al., 2006; ITGI & PwC, 2008). The broadly referred to and used international standard is Control Objectives for Information and related Technology (COBIT) and ISO 38500 for IT governance (ITGI, 2007b; ISO, 2008). Others are the IT Infrastructure Library (ITIL) and ISO 20000 for IT service management (ISO, 2008; OGC, 2008).
However, none of the above indicated studies, standards and frameworks has examined CSFs that have a holistic view of effective IT governance. In this case, holistic view means an approach across all five IT governance focus areas. Thus, holistic is defined as “a belief that the parts of something are intimately interconnected and explicable only by reference to the whole” (Soanes & Stevenson, 2004). The parts (focus areas) in this case of IT governance are strategic alignment, value delivery, risk management, resource management and performance measurement (ITGI, 2003; Buckby et al., 2008; Wilkin & Chenhall, 2010).

The referred frameworks were also too complex and generic for all organisations and situations, namely a ‘one size fits all’ approach. Thus, there was a need to consider specific context and geographical situations (Ribbers et al., 2002). Therefore, a holistic view of the few aspects to concentrate on for effective IT governance is paramount in public sector organisations. This approach together with the extent to which IT governance is practiced was even completely unrevealed in TaPSOs from the perspective of a developing country (Imran & Gregor, 2005; Nfuka et al., 2009). However, this was important because of the highlighted IT governance concerns and negative consequences. This also applies to the underlying IT resources, knowledge and culture constraints that bring us to the goal and purpose of this research.

1.3 Research goal, purpose and questions
This section indicates the goal and purpose of this research work and states the questions that guided the whole research process.

1.3.1 Research goal and purpose
The goal of this research work is to analyse how and to what extent IT governance practices are implemented and to design a CSFs framework for effective IT governance implementation in TaPSOs.

The purpose is to increase IT governance performance by achieving a more cost-effective use of IT and effective use of IT for growth, resource utilisation and business flexibility (Weill & Ross, 2004). In this way, the consequences of the ineffectiveness of IT governance in TaPSOs are reduced and this could lead to a more efficient and cost-effective public service delivery.
The users of these results are expected to be both IT and business management personnel. They will use them to recognise the state of IT governance and individual roles and eventually rationally plan, apply and continually improve IT governance implementation.

1.3.2 Research questions

The goal of this work is to be accomplished through two main research questions that are aligned with the defined research problem. For research simplicity, these two main questions are accomplished through four research questions (RQ1 to RQ4) that correspond to the undertaken research activities (research activities 1 to 4).

a) RQ1. How and to what extent are IT governance practices implemented in TaPSOs?

This question was answered by research activity 1, in which IT governance practices were analysed in terms of the:

- IT governance mechanisms and related implementation problems and consequences to be addressed in TaPSOs.
- IT governance maturity in TaPSOs and the comparison between public sector organisations in a developed country and internationally given the need to learn, benchmark and embrace best practices.

The research work for this question is addressed in Papers I and II.

b) How can IT governance practices in TaPSOs be improved in order to implement effective IT governance?

This question builds on the previous one by improving the determined IT governance practices, maturity and related concerns. Although there could be several ways to do so, as an intervention in this research work, CSFs were considered because of the highlighted concerns and the need to concentrate on few important areas and optimally use the scarce resources in TaPSOs. Moreover, this improvement through CSFs with a holistic view, i.e. across all five IT governance focus areas, has not before been applied in existing studies. This also applies to their correlated effect on IT governance performance. It is accomplished through three research questions (RQ2 to RQ4).

RQ2. Which CSFs enable effective IT governance in TaPSOs?
This question was answered by research activity 2, in which CSFs for implementing effective IT governance were analysed and identified.

The research work for this question is addressed in Paper III.

RQ3. What is the effect of CSFs on IT governance performance in TaPSOs?
This question was answered by research activity 3, in which the correlated effect of the identified CSFs on IT governance performance was statistically tested. Also analysed was how this correlated effect contributes to IT governance performance and the likely implication for public service delivery improvement.

The research work for this question is addressed in Paper IV.

RQ4. How can CSFs be implemented for effective IT governance in TaPSOs?
This question was answered by research activity 4, in which a method with guidelines in the form of a CSFs framework for implementing effective IT governance in TaPSOs (the CEITG framework) was developed and evaluated.

The research work for this question is addressed in Paper V.

1.4 Included papers and related publications
This section indicates the five main papers that are included in this thesis. It also presents the related publications. These included papers and related publications are listed below. The five included papers are as follows:

Paper I

Paper II
Paper III

Paper IV

Paper V

The following are the two related papers (journal and conference) and a chapter not included but that were part of the present research endeavours:


1.5 Outline of the thesis
This thesis consists of an introduction in the present chapter and research methodology in Chapter 2. It also consists of the theoretical foundation of IT governance in Chapter 3 and results and contributions in Chapters 4 and 5, respectively. Moreover, it consists of five included papers: Papers I to V. Finally, the appendices contain the questionnaires used in the entire research (Appendices 1 and 2) and a brief description of the IT landscape in Tanzania and public sector organisations in particular (Appendix 3).
2. Research methodology

In this chapter, the adopted research philosophy, methods and underlying data collection and analysis techniques are presented. This also applies to the research process as well as the validity and reliability of this research work.

2.1 Research philosophy, methods and underlying data collection and analysis techniques

This section describes the applied philosophical assumptions, methods and underlying data collection and analysis techniques. It also includes their relation to the research activities (research activities 1–4) in the next section.

2.1.1 Research philosophy

Referred to as the underlying epistemology\(^9\) that guides the research, philosophical assumptions can be interpretive, positivist and critical research (Garry, 1999; Trochim et al., 2007; Myers, 2008). Owing to the nature of this research, we indicate below the two philosophical assumptions that were applied, i.e. interpretive and positivist (Figure 1). The critical research, also included in this figure, was not applied as it assumes reality is socially constructed. It thus focuses on the social critique of current conditions (Alves-son & Deetz, 2000), which was not the focus of this research. The applied interpretive and positivist philosophical assumptions are as follows.

**Interpretive research** involves the exploration of a research topic and focuses on the meaning in context; it does not predefine the dependent and independent variables (Kuhn, 1970; Kaplan & Maxwell, 1994; Myers, 2008). This philosophical assumption was mainly applied in this research as it allowed the exploration and understanding of the context within which decisions and actions take place. In this case, the state of IT governance practices and CSFs for effective IT governance in TaPSOs (i.e. research activities 1 and 2).

**Positivist research** considers testing falsifiable theories. This is an attempt to increase the predictive understanding of phenomena through independent and dependent variables and the relationship between them (Popper, 1959;

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\(^9\) Assumptions about knowledge and about how it can be obtained (Hirschheim, 1992).
Orlikowski & Baroudi, 1991; Straub et al., 2005). This philosophical assumption was mainly applied in this research as it allowed the numerical analysis of the theoretical constructs and their interpretation, namely the effect of CSFs on IT governance performance in TaPSOs (i.e. research activity 3).

Furthermore, these interpretive and positivist philosophical assumptions (Figure 1) were considered because of the exploratory and confirmatory nature of this research. This required exploring inductively (Kuhn, 1970; Lipton, 1991) how and to what extent IT governance was implemented and mature and which CSFs enable effective IT governance in TaPSOs. This was carried out by considering all five IT governance focus areas: strategic alignment, value delivery, risk management, resource management and performance measurement (ITGI, 2003; Buckby et al., 2008; Wilkin & Chenhall, 2010) because of the concerns (section 1.2) found among them. The applied philosophical assumptions were also made because of the need to predict deductively (Johnson-Laird & Byrne, 1991) the correlated effect between the hypothesised CSFs and IT governance performance. This in turn could assist in determining the significance of such an effect, which could lead to a concentration on critical areas and a respective improvement in public service delivery.

These applied philosophical assumptions also implied the application of qualitative and quantitative research. Qualitative research emphasises studies in natural settings using mostly case studies (Yin, 2003; Myers, 2008), which was mainly applied to research activities 1 and 2. Quantitative research involves the application of numerical analysis and the testing and interpretation of hypothesised relationships (Straub et al., 2005), which was mainly applied to research activity 3. Figure 1 shows that quantitative research is mainly of a positivist nature, while qualitative research can involve all of them.
Furthermore, given the goal of this research to produce an artifact, as shown by the fourth question (RQ4), the two applied philosophical assumptions were complemented by a design science paradigm. This was motivated by its interplay with behavioural science (Peffers et al., 2008). This also applies to the aspiration to implement effective IT governance in TaPSOs through an innovative artifact that focuses on a few areas for success.

Design science research, similar to design theory (Simon, 1996), develops and evaluates a new IT artifact as the solution to an identified organisation’s problem (Hevner et al., 2004). These artifacts are not only computers and computer systems, but also IT use conceived as a complex and changing combination of people, organisations and technology (Dahlbom, 1996; Boland, 2002). In this case, and as indicated in research activity 4, the artifact created was the CEITG framework, which aimed to implement effective IT governance in TaPSOs.

Based on Hevner et al. (2004), the research design, relevance, evaluation, contributions, rigour, search process and communication were taken into account, so that the knowledge of a design problem and its solution were acquired. Similarly, this was used for the research results to have application and relevance in the studied organisations, to ensure that foundations and methodologies are used and to make sure that the results obtained contribute to the knowledge base (Figure 2).

![CEITG framework development consideration](image)

*Figure 2. CEITG framework (new artifact) development consideration adapted from Hevner et al. (2004)*
2.1.2 Research methods

Based on the applied set of philosophical assumptions, which is the knowledge that guides the research and how it can be obtained (Hirschheim, 1992; Myers, 2008), several research methods were used. Given this research problem, context, questions and guidelines to choosing a research method (Royer & Zarowaski, 1999), which is the strategy of the enquiry (Myers, 2008), two research methods were applied. These were case study research and survey research (Fowler, 2002; Yin, 2003).

*Case study research*, which was applied mainly from an interpretive philosophical assumption viewpoint, is a method of empirical enquiry. According to Yin (2003) it “*investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*”. It also “*relies on multiple sources of evidence and benefits from the prior development of theoretical propositions to guide data collection and analysis*”. It is an established research method for research in information systems (Benbasat *et al*., 1987; Oates, 2006). We used it in this research because it was generally difficult to isolate the IT governance phenomenon from its environment, the TaPSOs. Therefore, we needed to get the required details from the viewpoint of multiple sources of data (Stake, 1995; Myers, 2008). Its use was also necessary because of the exploratory nature of the first two research activities (research activities 1 and 2), which led to exploratory case study research (Oates, 2006). This also applied to research activity 4 for part of the framework evaluation in a real business environment.

In all three referred research activities, as part of the preparation and actual data collection process, *case study protocols* were prepared and *three principles of data collection* adhered to, according to Yin (2003). The *case study protocols* that contain instruments together with the procedures and general rules for using them were applied because these guide the researcher in carrying out and increasing the reliability of the case study research. Specifically, these protocols included an overview such as objectives and relevant readings, field procedures such as credentials to access the case study sites (e.g. Appendix 1) and sources of information, case study questions (e.g. Appendix 2.1) and a guide of the case study report.
The three principles of data collection, which are use multiple sources of evidence, create a case study database and maintain a chain of evidence, were applied for the in-depth study and development of converging lines of enquiry essential for the construct validity and reliability of a case study (Patton, 1987; Yin, 2003; Silverman, 2007). In these research activities, use of multiple sources of evidence provided multiple measures of the same phenomenon, which involved interviews, access to documents and filling in questionnaires as part of the interview sessions. For create a case study database, organising and documenting the data collected for the case studies involved evidentiary bases such as case study notes, documents, questionnaires filled in parallel with the interviews and reports for each case study organisation. Similarly, maintain a chain of evidence allowed readers of the case study to follow the derived evidence from questions to conclusion and vice versa and involved storing, using and cross-referencing the evidence collected in the process.

Survey research, which was applied from a positivist philosophical assumption viewpoint, is a method that studies a population sample and provides the possibility to generalise (Fowler, 2002; Kothari, 2004). It emphasises that reality can be described by measurable properties and theory testing (Kothari, 2004; Straub et al., 2005). It also applies to variables that are examined with an emphasis on a quantitative and confirmatory perspective. It was used in this research mainly because we needed to apply statistical analysis to determine the correlated effect of the identified CSFs on IT governance performance in research activity 3.

2.1.3 Data collection techniques
Based on applied research methods, several data collection techniques were used to access the relevant data (Royer & Zarlowaski, 1999; Collis & Hussey, 2003). This included interviews, survey questionnaires and documents (Myers, 1997; Boudreau et al., 2001; Fowler, 2002; Yin, 2003; Kleiber, 2004; Myers, 2008). The choice of one or a combination of them depended on the goal of each of the four research activities.

Interviews are a technique that involves questioning the interviewee in a structured, semi-structured or unstructured interview (Emory, 1980; Yin, 2003). Commonly used in social sciences and applied in this research were
semi-structured interviews (Myers, 2008). These were used in order to understand the beliefs, experiences and ideas of individuals in their natural settings mainly during the exploratory and design science parts of the research, i.e. research activities 1, 2 and 4. These were also used because they provide focus and consistency, while allowing important insights to pop up during the course of the interview.

*Focus groups* are a technique typically rich in generating ideas and consensus (Kleiber, 2004) that have a high apparent reliability and validity (Marshall & Gretchen, 1999; Lindlof & Taylor, 2002). Different to interviews, the researcher through group interaction ascertains views on the defined topic (Morgan, 1996; Kleiber, 2004; Myers, 2008). This was applied in this research because there were a large number of statements to assess and agree on in order to determine IT governance maturity in research activity 1.

*Documents* provide a source of data from the research settings concerned (Yin, 2003; Myers, 2008). This technique was used to gather documents because of the case study research applied in research activities 1, 2 and 4.

*Survey questionnaires* can be used for collecting data (Emory, 1980; Fowler, 2002; Yin, 2003; Kothari, 2004). This technique was applied in this research to complement the interviews in research activities 1, 2 and 4 (Figure 3). This also applies to research activity 3 as a sole data gathering technique because of its positivist and confirmatory nature.

### 2.1.4 Data analysis approach

Based on the applied research methods and data collection techniques, various data analysis techniques were taken on board to answer the research questions. These included content analysis, exploratory data analysis and structural equation modelling (SEM).

*Content analysis* is a qualitative data analysis technique that searches for structures and patterned regularities in the text and make inferences on the basis of these regularities (Krippendorff, 1980; Myers, 2008). With it, gathered qualitative materials that could be from interviews and documents were analysed step by step by dividing the materials into content analytical units. These content analytical units or theoretical categories form the basis from which texts from the interviews and documents collected were organised and
interpretations made in accordance with the research questions (Pyne & Payne, 2004; Kohlbacher, 2005). These categories, and in some cases a hierarchy of them, can be deductively generated from the theories or frameworks that exist in the literature and/or that are founded inductively in the process of data analysis. In this research, this was applied to research activities 1, 2 and 4 to analyse the texts for patterned regularities at the sentence level in interviews and documents. It was carried out using theoretical categories obtained from the literature and those that emerged inductively from the data.

*Exploratory data analysis* is the process of using statistical tools to investigate data sets in order to understand their important characteristics (Leinhardt & Leinhardt, 1980; Fowler, 2002). This includes the measures of centre and relative locations. The primary goal of exploratory data analysis is to maximise the insights from the structure of a data set, while providing all the specific items that can be extracted from it (Tukey, 1977; Emory, 1980), such as a ranked list of important factors. In this research, it was applied to research activities 1, 2 and 4 to analyse quantitative data that were obtained from the questionnaires. This was mainly measures related to relative location such as rankings and those related to the centre such as means.

*SEM* is a quantitative-based data analysis tool for testing and estimating causal relations (Pearl, 2000). It was applied in this research because of its capability to develop and test hypotheses with falsifiable implications (Bollen & Long, 1993) in order to test the effect of the CSFs on IT governance performance in research activity 3. Partial Least Squares (PLS), a variance-based SEM data analysis technique (Wold, 1985; Fornell & Larcker, 1981), was specifically used because of its comprehensive analysis of the relationships among multiple independent and dependent constructs simultaneously (Hair et al., 1995; Gefen et al., 2000). This also applied to the capability to deal with constructs of a non-parametric nature (Urbach & Ahlemann, 2010), which was the case for this research. Owing to the need for readily available support and ease of use, we also adopted SmartPLS (Ringle et al., 2005), which is a comprehensive PLS with favourable requirements (Urbach & Ahlemann, 2010).
2.2 Research process

This section shows the process followed to accomplish this research by providing an overview of the research process and relationships of the involved activities in the first sub-section. This is followed by the individual research activities (research activities 1-4) undertaken to accomplish this research in the next sub-sections. Both are summarised in Figure 3.

2.2.1 The research process and relationships of the involved activities

The review of IT governance in general, and specifically in TaPSOs, was the starting point of this research that was undertaken between September 2007 and June 2011. This led to the study of the theoretical aspects behind it, including related research work and practice as presented in the next chapter. In this initial research work, we also singled out five case study organisations representing TaPSOs as explained in the next sub-section.

In this way, research activity 1 was undertaken to analyse how and to what extent IT governance practices were implemented including the related problems and consequences. Additionally, IT governance maturity was studied through IT processes and comparisons made with public sector organisations in a developed country and internationally.

The reflection on research activity 1, especially on its weaknesses, led us to search for an intervention to improve IT governance implementation. This reflection and further literature review ended up with research activity 2 in which we identified CSFs for effective IT governance in TaPSOs.

The reflection on these results led us to research activity 3. In this activity, we created a model for and determined the effect of CSFs on IT governance performance by sampling data from TaPSOs as a whole in contrast to the earlier used five organisations. The obtained results confirmed a model of CSFs for effective IT governance in TaPSOs, namely that its implementation was considered essential for IT governance improvement.

Reflections on these results and those of the first two activities (research activities 1 and 2) led us to research activity 4. In this activity, we developed and evaluated a CSFs framework for implementing effective IT governance in TaPSOs (CEITG framework).
<table>
<thead>
<tr>
<th>Research activity 1</th>
<th>Research activity 2</th>
<th>Research activity 3</th>
<th>Research activity 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Result</strong></td>
<td>Determined ITG practices and maturity</td>
<td>Identified CSFs for effective ITG</td>
<td>Effect of CSFs on ITG performance</td>
</tr>
<tr>
<td><strong>Goal</strong></td>
<td>Determine how ITG practices are implemented and mature</td>
<td>Identify CSFs for effective ITG</td>
<td>Determine effect of CSFs on ITG performance</td>
</tr>
<tr>
<td><strong>Procedure</strong></td>
<td>Explore and analyze IT Governance (ITG) practices as well as ITG maturity and comparison with others</td>
<td>Explore and analyze the Critical Success Factors (CSFs) for effective ITG</td>
<td>Test and analyze the correlated effect between hypothesized CSFs and ITG performance</td>
</tr>
<tr>
<td><strong>Question/Paper that answered it</strong></td>
<td>RQ1. How and to what extent ITG practices are implemented in TaPSOs? /Paper I and II</td>
<td>RQ2. Which CSFs enable effective ITG in TaPSOs? /Paper III</td>
<td>RQ3. What is the effect of CSFs on ITG performance in TaPSOs? /Paper IV</td>
</tr>
<tr>
<td><strong>Philosophical perspective/paradigm</strong></td>
<td>Interpretive/Qualitative - Exploratory studies</td>
<td>Positivist/Quantitative - Confirmatory study</td>
<td>Design science</td>
</tr>
<tr>
<td><strong>Method</strong></td>
<td>Case study research</td>
<td>Survey research</td>
<td>Survey and case study research</td>
</tr>
<tr>
<td><strong>Data collection technique</strong></td>
<td>Interviews/questionnaires, documents &amp; focus groups</td>
<td>Interviews/questionnaires and documents</td>
<td>Survey questionnaires</td>
</tr>
<tr>
<td><strong>Data analysis approach</strong></td>
<td>Content analysis complimented by Exploratory Data Analysis (EDA)</td>
<td>Structural Equation Modeling (SEM)</td>
<td>Content analysis complimented by EDA</td>
</tr>
<tr>
<td><strong>Empirical source</strong></td>
<td>Literature and case study of five Tanzanian public sector organizations</td>
<td>Literature/samples from Tanzanian public sector organizations</td>
<td>Literature, a group of IT/business people &amp; a case study organization</td>
</tr>
</tbody>
</table>

Figure 3. Research process and relationships of the involved activities.
2.2.2 Research activity 1

The goal for this research activity was to determine the state of IT governance practices in TaPSOs. This was in response to the first question (RQ1), i.e. how and to what extent are IT governance practices implemented in TaPSOs? To achieve this goal we:

- **Explored and analysed IT governance practices** in terms of mechanisms and related problems and consequences.

- **Assessed and analysed IT governance maturity** in TaPSOs in terms of the maturity levels of IT processes, which was then compared with public sector organisations in a developed country and internationally.

In order to gain a detailed understanding of how and to what extent IT governance practices are implemented, previously unexplored in TaPSOs, case study research was applied. Specifically, we applied explorative case study research given its appropriateness for understanding the research problem when there is little in the literature regarding a particular context (Walsham, 1995; Oates, 2006; Eisenhardt & Graebner, 2007). The **case** was IT governance practices and maturity in TaPSOs. According to Yin (2003), **five components of research design** that are important when undertaking case study research were taken into consideration. These are “a study’s questions, its propositions (if any), its unit of analysis, the logic linking the data to the propositions and the criteria for interpreting the findings”.

_A question_ that guided the enquiry is as already indicated. Being explorative case study research rather than having a _propostion_, we had a goal that is already stated on which success was judged. The **unit of analysis** was an organisation, in this case a public sector organisation. A multi-case study approach was also necessary because of the existence of different categories of public sector organisations and need to increase confidence in the results, including possible replication (Yin, 2003; Myers, 2008). Readers often find evidence and outcomes from multiple case studies more compelling than conclusions drawn from just one case study (Herriot & Firestone, 1983; Oates, 2006). Therefore, taking into account Eisenhardt (1989), who recommended four to seven cases, we conducted a multiple case study of five TaPSOs. In line with Marshall and Rossman (1989), the selection of these organisations, which were categorised as ministries, departments and agen-
cies (MDAs), was based on several factors to ensure varied practices across them. These factors included the level of IT deployment (Miller, 2007; Mutagahywa et al., 2007), the presence of each organisation’s category and the multiplier effect on the services provided to the public and among them.

As detailed in Paper I, the case study organisations were:

- Tanzania Revenue Authority (TRA), an agency responsible for the administration of central government revenue.
- Medical Stores Department (MSD), which is responsible for the distribution of essential drugs and other medical supplies.
- Prime Minister’s Office-Regional Authorities and Local Government (PMO-RALG), a ministry responsible for the coordination of regional and local government affairs.
- President’s Office-Public Service Management (PO-PSM), a ministry responsible for public service management through improved human resources management, systems and structures.
- The Ministry of Finance and Economic Affairs (MoFEA), which is responsible for managing government revenue, expenditure and financing and providing advice on broad financial and economic affairs.

Furthermore, the linkage of the data to the goal and criteria for interpreting the results represented the data analysis steps in this research activity. This was guided by the identified theoretical frameworks from the literature that linked the data to this research activity goal. This also applies to content analysis and explorative data analysis, which were used to interpret the results to both explore and analyse IT governance practices and assess and analyse IT governance maturity aspects. These two complementary aspects in this research activity that were undertaken between December 2007 and September 2008 are presented next.

i) Exploring and analysing IT governance practices in TaPSOs

Specifically, in order to determine how IT governance practices are implemented, we found that the IT governance assessment process model (Peterson, 2004) encompassed several components of interest for exploring and analysing IT governance practices. This model assesses IT governance capability from which we adopted the IT governance mechanisms proposed by
Van Grembergen and De Haes (2008). This constitutes structures, processes and relational mechanisms. These were used because they are essential for IT governance implementation, as indicated by earlier studies (Weill & Woodham, 2002; Ribbers et al., 2002; Peterson, 2003; ITGI & PwC, 2006a; De Haes & Van Grembergen, 2006). The model also assesses IT governance complexity to which we adopted key decision rights (Weill & Ross, 2004). This is because they ensure effective IT governance because of their importance in IT decision making and monitoring processes (Duffy, 2002b; Broadbent, 2003).

The assessment was complemented by IT governance-related problems and their consequences in IT governance focus areas (ITGI, 2003; Buckby et al., 2008; TheAuditor, 2009). These areas are strategic alignment, value delivery, risk management, resource management and performance measurement. This was because of their holistic view of IT governance and benefits to business goals through improvements in each of them and thus IT governance practices (Supangkat et al., 2006; Bhattacharjya & Chang, 2008). Given the fact that there were no unified problems or consequences, these were adopted from several studies taking into account the IT governance focus areas. These studies were Ribbers et al. (2002); Duffy (2002a); Weill and Woodham (2002); Peterson (2003); Luftman et al. (2004); Weill and Ross (2004); Ndou, 2004; ITGI and PwC (2006a, 2006b); and Van Grembergen and De Haes (2008). This also included studies that were undertaken in TaPSOs (Mhayaya, 2003; Bakari, 2007; COSTECH, 2007; Miller, 2007; Mutagahywa et al., 2007).

Based on these studies together with the need to understand the IT governance context (Peterson, 2004) in TaPSOs, a guiding questionnaire to assess the state of IT governance practices was developed as shown in Appendix 2.1a. This questionnaire was used in the case study of the selected five TaPSOs through a number of respondents. The selection of respondents considered the involvement of both IT and business management personnel in three layers of IT governance responsibility, i.e. board, executive management and operational management composition (Van Grembergen et al., 2003). Specifically, these IT and business management personnel were mainly supervisors, section heads or managers, directors, chief executives and, in some applicable cases, board members. Table 1 provides the distribution of the
respondents in terms of IT and business management personnel participation in all five case study organisations.

Table 1. Distribution of the respondents in the case study organisations

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TRA</td>
</tr>
<tr>
<td>IT management</td>
<td>8</td>
</tr>
<tr>
<td>Business management</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
</tr>
</tbody>
</table>

In order to gain detailed information about how IT practices are implemented in TaPSOs data were gathered through semi-structured interviews in which face-to-face in-depth interviews were conducted and complemented by filling out questionnaires. Each interview involved writing down the notes and tape recording, and lasted from 45 minutes to an hour. This data collection process also involved gathering IT/business-related documents. These documents contained policies, strategies and computerisation/performance reports. This allowed for triangulation, which is the use of more than one method or technique to gather data, thus increasing confidence in the results (Patton, 1987; Denzin, 2006).

Based on content analysis, which searches for structures and patterned regularities in the text and makes inferences on the basis of these regularities (Krippendorff, 1980; Myers, 2008), the data collected were analysed for each studied organisation and across them. This also applies to exploratory data analysis, which uses statistical tools to investigate data sets in order to understand their important characteristics (Tukey, 1977; Fowler, 2002). A content analysis was necessary because we needed to interpret the interviews and collected documents using the theoretical categories established from the literature while taking into account the emerged ones. An exploratory data analysis was also used because of the need for the quantitative enumeration and ranking of the studied aspects across the studied organisations.

According to Krippendorff (1980), six questions should be addressed when carrying out a content analysis i.e. which data are analysed, how are they defined, what is the population from which they are drawn, what is the context relative to which the data are analysed, what are the boundaries of the
analysis and what is the target of the inference. Specifically in this research activity, the data analysed were IT governance practices and the related problems and consequences. The practices were defined using theoretical categories from the literature, mainly Van Grembergen and De Haes (2008) on structures, processes and relational mechanisms and subcategories on practices (Figure 5). This also applied to the problems and consequences that were defined along five IT governance focus areas (ITGI, 2003; Buckby et al., 2008) i.e. strategic alignment, value delivery, risk management, resource management and performance measurement. These problems and consequences were further defined by the subcategories from the literature on IT governance-related problems and consequences as already indicated in this research activity. Apart from the established categories and subcategories from the literature, the data were also defined using the emerged subcategories on IT governance practices and the related problems and consequences during the data analysis. The population from which they were drawn is TaPSOs, in which five case study organisations were investigated. The context relative to which the data are analysed is IT governance in TaPSOs from the perspective of a developing country. The boundary of the analysis is IT governance practices in terms of essential mechanisms for IT governance implementation and the related problems and consequences within IT governance focus areas. The target of the inference is practitioners and decision makers in TaPSOs and similar environments.

Specifically, and in line with Krippendorff (1980) and Downe-Wamboldt (1992), we started with the data entry and storage step, in which data on practices were transcribed from the interviews and documents collected into texts using a word processor. These texts were analysed at a sentence level by looking for patterned regularities of categories that we adopted from the literature i.e. structures, processes and relational mechanisms and subcategories (practices) for each category e.g. IT steering committee. This also applied to the emerged subcategories within the data analysis process that were categorised when we located a meaningful pattern different to the ones in the construct, e.g. IT project committee.

This analysis of practices (subcategories) further looked at how they are implemented, counted the number of studied organisations that use them in
practice and assessed the possible implications for these organisations. For example, the balanced scorecard (BSC) practice indicated that this was practiced in only one of them. Also, the analysis indicated that it is implemented from an organisation level down to departments and individuals, including the IT department. Similarly, it indicated that IT performance can be regularly measured and reported back to the management and individuals, thus making a contribution to the communication across the organisation and linkage between IT and business goals. This example shows that even though the BSC was practiced in only one organisation, it is vital for the others, too.

Such an analysis was carried out on all 15 practices across the IT governance structures, processes and relational mechanisms (Van Grembergen & De Haes, 2008) that were included in the adopted construct. This also applies to the five emerged practices in TaPSOs such as activity-based budgeting in terms of the Medium-Term Expenditure Framework (MTEF) and IT project committees. Similarly, this analysis was applied to the related problems and their consequences as attention to them could improve these practices. In this case, the used categories were from the literature along five IT governance focus areas (ITGI, 2003; Buckby, 2008). As mentioned before, these categories were strategic alignment, value delivery, risk management, resource management and performance measurement. Also used for the analysis were the subcategories in each category found from relevant literature on IT governance-related problems and consequences as already indicated in this activity e.g. weak measurement of IT performance and value to business.

This was complemented by explorative data analysis (Emory, 1980; Fowler, 2002) through SPSS and MS Excel with which IT governance practices were enumerated and the problems and consequences ranked according to their seriousness in TaPSOs. The enumeration of IT governance practices was carried out across the studied organisations in which a number of occurrences at organisation level for each implemented practice were counted and statistical tabulation and respective analysis carried out as shown in Table 10. The problems and consequences obtained from the questionnaires filled out by respondents and the interviews were introduced into SPSS for ranking analysis. This ranking was carried out according to their seriousness in TaP-
SOs and was further represented graphically using MS Excel as indicated in Paper I, which allowed analytical comparisons among them. For example, a highly ranked problem was *business people lower acceptance to the new IT applications and use* and a highly ranked consequence was *difficulty holding individual staff members accountable for their results*. The use of such different analysis approaches, i.e. content analysis and exploratory data analysis, also allowed triangulation (Yin, 2003; Brusoni & Prencipe, 2006).

The analysis report for each case study was also sent back to the studied organisation to ensure correctness as pointed out by Yin (2003) and Brusoni and Prencipe (2006). This was followed by the analysis of all five studied organisations both in terms of practices and the related problems and consequences. This led to a summary of how IT governance practices are implemented in TaPSOs as described in Chapter 4 and their related contributions in Chapter 5. More details are in Paper I.

**ii) Assessing and analysing IT governance maturity in TaPSOs**

Specifically, in order to determine the levels of IT governance maturity in TaPSOs, a literature review was undertaken to explore IT governance-related frameworks and maturity models to apply in the assessment and analysis process. In this process, we specifically adopted a combination of the generic maturity model (ITGI, 2003, 2007b) and 15 COBIT IT processes (Guldentops *et al.*, 2002; ISACA, 2003). The adoption of a generic maturity model, which was originally founded on a well-established Software Engineering Institute’s Capability Maturity Model (Paulk, 1995; ITGI, 2007b), was because of its benchmarking and decision making for capability improvements. This maturity model ranges from *level 0 (non-existent)*, meaning a complete lack of any recognisable processes, to *level 5 (optimised)*, meaning processes have improved to a level of good practice (ITGI, 2007b; Scott, 2007). The adoption of COBIT IT processes and the selection of 15 out of 34 IT processes were because of their relatively higher importance in the studied public sector organisations (Guldentops *et al.*, 2002, Liu & Ridley, 2005). This selection also met the need to compare IT governance maturity in TaPSOs to public sector organisations in Australia as a developed country (Liu & Ridley, 2005) and internationally across a range of nations (Guldentops *et al.*, 2002).
Therefore, a questionnaire for this assessment was developed based on the above considerations and the five maturity levels for each IT process (ITGI, 2007b) as shown in Appendix 2.1.b. In addition, we adopted IT governance maturity measurement scales (ITGI, 2007a). In this questionnaire (Appendix 2.1b), each maturity statement in a process was assessed by indicating ‘How much do you agree’: ‘Not at all (0)’, ‘A little (0.33)’, ‘To some extent (0.66)’ or ‘Completely (1)’. On average, 28 statements per process were assessed, leading to 420 statements for the 15 IT processes studied. An example of a statement from the ‘Define a Strategic Plan – PO1’ process is ‘IT strategic planning is a defined management function with senior-level responsibilities’ (ITGI, 2007b).

Focus groups (Kleiber, 2004; Myers, 2008) were used as the main data collection technique. This was because of the large number of statements (ITGI, 2007a) to assess and agree on in order to determine IT governance maturity. This therefore required a multidisciplinary group of management personnel in a focus group session in each studied organisation in order to provide rich reflection, debate and consensus (Guldentops et al., 2002; Kleiber, 2004) on the current level of maturity to achieve realistic and credible results. In each of these organisations, the focus group comprised six or seven IT and business management personnel, mainly directors and managers or section heads. This is because we needed to gain insights from both an IT and a business perspective to better judge the maturity level. This was also in line with earlier studies (Guldentops et al., 2002; ISACA, 2003).

We also analysed and prepared a list of possibly required documents according to the assessed IT processes and where available collected them prior to the focus group sessions. These documents included IT-related strategic and operational plans, policies, structures, frameworks, service level agreements and performance reports. These were mainly collected with assistance from the chief information officers (CIOs) in these organisations and they supported the focus group sessions during the assessment of the IT process maturity level. This means that apart from the focus group participants’ knowledge and experience, we brought in evidence from practices on the ground in line with the requirements for each process maturity model (ITGI, 2007a). For instance, in the process ‘Define a Strategic Plan – PO1’, a document
such as the existence of an approved strategic IT plan was available if it was the organisation’s practice. In other words, this allowed the triangulation of different data sources, thus adding to the credibility (Yin, 2003; Lindlof & Taylor, 2002) of the scored maturity levels.

At the beginning of each focus group session, which took about four to five hours, we provided a brief description of the study purpose, maturity assessment and questionnaire. In each session, one participant, often the CIO, took the role of session chair. The researcher remained as an observer to note comments and intervene when necessary. An example of an intervention is when a higher maturity level was scored while the documentation available did not support it. This was resolved after the relevant supporting document was quoted, explanations made and consensus reached.

Data were analysed using a combination of the maturity measurement tool (ITGI, 2007a), generic maturity model (ITGI, 2003), description of the maturity levels of COBIT IT processes (ITGI, 2007b) and MS Excel. The selection of MS Excel as an exploratory data analysis tool to complement the inherent analysis tools of the maturity levels of IT processes was because of its simplicity but yet capability to calculate and present the results in tables and graphs.

Specifically, the focus group scores for each assessed statement were incorporated into the maturity measurement tool. This was carried out for the statements of each maturity level (from 0 to 5). Eventually, we calculated their compliance and contribution from which the maturity level of each IT process was obtained. This was carried out for all 15 IT processes in each studied organisation. The analysis of compliance also served to show and discuss the concerns that an IT process still had at lower maturity levels and the progress made at higher maturity levels.

Once these maturity levels were available, the aim was to meet the goal of this research activity; thus, the average maturity level of the five studied public sector organisations was analysed. This also applies to the individual organisations’ maturity levels and the comparison of their maturity levels to those of public sector organisations in a developed country and internationally.

The analysis of the average maturity level across the five studied public
sector organisations involved calculating the average of each IT process maturity level across the five studied organisations. These averages provided the range within which the maturity levels of all assessed IT processes were found and their relative performances across these organisations calculated. This provided the average maturity level of IT processes across the five studied public sector organisations, as shown by the results in Chapter 4.

The analysis of the individual organisations’ maturity levels was carried out using the obtained maturity level for each IT process from each organisation’s point of view. Different to the previous one, the maturity levels of IT processes were compared at the level of individual organisations. Such comparisons provided the relative performances of the processes in each organisation and led to the individual organisations’ maturity levels for the 15 assessed COBIT IT processes, as shown by the results in Chapter 4.

The TaPSOs’ maturity levels were compared with those of the public sector organisations in a developed country and internationally through the obtained maturity levels of IT processes in TaPSOs with respect to the data obtained from previous studies. In this case, these data were from public sector organisations in Australia as a developed country (Liu & Ridley, 2005) and internationally across a range of nations (Guldentops et al., 2002; ISACA, 2003). This analysis was carried out with MS Excel as the exploratory data analysis tool, in which the maturity levels of 15 IT processes from the three groups of data, i.e. TaPSOs, developed country and internationally, were incorporated and graphs and analysis made, as shown in the results in Chapter 4. This also included the use of the generic maturity model to reflect on the maturity performances of their relative IT processes among these three groups.

2.2.3 Research activity 2
The goal of this research activity was to identify the CSFs for effective IT governance in TaPSOs. This was in response to the second research question (RQ2), i.e. which CSFs enable effective IT governance in TaPSOs? To achieve this goal we explored, analysed and identified a list of the relevant CSFs for effective IT governance in TaPSOs. This took into consideration that CSFs are a limited way to help an organisation understand the few key areas in which to invest its resources and time (Rockart & Van Bullen, 1986)
and also provide a focus on identifying the key factors important for successful behaviour (Boynton & Zmud, 1984; Tan et al., 2009).

As in the previous research activity, in order to gain a detailed understanding of the complex phenomenon of IT governance in TaPSOs case study research was conducted according to Yin (2003) between October 2008 and March 2009. Specifically, we applied explorative case study research given its suitability when there is little in the literature regarding a particular context or group and a need to build theory (Morse, 1991; Eisenhardt & Graebner, 2007). A multi-case study approach was also necessary as described in research activity 1, including the use of five TaPSOs.

Specifically, in order to identify the CSFs for effective IT governance in TaPSOs, the research design considered their exploration and analysis by the use of the literature and case study organisations from the viewpoints of five IT governance focus areas: strategic alignment, value delivery, risk management, resource management and performance management (ITGI, 2003; Buckby et al., 2008). This was carried out to provide a holistic view of the CSFs necessary for effective IT governance in order to address the concerns found in TaPSOs. We also took into account that IT value should be realised because effective IT governance is related to efficient and cost-effective IT delivery, innovation and business impact (Peterson, 2004). This is because of the need to innovate, align, deliver and measure IT from a business perspective rather than from an IT one per se (Ndou, 2004; Bakari, 2007; Nfuka et al., 2009).

The exploration of CSFs from the literature was based on the review of related journals including senior scholars' baskets of journals, AIS journals and MIS journals from nine different ranking papers published between 1995 and 2005 (AIS, 2008). Furthermore, we looked at the conferences with specific or related track records in IT governance such as the Hawaii International Conference on System Sciences and European, Pacific Asia, Mediterranean, Australian and International Conferences on Information Systems. This was also applied to the repositories of the IT Governance Institute (ITGI), which spearheads IT governance research globally (ITGI, 2008).

In this way, 100 papers were reviewed, of which 10 were found to be relevant to IT governance-related CSFs, namely Luftman et al. (1999); Ribbers
et al. (2002); ITGI (2003); Weill (2004); Guldentops (2004); Peterson (2004); ITGI and PwC (2006b); Bowen et al. (2007); Tan et al. (2007); and De Haes and Van Grembergen (2008). Given the similarities and differences in the levels of the granularity of the found IT governance-related CSFs and the research goal, we harmonised them logically. This harmonisation ended up with a construct of 17 CSFs as shown in Chapter 4 and more details in Paper III.

Based on this construct, a questionnaire to identify the CSFs for effective IT governance in TaPSO was developed, as indicated in Appendix 2.1c. As in the previous research activity, this questionnaire was used in the five case study organisations through interviews with IT and business management personnel as shown in Table 2. Semi-structured interviews were used in the data collection process through face-to-face interviews complemented by filling out questionnaires. This took about 45 minutes. It also allowed for triangulation (Brewer, 2000; Yin, 2003; Myers, 2008), which was supported further by collecting relevant documents. These documents included IT-related strategies, policies and progress/performance reports essential for identifying CSFs and related contextual elements for IT governance improvement.

Table 2. Distribution of respondents in the case study organisations

<table>
<thead>
<tr>
<th></th>
<th>IT Management</th>
<th>Business Management</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondents</td>
<td>TRA</td>
<td>MSD</td>
<td>PMO</td>
</tr>
<tr>
<td>IT Management</td>
<td>8</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Business Management</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

The results were analysed using a content analysis that searches for structures and patterned regularities in the text and makes inferences on the basis of these regularities (Krippendorff, 1980; Myers, 2008). A content analysis was necessary because we needed to interpret the interviews and collected documents based on theoretical categories from the literature and emerging ones from the gathered data.

According to Krippendorff (1980), six questions indicated in the previous activity should be addressed when carrying out a content analysis. In line
with them, this research activity *analysed data* based on which CSFs enable effective IT governance. These *CSFs were defined* along the five IT governance focus areas i.e. strategic alignment, value delivery, risk management, resource management and performance measurement (ITGI, 2003). They were further defined by the subcategories from the literature on the 17 IT governance-related CSFs as already shown in this research activity. Apart from the established categories and subcategories from the literature, the *data were also defined* by the emerged subcategories during the data analysis of CSFs that enable effective IT governance. The *population from which they were drawn* is TaPSOs, of which five case study organisations were investigated. The *context relative to which the data are analysed* was IT governance in TaPSOs from the perspective of a developing country. The *boundary of the analysis* was the CSFs that enable effective IT governance implementation. The *target of the inference* is practitioners and decision makers in TaPSOs and similar environments.

Specifically, and in line with Krippendorff (1980) and Downe-Wamboldt (1992), we started with a *data entry and storage* step in which data on which CSFs enable effective IT governance in TaPSOs were *transcribed from the interviews and documents collected*. These texts were *analysed at a sentence level* by looking for *patterned regularities* in the subcategories adopted from the literature, i.e. the 17 IT governance-related CSFs, e.g. involve and gain the support of senior management. In the course of the analysis across the studied organisations, some CSFs were renamed and others merged and thus these emerging subcategories were used in the subsequent analysis for patterned regularities and counts across the studied organisations.

This content analysis was complemented by an exploratory data analysis using SPSS and MS Excel (Lewis-Beck, 1995; Fowler, 2002). In this case, ranking was applied because of the need to find out the relative criticality of the CSFs in TaPSOs given that these areas should receive constant attention from management (Ward & Peppard, 2002; Caralli, 2004). This was carried out using respondents’ responses from the questionnaires and interviews. These responses were introduced into SPSS for ranking analysis. MS Excel was further used to allow analytical comparisons across all studied CSFs and organisations in which the rank was indicated by the percentage of occur-
rence as shown in Paper III. For example, a highly ranked CSF was *Demonstrate IT leadership*.

In this process, that involved both content analysis and exploratory data analysis, one CSF was dropped from the ranking because it was not favoured by the majority of respondents. Moreover, another two CSFs were merged because of the need for their concerns to be consolidated equally since both aimed at optimising costs and increasing responsiveness in public service delivery, as shown in Chapter 4.

As a result, we obtained 15 CSFs, which were adjusted as per contextual elements that are the issues found pertinent for IT governance improvement in the context of TaPSOs. These contextual elements, which form part of Figure 12, include the understanding of IT opportunities and business imperatives, change of mindset, active IT committees, IT usage enforcement and political support. For example, ‘*Demonstrate IT leadership*’ was adjusted to ‘*IT leadership to understand the business goals and IT contribution and bring it to management attention*’. This came out of the interviews and collected documents because contextual elements such as the management understanding of IT opportunities had been relatively low. However, the same management decides, provides direction and oversees the progress of corporate activities including the integration of IT in the business. Furthermore, weak IT leadership and the understanding of business imperatives and competencies to bring IT contribution convincingly to management attention were shown as other contextual elements in these organisations.

According to Rockart and Van Bullen (1986), CSFs should be “*a limited number of areas in which satisfactory results will ensure a successful competitive performance for the individual, department or organisation.*” CSFs should also meet the central objectives of an organisation (Ward and Peggard, 2002). Therefore, these 15 CSFs were subject to a validation process in the five organisations as shown in Appendix 2.1d. In this process, four CSFs were not accepted by the majority of respondents, so given their criticality we considered only those CSFs accepted by the majority of respondents. Considering this result together with the initial result of the survey ranking and the analysis from interviews and documents collected we came out with a final list of 11 CSFs for effective IT governance in TaPSOs. These CSFs
were obtained as shown in Chapter 4 and Paper III.

An example of these 11 CSFs is “engage key stakeholders.” In the initial survey, 93% of respondents supported this CSF (Figure 1 of Paper III). This also applied to the validation process with 100% (Figure 2 of Paper III). Moreover, the analysis of interviews and documents also showed the criticality of this CSF. For example, the chairperson of the TRA Board said, “Such engagement if done early assists, as we have seen in some of our projects. It helps to determine a broader view of needs and approaches to solutions. Given the spread of public sector organisations such as our organisation and the objective for a cost-effective tax administration the focus of this CSF will leapfrog widely due to the successful use of IT.”

2.2.4 Research activity 3

The goal of this research activity was to determine the effect of the identified CSFs on IT governance performance in TaPSOs. This was in response to the third question (RQ3), i.e. what is the effect of CSFs on IT governance performance in TaPSOs? This was achieved by testing and analysing statistically the effect of these 11 CSFs on IT governance performance.

Given the need to test and analyse statistically the correlated effect of the 11 CSFs on IT governance performance, a survey research method was applied (Fowler, 2002; Kothari, 2004; Rea & Parker, 2005). This was because we needed to examine hypotheses, i.e. independent vs. dependent variables with emphases on testing and analysing them quantitatively (Fornell & Larcker, 1981; Wold, 1985). In this case, the independent variables were the 11 CSFs for effective IT governance (Nfuka & Rusu, 2010b) and the dependent variable was IT governance performance (Weil & Ross, 2004).

This research activity, which took place between January and May 2010, different from the preceding ones (research activities 1 and 2), used sample data from all TaPSOs. This was because of the need to find out the widespread effect of CSFs on IT governance that could also allow for generalisability in the sample population (Fowler, 2002), i.e. TaPSOs. Based on previous IT governance-related CSFs studies and the five case study organisations in which they were identified, it was reasonable to believe a correlated effect with IT governance performance, although this was not statistically confirmed.
Specifically, in order to determine this correlated effect, we developed a research model with 11 hypotheses based on the identified CSFs for effective IT governance in TaPSOs as independent variables. Also in the model was IT governance performance, which was adopted as a dependent variable, in which we used Weill and Ross’ (2004) governance performance objectives (outcomes) and approach for measurement. These objectives (outcomes) were “the cost-effective use of IT, effective use of IT for asset utilisation, effective use of IT for growth and effective use of IT for business flexibility”. Their use was because of the possibility to measure the outcome rather than the process. This approach was also simpler and previously used widely (Simonsson et al., 2010).

Based on this research model (Figure 12), a self-administered survey questionnaire was developed with contextual elements supported by the relevant literature as measurement items for independent variables. This also applied to governance objectives for the dependent variable. The questionnaire contained three to five measurement items for each independent variable as recommended by MacCallum et al. (1999) and four measurement items for the dependent variable. The measurement items of the independent variables were tested for their level of fulfilment in the organisation on a five-point Likert scale, i.e. ‘1’ Strongly disagree, ‘2’ Disagree, ‘3’ Undecided, ‘4’ Agree and ‘5’ Strongly agree (Kothari, 2004). This also applied to the dependent variable but its five-point scale ranged from ‘Not important/Not successful to Very important/Very successful’ (Weill & Ross, 2004). Using the same scale, the latter was measured on two aspects: the influence of their measure of success and how important they are in their organisations. Its result (governance performance) for each respondent was computed as per governance performance formulae (Weill & Ross, 2004) and used against the results from the independent variables. The measurement items and their sources of constructs and governance performance formulae are in Paper IV and the questionnaire is in Appendix 2.2.

This self-administered survey questionnaire (Appendix 2.2) was first distributed to a few respondents as a pilot test to determine its correctness including a verification of internal consistency (Fowler, 2002). These considerations led to preliminary estimates of the reliability and validity of construct
measurement, i.e. average variance extracted, Cronbach’s alpha and composite reliability. These were found to be acceptable above 0.5, 0.7 and 0.5, respectively (Fornell & Larcker, 1981; Nunnally & Bernstein, 1994).

In this way, a self-administered and closed survey questionnaire was used as the sole data collection technique. The unit of analysis was individuals consisting of IT and business management personnel, mainly directors of departments and heads or managers of units from TaPSOs. These organisations were mainly MDAs and by 2010 there were 75 (PO-PSM, 2010). The sampling frame was mainly the Tanzanian Government directory, which provided contacts for individuals (PO-PSM, 2010). The questionnaires were distributed to a sample of 198 respondents in these organisations. This number of respondents was selected because the minimum sample size calculated was 100 (Marsh et al., 1998) and because in many social research studies response rates are typically 40–50% (Salkind, 2005). We received responses from 135 respondents (68%) from 51 TaPSOs, as shown in Table 3.

<table>
<thead>
<tr>
<th>Table 3. Respondents’ distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
</tr>
<tr>
<td>1. Respondent’s organisation type (N=135)</td>
</tr>
<tr>
<td>Ministry</td>
</tr>
<tr>
<td>Department</td>
</tr>
<tr>
<td>Agency</td>
</tr>
<tr>
<td>2. Role in the organisation (IT or business) – Directors &amp; heads/managers</td>
</tr>
<tr>
<td>IT</td>
</tr>
<tr>
<td>Business</td>
</tr>
</tbody>
</table>

Based on these 135 responses, data were analysed using the SEM technique (Wold, 1985; Urbach and Ahlemann, 2010) to assess the proposed model and relationships. This analysis covered the validity and hypothesised relationships (Fornell & Larcker, 1981; Hair et al., 1995). In this analysis, both convergent and discriminant validity were found to be above the satisfactory thresholds (Gefen & Straub, 2005; Hair et al., 2006). In other words, the measures that were theoretically supposed to be highly interrelated were in fact highly interrelated and vice versa (Hair et al., 2006; Trochim et al.,...
The results of the hypothesised relationships, i.e. the tested effects of the 11 CSFs on IT governance performance, were also determined. This was shown to be significant (Hair et al., 1995) with path coefficients in a range of small to strongly positive (Cohen, 1988) correlated effects. Based on these results, implications were suggested. A summary of these results and related contributions are described in Chapters 4 and 5 with details in Paper IV.

2.2.5 Research activity 4
The goal of this research activity was to design the CSFs framework for implementing effective IT governance in TaPSOs (CEITG framework). This was in response to the fourth question (RQ4), i.e. how can CSFs be implemented for effective IT governance in TaPSOs? This was achieved by developing and evaluating a CSFs framework for implementing effective IT governance based on the design science research paradigm.

The design science research paradigm (Hevner et al., 2004; Peffers et al., 2008) was employed because of its capability to develop and evaluate IT artifacts intended to solve identified organisational problems. This was motivated by the aspiration to implement effective IT governance in TaPSOs by means of an innovative artifact that could be a construct, model, instantiation or method. The latter, method, was adopted for this case in the form of a framework because it can provide practical knowledge for improving IT governance in TaPSOs.

This took into account that a framework is an outline of interlinked elements that supports a particular approach to a specific objective, and serves as a guide that can be modified as required by adding or deleting elements (Business Dictionary, 2010). It also took into account that a framework can be based on theoretical and/or practical experiences that finally yield recommendations to help practitioners and academicians alike in their work (Peffers & Tuunanen, 2005; Becker, 2009). Through design science, practical knowledge was achieved in two phases: develop and evaluate (Hevner et al., 2004; Vaishnavi & Kuechler, 2007). Owing to the nature of our data sources, we methodically applied survey research and case study research.

Specifically, the starting point of this research activity, which was conducted from June 2010 to February 2011, was the earlier confirmed model of CSFs
for effective IT governance; therefore, a foundation for IT governance improvement in designing a CEITG framework. The activity was realised in three iterations, in which an artifact was iteratively developed to innovatively address the problem identified and evaluated against its utility (Hevner et al., 2004). Two iterations were employed in the development phase and the rest in the evaluation phase, as indicated in Table 4.

In iterations 1 and 2, the framework development was accomplished, ending up with a framework to be evaluated.

Specifically, iteration 1 involved a synthesis from the first four papers (Papers I to IV) with which a list of initial CEITG framework activities for each guiding CSF was obtained as another framework element summarised in Appendix 1 in Paper V.

**Table 4. CEITG framework development process and empirical sources**

<table>
<thead>
<tr>
<th>Development phase</th>
<th>Iteration 1</th>
<th>Build and extend the CEITG framework (initial version)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Initially based on the four previous research activities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extension with existing knowledge base</td>
</tr>
<tr>
<td></td>
<td>Iteration 2</td>
<td>Enhance the CEITG framework (first version)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Based on surveying 43 personnel in 25 public sector organisations (mainly heads of IT and business units who attended training on the strategic management of IT in the public sector in Tanzania)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complemented by surveyed opinions from 6 related industry/academic experts.</td>
</tr>
<tr>
<td>Evaluation phase</td>
<td>Iteration 3</td>
<td>Evaluate the CEITG framework (second version)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Based on a case study in one of the public sector organisations (TRA) mainly through interviews with 24 IT/business IT management personnel.</td>
</tr>
</tbody>
</table>

This was also possible because of the interplay between design science research and behaviour science (Hevner et al., 2004; Peffers et al., 2008). Additionally, given the concern found in TaPSOs of relegating IT issues, including its governance, to IT people rather than treating it as an IT and business concern (Bakari, 2007; Nfuka et al., 2009), this initial framework also
considered a role for each activity as another element in the framework. According to role theory, this is a set of rights, duties, norms and behaviour that a person, in this case as a manager, has to face and fulfil (Hindin, 2007). Special emphasis was placed on involving both IT and business management personnel to assure ownership and promised business contribution from IT amidst IT resources constraints. Given the nature of the obtained activities and corresponding guiding CSFs, the role for each activity was established as indicated in Paper V.

Furthermore, because of concerns related to the operating culture and the state of IT in these organisations and the country as whole (Mutagahywa et al., 2007; Nfuka et al., 2009), the environment was considered to be another framework element. According to Schoderbek (1990), apart from the fact that it lies outside the system’s control, it also determines some aspects of the system’s performance – in this case the success of the CEITG framework. This also applies to the organisation as another framework element in which it will be implemented and envisaged to fit, coexist and fulfil the intended objective. While things may differ depending on the nature and type of the services provided (PO-PSM, 2010), generally the framework is expected to interact and align with the organisation’s goals, strategies, structures and systems for sustainable success.

Moreover, considering that design science research refers to a broad knowledge base of theories, models and methods that provide a basis for the design process (Hevner et al., 2004; Becker, 2009), this iteration was extended by a related literature review. With this literature extension, IT governance-related frameworks and standards and existing artifacts and theories to enhance the framework were explored with which additional framework elements and some activities were found and added. For example, as an additional element to the framework was IT resources that are important for implementing effective IT governance, because a greater contribution of IT to business can be obtained when such resources are leveraged (Peterson, 2004; ITGI, 2007a). This element, which constitutes applications, information, infrastructure and people (ITGI, 2007a; Buckby et al., 2008), is even more important in TaPSOs given the noted IT resources constraints (Nfuka et al., 2009). An example of additional activities was defining and aligning IT
goals to business goals (ITGI, 2007b; Van Grembergen & De Haes, 2009). This is because of the importance in TaPSOs to focus on what IT can contribute to a business by engaging more business people in IT, which is traditionally seen as an issue for technical people (Bakari, 2007, Nfuka et al., 2009).

Iteration 2 enhanced the framework by employing a survey questionnaire as the main data collection technique (Fowler, 2002). This questionnaire collected the opinions of 43 personnel from 25 public sector organisations, mainly heads of IT and business department and units that attended training on the strategic management of IT in the public sector (CEMIPS, 2010). This also applies to opinions from six related industry/academic experts. Respondents were asked for the required CEITG framework enhancements including improved or new activities and the appropriateness of assigned roles and IT resources, as indicated in Appendix 2.3a.

Through a content analysis (Krippendorff, 1980), the collected data from questionnaires were categorised as per the elements of the framework and those that emerged from the data. Then, patterned regularities were counted and analysed and improvements incorporated into the framework (Table 1 of Paper V). This development process ended up with the CEITG framework (Figure 2 of Paper V) that was subjected to the evaluation phase in iteration 3.

In iteration 3, the framework evaluation was accomplished, ending up with a final CEITG framework. As Hevner et al. (2004) indicated, the developed artifact should be evaluated against the utility it provides in the business environment using analytical, case study, experimental, field study or simulation approaches. The case study approach was applied in this case according to Yin (2003) because of the context of the CEITG framework and the need for a real business environment within these public sector organisations in which to evaluate it. Specifically, we selected TRA for a number of reasons. First, it had highly demanded IT-enabled business applications and infrastructure in place throughout the country (TRA, 2010). Its number of established IT processes (Nfuka & Rusu, 2010a) and experienced IT/business management personnel were also considered to be valuable inputs in this evaluation process.

Specifically, given the nature of the framework structure and the objective, the interview protocol for the evaluation was based on evaluation criteria to
measure its effectiveness (Walford, 1990; Clementi & Carvalho, 2006). Such measures included a formal description to meet the need for no ambiguity, definable activities through the understandability of the framework, completeness of the framework to ensure no additional activities to achieve the objective and implementable actions for activities to be capable of implementation. These evaluation criteria were complemented by measuring ease of use and fit to assess the usefulness of the framework in the organisation (Hevner et al., 2004). Each criterion was quantitatively measured according to how they are fulfilled by the CEITG framework on a five-point Likert scale (Kothari, 2004). Additionally, qualitative opinions were requested on what to improve further in each of them to fulfil the framework objective, as indicated in Appendix 2.3b.

This evaluation phase employed semi-structured interviews (Yin, 2003; Myers, 2008), through face-to-face interviews complemented by filling out questionnaires. A brief on the framework was provided to respondents, who were then given independent time to go through it, fill out the questionnaire and undergo a face-to-face interview. The interviews involved 24 IT/business management personnel (Table 4) and lasted for about 45 minutes to an hour. This also applied to the document review, in which we gathered IT/business-related documents such as strategies and progress/performance reports. For example, one of the Deputy Commissioners said, “The framework is useful and due to its holistic view of aligning strategies to evaluation will improve business value from IT even with the existing IT resources. Also it will enable systems to talk thus reducing the cost of incompatibility while increasing efficiency.”

This was complemented by an observed concern in their corporate plan that “challenges they face include the underutilisation of the available IT resources and poor state of the telecommunication infrastructure needed to link all TRA operational offices country-wide in order to facilitate e-government” (TRA, 2008). Using a content analysis (Krippendorff, 1980; Neuendorf, 2002), their inputs were categorised as per the elements of the framework and those that from the data, and pattern regularities were counted and analysed before being incorporated into the final CEITG framework as indicated in Table 3 of Paper V.
This was complemented by an exploratory data analysis (Emory, 1980; Fowler, 2002) using SPSS and MS Excel. This analysis captured the quantitative result of framework effectiveness and usefulness, which was then graphically represented (Figure 3 of Paper V), analysed and incorporated into the final CEITG framework as shown in Paper V.

The results from both the content analysis and exploratory data analysis showed the CEITG framework to be effective and useful (Table 3 and Figure 3 of Paper III). They also indicated some concerns about ease of use together with suggestions for improvement, which were incorporated into the final version of the framework as indicated in Paper V. The converging lines of these results also allowed for triangulation (Brewer, 2000; Denzin, 2006). This framework that aimed to implement effective IT governance in TaPSOs is summarised in Chapter 4 and its related contributions are presented in Chapter 5.

Since the CSFs framework is one of the main contributions of this research, a summary of how design science research was fulfilled in this research activity is also provided. This is accomplished through Hevner et al.’s (2004) seven guidelines (Table 5) because of their completeness for good design research (Peffers et al., 2008).

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guideline 1: Design as an artifact</td>
<td>Design science research must produce a viable artifact in the form of a construct, a model, a method or an instantiation.</td>
</tr>
<tr>
<td>Guideline 2: Problem relevance</td>
<td>The objective of design science research is to develop technology-based solutions to important and relevant business problems.</td>
</tr>
<tr>
<td>Guideline 3: Design evaluation</td>
<td>The utility, quality and efficacy of a design artifact must be rigorously demonstrated via well-executed evaluation methods.</td>
</tr>
<tr>
<td>Guideline 4: Research contributions</td>
<td>Effective design science research must provide clear and verifiable contributions in the areas of the design artifact and design methodologies.</td>
</tr>
<tr>
<td>Guideline 5: Research rigour</td>
<td>Design science research relies upon the application of rigorous methods in both the con-</td>
</tr>
</tbody>
</table>
Design as an artifact was mainly fulfilled by producing a method in the form of a framework with guidelines to facilitate effective IT governance implementation in TaPSOs, as detailed in Chapter 4. With this artifact, IT/business management personnel should be able to recognise their roles and plan, apply and continually improve IT governance implementation.

Problem relevance was fulfilled by determining IT governance practices in terms of the mechanisms, problems faced and consequences. IT governance in TaPSOs was ineffective and, therefore, a technology-based solution, i.e. the CEITG framework, was designed as shown in Chapter 4.

Design evaluation was achieved by evaluating the CEITG framework through an evaluation of a case study organisation in the business environment as was described in this research activity with more details in Paper V. This evaluation indicated that the CEITG framework is relevant, valuable and usable (Table 3 and Figure 3 of Paper V); thus, it can facilitate effective IT governance implementation in TaPSOs.

Research contribution was achieved through the results of this research activity. These results provided a better understanding of how to improve IT governance implementation in TaPSOs and a means for such improvement from a CSFs viewpoint. In this way, it contributes to context, practice and theory. As detailed in Chapter 5, prior to this research no empirical data were available in the knowledge base regarding such a CSFs framework to achieve effective IT governance implementation.

Research rigour was fulfilled by the use of various methods and data collection and analysis techniques as summarised in this research activity and in Figure 3. This also applied to the literature review to gain theoretical insights.

<table>
<thead>
<tr>
<th>Guideline 6: Design as a search process</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>The search for an effective artifact requires utilising available means to reach desired ends while satisfying laws in the problem environment.</td>
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</table>

<table>
<thead>
<tr>
<th>Guideline 7: Communication of research</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design science research must be presented effectively both to technology-oriented as well as management-oriented audiences.</td>
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</tbody>
</table>
Design as a search process was fulfilled using available means while satisfying applicable laws such as getting credentials to the studied cases. The search took into account that we were investigating a business problem in TaPSOs and that IT governance is a new innovation in this context. Following Simon (1996), who described the nature of the design process as a generate/test cycle, progress was made iteratively in the phases of development and evaluation, as shown in this research activity (Table 4). Also, prior to this, requirements and a solution space were established through the results of research activities 1 to 3 (Figure 3). Altogether, three iterations (Table 4) and the respective methods, empirical sources and data collection and analysis (Figure 3) were applied systematically during the search process.

Communication of research was fulfilled by communicating the results of this research through the five included papers in reputable international conferences and a journal (Papers I to V). This also applies to other related publications in a journal, a conference and a book chapter, as indicated in section 1.4.

2.3 Validity and reliability

The design of this research, as described in research activities 1 to 4, took into account validity and reliability. Validity was considered because we needed to ensure the best available approximation to the truth or falsity of the propositions and conclusions (Cook & Campbell, 1979; Brewer, 2000). Reliability was considered because we needed to ensure the suggested instruments measure the same ways each time and that they were used under the same conditions with the same subjects (Mitchell & Jolley, 2001). Both aspects were essential to the precision and accuracy of this research. This is because reliability enhances confidence in validity, but it is insufficient on its own to show validity since some measurement strategies can produce consistently wrong results (Yin, 2003; Trochim et al., 2007). In this research, validity and reliability also took into consideration the applied qualitative and quantitative methods, i.e. case study and survey research. With these considerations, aspects to meet research quality were ensured. According to Yin (2003), Kidder and Judd (1986) and Trochim et al. (2007), the
widely applied aspects to meet research quality in such social science methods are construct validity, internal validity, external validity and reliability.

Construct validity establishes the correct operational measures for the concepts being studied (Lincoln & Guba, 1986; Yin, 2003; Trochim et al., 2007). This is how you operationalise the concepts in the study for a credible conceptual interpretation of the data drawn from the field. According to Yin (2003), when carrying out case studies, which were applied in research activities 1, 2 and partly in 4, three tactics are available to increase construct validity: the use of "multiple sources of evidence, chain of evidence and a review of the case study report by key informants.

As shown in research activities 1, 2 and 4 in sub-sections 2.2.2, 2.2.3 and 2.2.5, these three tactics were applied in the research enquiry based on the constructs in the literature. Multiple sources of evidence were applied through interviews or focus groups, questionnaires and documents. The use of such multiple sources of evidence allowed for the development of convergent lines of enquiry that also led to triangulation (Patton, 1987; Silverman, 2007). According to Cohen et al. (2007), these multiple sources of evidence also minimise the bias brought about by using only interviewer–respondent conversations. Chain of evidence was also applied in which derivations of evidence from the initial research questions to conclusion were part of the research design as indicated in the respective research activities. A review of the case study report by key informants was yet another tactic that was applied. With it, a draft case report was sent back to each studied organisation for review, which in turn contributed to quality results.

As part of the tactics for construct validity, we also considered statistical construct validity in terms of convergent and discriminant validity, which contributed to the use of correct operational measures (Gefen & Straub, 2005; Hair et al., 2006) in research activity 3. This was because the nature of this research activity was to test the correlated effect of CSFs on IT governance performance. Convergent validity showed that the measures that were theoretically supposed to be highly interrelated were, in fact, found to be highly interrelated. This also applied to discriminant validity, which showed that the measures that shouldn't be related to each other were not (Hair et al., 2006; Shuttleworth, 2009.)
*Internal validity* refers to the internal design of research (Brewer, 2000; Mitchell & Jolley, 2001; Shuttleworth, 2009). This established the rigour with which this research was conducted. Given the exploratory, confirmatory and design science aspects (Figure 3) of this research, we designed strategies for collecting and analysing the data that led us to the conclusion. In the exploratory parts in research activities 1 and 2, as indicated in the respective sub-sections, we ensured that all relevant evidence from the state and maturity of IT governance practices to CSFs for effective IT governance were investigated and used to infer the conclusions. We also used well-established theoretical categories and subcategories from the literature for content analysis as indicated in these sub-sections. This also applies to the emerged subcategories that were obtained by investigating pattern regularities across the variety of sources i.e. interviews and documents where respondents were both IT and business management personnel.

This also applied to the confirmatory part of research activity 3 that through its research model, the correlated effect of CSFs on IT governance performance was determined and used to infer the conclusions. Moreover, research activity 4 was based on design science research and thus the CEITG framework was developed and evaluated iteratively.

*External validity* refers to the generalisability of a study. It is the extent to which the internally valid results of a study can be held to be true for other domains to which the study’s findings can be generalised (Brewer, 2000; Yin, 2003; Trochim et al., 2007). In this research, validity was determined in two ways. One was based on the case study research in research activities 1, 2 and 4 that provided analytical generalisations, suggesting that the results can be replicated (Yin, 2003). This replication was also strengthened by the use of well-defined case studies of five public sector organisations. This also applies to a considerable number of respondents that comprised both business and IT people mainly at various management levels (Tables 1, 2 and 3). The other was based on survey research in research activity 3, which provided the possibility for statistical generalisation in which a particular set of results are generalised to a population (Trochim et al., 2007), in this case, the effect of CSFs on IT governance performance in TaPSOs.
Reliability, as shown earlier, is the consistency of the measurement (Trochim et al., 2007). This minimises errors and bias in the research by applying case study and survey research methods through the documentation of research procedures and estimation of statistical reliability.

In research activities 1, 2 and 4, we applied case study research including the use of case study protocols and case studies databases (Yin, 2003; Cohen et al., 2007) as shown in subsection 2.1.2. Using these tactics, procedures that are important in such a multiple case design were outlined and documented. For example, we prepared in advance an overview of the case studies, data collection instruments, required evidence list and a guide for the report. A case study database was put together and this linked case study notes and documents. Furthermore, according to Silverman (2007), the interviews protocols were prepared and applied in the manner that allowed the same format and sequence of the questions so that each respondent understands them in the same way.

In research activity 3, which applied survey research, apart from verifying the questionnaire correctness in the pilot study, its reliability was estimated in two stages: the pilot and the actual study (Fowler, 2002). In both cases, internal consistency was estimated and found to be acceptable. This was by using the average variance extracted, Cronbach’s alpha and composite reliability measures (Fornell & Larcker, 1981; Nunnally & Bernstein, 1994).
3. Theoretical foundation of IT governance

In this chapter, we present the theoretical foundation of IT governance in line with the present research work. The first section covers the IT governance focus and approaches that are related to and/or applied in this research. This includes IT governance focus areas, decisions, mechanisms, metrics and standards and frameworks in practice.

The second section covers IT governance-related research in public sector organisations and CSFs. It also covers the research gap on effective IT governance in TaPSOs. In this way, it highlights and provides a foundation for the areas of intervention in this research as shown in the previous chapter.

3.1 IT governance focus and approaches

IT and its use in the business environment have experienced several turbulences and transformations in recent decades, leading to the area of IT governance. This area is still a fairly new concept, only emerging in the 1990s when Henderson and Venkatraman (1993) first used the term to describe the complex array of inter-firm relationships necessary for IT success (Simonsen et al., 2010). Different to the structure of management that concentrates on making operating decisions, governance focuses on creating a setting in which others can manage effectively (Sohal & Fitzpatrick, 2002).

Situated at multiple levels in the organisation, i.e. board, management executives and line management (Van Grembergen et al., 2003), a number of scholars have defined it from various points of view. These views include the fusion of business and IT (Van Grembergen, 2002); leadership, structures and processes to ensure the enterprise’s IT (ITGI, 2003); and encouraging desirable behaviour in using IT (Weill & Ross, 2004). This also applies to related theories and best practices in such an emerging knowledge domain (Peterson, 2003), as shown in this section and applied in this research work.

3.1.1 IT governance focus areas

According to ITGI (2003; 2007c), IT governance is concerned about two outcomes: *IT’s delivery of value to the business* and *the mitigation of IT risks*. The first is driven by the strategic alignment of IT & business and the second
by embedding accountability into the enterprise. Both need to be supported by adequate resources and processes and measured for results to be obtained.

In this way, an organisation requires that IT is aligned with the business and delivers value, its performance is measured, its resources are properly allocated and its risks are mitigated (ITGI, 2003). This leads to five focus areas for IT governance: “strategic alignment, value delivery, risk management, resource management and performance measurement” (ITGI, 2003; Buckby et al., 2008; Wilkin & Chenhall, 2010).

These IT governance focus areas, which have been applied in the whole research process, are all driven by stakeholder value as shown in Figure 4. Furthermore, since IT governance is a continuous life cycle, usually one starts with the aligned strategy that drives the delivery of the value it promised while addressing the risks. Moreover, at regular interviews the results need to be measured, reported and acted upon, with resource management overlaying the whole life cycle as indicated in Figure 4. The coverage of each focus area similarly ranges from alignment to measure-related functions as indicated in Table 6.

Figure 4. Focus areas of IT governance (ITGI, 2003)
Table 6: Description of IT governance focus areas adapted from ITGI (2003; 2007b), Buckby et al. (2008) and Wilkin and Chenhall (2010)

<table>
<thead>
<tr>
<th>Focus Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT strategic alignment</td>
<td>Ensures a linkage between business and IT plans and defined, maintained and validated IT value proposition and aligned IT and enterprise operations. The main concern relates to the linkage of enterprise business and IT plans with operations.</td>
</tr>
<tr>
<td>IT value delivery</td>
<td>Deals with execution of the value proposition all through the delivery cycle, making certain that IT delivers the promised benefits vs. the strategy. The main concern is on optimising costs and proving the intrinsic value of IT throughout the delivery cycle.</td>
</tr>
<tr>
<td>Risk management</td>
<td>Ensures risk awareness by senior officers in the organisation, a clear transparency and understanding of the organisation’s desire for significant risk and compliance requirements and embedding of risk management responsibilities in the organisation. The main concern is on embedding accountability to mitigate significant risks.</td>
</tr>
<tr>
<td>IT resource management</td>
<td>Ensures optimal investment and proper management of critical IT resources: applications, information, infrastructure and people. Main concern is on optimizing knowledge and infrastructure.</td>
</tr>
<tr>
<td>Performance measurement</td>
<td>Is about tracking and monitoring implementation of strategies and projects. This also applies to use of resources, performance of processes and delivery of services. An example is the use of BSC, which translates strategies into action for achieving goals that are measurable beyond conventional accounting. Key issues relate to setting and monitoring strategies and services.</td>
</tr>
</tbody>
</table>

3.1.2 Key IT governance decisions

IT governance is also about specifying the decisions to be made and respective accountability frameworks in the organisation. From this viewpoint, effective IT governance must address three issues. These are decisions to be made to ensure the effective management and use of IT; who should make such decisions (Weill & Ross, 2004); and how these decisions will be made and monitored (Duffy, 2002b; Broadbent, 2003). Given their importance in
IT decision making and monitoring processes, here we briefly discuss the IT governance decisions to be made and who should make them.

The decisions to be made are categorised as principles, architecture, infrastructure, business applications and investment and prioritisation. The corresponding IT governance key decisions are IT principles, which clarify the business role of IT; IT architecture, which defines the integration and standardisation requirements; and IT infrastructure, which determines shared and enabling services. Others are business application needs, which specify the business requirements for purchased or internally developed IT applications; and IT investment and prioritisation, which chooses initiatives to fund and how much to spend (Table 7). How these decisions are made in the organisation is likely to affect the IT decision making and monitoring process and eventually the integration of IT into its corporate strategies and operations.

Table 7. Key IT governance decisions, adapted from Weill and Ross (2004)

<table>
<thead>
<tr>
<th>IT principle decision</th>
<th>IT architecture decisions</th>
<th>IT infrastructure decisions</th>
<th>IT investment and prioritisation decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-level statements about how IT is used in the business</td>
<td>Organisations logic for data, applications, and infrastructure captured in a set of policies, relationships and technical choices necessary to achieve the desired business and technical standardisation &amp; integration.</td>
<td>Centrally coordinated, shared IT services that provide the foundation for the enterprise’s IT capability.</td>
<td>Decisions about how much and where to invest in IT, including project approvals and justification technology.</td>
</tr>
<tr>
<td>Business applications needs</td>
<td>Specifying the business need for purchases or internally development IT applications.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Together with key decisions is the issue of who has decision rights or input rights for a particular IT decision (Weill & Ross, 2004; Grover et al., 2007; Chiu et al., 2008). These decision rights range from business monarchy to anarchy and each of them can have one or more roles except anarchy, which covers each individual user as indicated in Table 8. As an example, business monarchy comprises executive management (CxO level), while IT monarchy comprises individuals/groups of IT executives.
Both key decisions and decision rights are important in IT-related decision making and monitoring processes (Broadbent, 2003; Weill & Ross, 2004) because of the need for careful analysis and the approval of IT decisions. This practiced well can increase business and IT alignment, accountability and the ownership of business applications. Given their importance, these key decisions and decision rights are explored in the present research in research activity 1, as shown in the previous chapter on research methodology.

Table 8. Decision/input rights for IT decisions (Weill & Ross, 2004)

<table>
<thead>
<tr>
<th>Decision rights or input rights for a particular IT decision are held by:</th>
<th>CxO level execs</th>
<th>Corporate IT and/or business unit IT</th>
<th>Business unit leaders or business process owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business monarchy</td>
<td>A group of, or individual, business executives (i.e. CxOs). Includes committees comprising senior business executives (may include the CIO)</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>IT monarchy</td>
<td>Individuals or groups of IT executives</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Feudal</td>
<td>Business unit leaders, key process owners or their delegates</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Federal</td>
<td>C-level executives and at least one other business group (e.g. CxO and business unit leaders)</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>IT duopoly</td>
<td>IT executives and one other group (e.g. CxO or business unit leaders)</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Anarchy</td>
<td>Each individual user</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.1.3 IT governance mechanisms

Now that we have covered some IT governance concepts in relation to this research, we assess the kinds of practices in terms of mechanisms that can be implemented in an organisation to bring the benefits it promises. Generally, IT governance can be deployed using a mixture of structures, processes and relational mechanisms (Peterson, 2003; Weill & Ross, 2004; Ali & Green, 2007; Van Grembergen & De Haes, 2008).
Structures involve the organisation of the IT function, clearly defined roles and responsibilities and a diversity of IT/business committees. Processes refer to strategic decision making and monitoring. Relational mechanisms are the catalyst for attaining and sustaining business–IT alignment, even when structures and processes are in place. These mechanisms form the IT governance implementation framework indicated in Figure 5.

Each dimension of the framework, i.e. structures, processes and relational mechanisms, also constitutes the necessary mechanisms for IT governance implementation (Van Grembergen & De Haes, 2008). For example, structures include roles and responsibilities that should be unambiguously defined and clearly understood throughout the whole organisation for effective IT governance. This also applies to the IT steering committees that oversee IT investment and that provide strategic leadership for IT operations. Processes include service level agreements, which are important for ensuring that the required quality of service is manageable and meets the set criteria. This also applies to the best practice frameworks such as COBIT and ITIL that ensure that the right processes and procedures are in place for effective IT govern-
Relational mechanisms include active participation and collaboration between principle stakeholders and cross-functional business/IT training, which facilitates a common understanding and catalyses structures and processes to yield the envisaged results.

Although there are several mechanisms, however, the decision about what to implement depends on the context and contingencies in an organisation and the interacting environment as a whole (Weill & Olson, 1989; Schoderbek et al., 1998; Ribbers et al., 2002). Therefore, in this research, specifically in research activity 1, we also explored them with the latter as one of the drivers.

3.1.4 Measuring the IT governance process

In recent years, many organisations have been in the process of implementing a combination of IT governance mechanisms, some directly as specific IT governance projects and others indirectly as part of general organisational improvements. An important aspect of IT governance implementation is performance measurement (Weill & Ross, 2004; Ali & Green, 2007).

The BSC, a performance measurement framework originally developed by Kaplan and Norton (1992), is one of the frequently used tools today. Based on the latter and an earlier version of IT BSC (ITGI, 2003), a specific BSC for IT governance has also been developed (Van Grembergen & De Haes, 2005; 2009). Its four dimensions with the original BSC in brackets are corporate contribution perspective (financial), stakeholder perspective (customer), operational excellence perspective (internal processes) and future orientation perspective (learning and growth) (Figure 6). The BSC is not only a performance measuring system; it also provides a management system when causal relationships between metrics are implemented.

The ultimate goal of instituting IT governance is the attainment of better IT value delivery and, consequently, the achievement of higher corporate contribution. Therefore, the corporate contribution perspective is an end enabled by other scorecard perspectives through a cause-and-effect relationship as indicated in Figure 6. As can also be observed in this figure, IT governance mechanisms, i.e. structures, processes and relational mechanisms, are found in the operational excellence and future orientation perspectives, thus indicating further their importance to IT governance improvement. This also
applies to maturity, which is an important aspect for measuring IT governance implementation in the organisation, mostly through IT processes.

Measuring IT governance maturity through IT processes can be based on a generic maturity model with selected or all 34 COBIT IT processes (Gulden-tops et al., 2002; ITGI, 2007b). Through this model, maturity is measured in levels, from 0 to 5, and this provides the states of IT processes and what has to be in place to score higher and improve IT governance (Table 9). The model can also be used to compare organisations, industries or sectors, thus triggering learning from each other. Given the importance and unexplored state of IT governance in TaPSOs, maturity was also investigated in this research, specifically in research activity 1.

![Figure 6. Metrics for an IT governance BSC (Van Grembergen & De Haes, 2005)](image-url)
Table 9. Generic maturity model, adapted from ITGI (2003; 2007b)

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Non-existent</td>
<td>Complete lack of any recognisable processes. The enterprise has not even recognised that there is an issue to be addressed.</td>
</tr>
<tr>
<td>1 Initial</td>
<td>There is evidence that the enterprise has recognised that issues exist and need to be addressed. There are, however, no standardised processes; instead, there are ad-hoc approaches that tend to be applied on an individual or case-by-case basis. The overall approach to management is disorganised.</td>
</tr>
<tr>
<td>2 Repeatable</td>
<td>Processes have developed to the stage where similar procedures are followed by different people undertaking the same task. There is no formal training or communication of standard procedures, and responsibility is left to the individual. There is a high degree of reliance on the knowledge of individuals and, therefore, errors are likely.</td>
</tr>
<tr>
<td>3 Defined Process</td>
<td>Procedures have been standardised, documented and communicated through training. It is mandated that these processes should be followed; however, it is unlikely that deviations will be detected. The procedures themselves are not sophisticated but are the formalisation of existing practices.</td>
</tr>
<tr>
<td>4 Managed</td>
<td>Management monitors and measures compliance with procedures and takes action where processes seem not to be working effectively. Processes are under constant improvement and provide good practice. Automation and tools are used in a limited or fragmented way.</td>
</tr>
<tr>
<td>5 Optimized</td>
<td>Processes have been refined to a level of good practice, based on the results of continuous improvement and maturity modelling with other enterprises. IT is used in an integrated way to automate the workflow, providing tools to improve quality and effectiveness, making the enterprise quick to adapt.</td>
</tr>
</tbody>
</table>

IT governance can also be measured from a performance perspective, specifically looking into its outcome rather than the process itself. This can be carried out based on a MIT-CISR study in 256 organisations worldwide on IT governance strategies (Weill & Ross, 2004). This widely used and relatively quick performance assessment (Ferre, 2004; Simonsson et al., 2010) is based on two factors: the importance of a particular governance outcome and the success (Figure 7). Figure 7 indicates the four IT governance outcomes (a to d) and how to calculate performance based on these data and the
weighting criteria suggested by the method. Such a measure is important for the organisation as IT is not an end but a tool to enable an end, the business. Therefore, given this importance, in this research, specifically research activity 4, business-oriented outcome and success were also used to investigate the intervention of IT governance improvement in TaPSOs.

3.1.5 IT governance standards and frameworks in practice

There are several standards and frameworks essential to the process of IT governance in an organisation (Liu & Ridley, 2005; Larsen et al., 2006; ITGI & PwC, 2008). This encompasses the policies, procedures and structures designed to provide reasonable assurance that IT delivers value to the business (ITGI, 2003; Van Grembergen & De Haes, 2008).

One of the most internationally deployed IT governance frameworks is COBIT (Larsen et al., 2006; ITGI & PwC, 2008). This is an IT governance framework that provides a set of generally accepted global perspectives and best practices (Lainhart, 2000). It is adopted in private and governmental entities around the world and based on the premise that IT resources need to deliver the information that an enterprise requires to achieve its objectives.

Figure 7. Calculating governance performance (Weill & Ross, 2004)

3. Calculate governance performance:

\[
\text{Importance total} = \ \\
\text{Total} = \frac{(\text{Total} \times 100)}{(5 \times \text{Importance total})} = \]
In order to deliver that information, IT resources, namely infrastructure, application, people and information, need to be managed by a set of naturally grouped IT processes.

To date, COBIT has 34 IT processes grouped into four domains: planning and organisation, acquisition and implementation, delivery and support, and monitoring and evaluation. These are achieved through a rather overwhelming 318 control objectives. This also applies to several other tools to assess and improve the management of IT (ITGI, 2007b) and make them consistent with business goals (Van Grembergen & De Haes, 2008).

Several generic standards and frameworks for best practices issued by both international standardisation and other organisations exist in addition to COBIT. These standards and frameworks manage different aspects of IT that altogether might be useful when embarking on IT governance-related implementation or research work. These include ITIL for IT service management, ISO 17799 for IT security management, PRINCE2 for project management and ISO 38500 for the corporate governance of IT (Brand & Boonen, 2007; OGC, 2008; ISO, 2008).

These standards and frameworks have some limitations with respect to the research problem, goal and context of the targeted environment, TaPSOs. For example, ITIL focuses on IT service management, ISO 17799 on information security management and the closer ISO 38500 on IT projects and operations. Also, the ideal COBIT focuses on controls that are also overwhelming as already stated.

3.2 IT governance research in the public sector
This section focuses on IT governance research in public sector organisations. It provides the relevant public sector characteristics and patterns of IT governance research. This also applies to IT governance CSF-related research and finally the gap in the environment of this research i.e. TaPSOs from the perspective of a developing country.

3.2.1 Defining and characterising the public sector
The public sector is defined as a part of economic and administrative life that deals with government services delivery by and for the government whether national, regional or local/municipal (Lane, 1995). Different to the
private sector (Caudle et al., 1991), the public sector is characterised by the fact that it serves all citizens through the exercise of its powers, authorities and roles in the public interest (Elpez & Fink, 2006). Furthermore, making profit is not the main objective of public sector organisations nor do they depend on outperforming their competitors (DeLooff, 1996; Sethibe et al., 2007). However, the scope of concerns in the public sector is often much wider than that in the private sector (Lane, 1995; Boyne, 2002; Nicoll, 2005; Lawry et al., 2007).

These differentiating concerns that characterise the public sector include:

- Existence of more bureaucracy, i.e. a greater amount of formal procedures for decision making that are relatively less flexible (Farnham & Horton, 1996; Nicoll, 2005; Shaikh et al., 2007).
- Red tape, i.e. operating with counterproductive amounts of rules that rely more on processes than they do on results and outcomes (Lane, 1995).
- Lower managerial autonomy that allows managers less freedom to react as they see fit, e.g. issues on staffing and performance incentives (Boyne, 2002; Nicoll, 2005; Lawry et al., 2007).
- Wider accountability given the wider internal operating environment and the demands of the general public (Lane, 1995; Sethibe et al., 2007).
- Constantly changing requirements of legislature as well as ministerial expectations (Liu & Ridley, 2005; Shaikh et al., 2007).

These differences together with the earlier mentioned IT-related concerns and growing application, reliance and importance of IT on public service delivery lead to specific needs and approaches to IT governance in the public sector (Loukis & Tsouma, 2002; Liu & Ridley, 2005; Sethibe et al., 2007). This is also because IT governance best practices can vary in different sectors (Ribbers et al., 2002; De Haes & Van Grembergen, 2008).

### 3.2.2 Patterns of related IT governance research in the public sector

Public sector organisations have recognised the importance of effective IT governance on success (Ali & Green, 2007), and research specific to this sector has been carried out. This is mainly on IT governance practices in terms of the mechanisms, approaches and factors that influence effective IT
governance. This includes the study that looked into IT governance mechanisms in terms of structures with a viewpoint on the roles, responsibilities and futures of CIOs in the public sector (Lawry et al., 2007). This showed that because of the context in which the public sector operates, there are some similarities but also vast differences such as its reliance on rules and procedures and lower managerial autonomy. These differences led to the adaption of a model for measuring CIOs specifically for the public sector.

This also applies to IT governance mechanisms that were investigated by Ali and Green (2007) in public sector organisations in Australia. Specifically, they examined four individual IT governance mechanisms that influence the overall effectiveness of IT governance in public sector organisations. The study showed significant relationships between the existence of an IT strategy committee and corporate communication systems, and effective IT governance in these public sector organisations (Ali & Green, 2007).

Furthermore, another study of the maturity of these IT governance practices analysed IT controls from a public sector perspective (Liu & Ridley, 2005). This study applied the maturity model to measure the maturity levels of 15 of the most important IT control processes (Guldentops et al., 2002) from COBIT (ITGI, 2007b), in this case public sector organisations in Australia. It also compared benchmarks from a range of nations, of which the former was shown to perform better than did the latter. Among others, this was attributed to the differences in awareness, although in general there is a need for improvement in the shared understanding of the importance of IT governance in both cases.

This was also indicated in a case study of three public sector agencies in Australian government. This study investigated the awareness and perception of the value of IT governance frameworks (Warland & Ridley, 2005). It showed that although some practices were in place, the awareness and understanding of IT governance frameworks in the agencies seemed to be limited. Taking into consideration public sector concerns, it indicated the need to increase such awareness. It also pointed out the need for further investigation with respect to its contribution to effective mechanisms to derive value from utilising IT governance frameworks in the sector.
Moreover, another study was carried out on how top performers manage IT for superior results that, among others, specifically analysed the public sector (Weill & Ross, 2004). This IT governance-related study revealed the factors influencing the approach that organisations choose to make successful IT decisions. These factors include strategic and performance goals, organisational structure, governance experience, size and diversity, and industry and regional differences. In addition, the study indicated that governance performance in the public sector is less than it is in for-profit enterprises by 10%. This was suggested to be the result of the greater difficulty in measuring performance and setting goals in the public sector, as also indicated by a study of value frameworks for the public sector (Moore, 1995).

Hoch and Payán (2008) recognised these factors, including the industry and regional differences that should be taken into account to determine the approach for IT governance implementation. This study claimed that IT governance has a critical capability for the public sector to increase IT value. It analysed good IT governance in the German public sector and came up with a five-dimensional framework that enables an organisation to identify the institutional design model most appropriate to its specific circumstances. This also applies to the creation of a baseline to calculate the potential value that can be gained from redesigning IT governance for the effective functioning of IT and ultimate realisation of its value in the public sector.

Finally, another study of IT governance in public and private sector organisations examined the differences between these two sectors (Sethibe et al., 2007). It reflected that although there are similarities between the public and private sectors, there are also inherent differences. It suggested that a one size fits all approach is not appropriate when studying the two sectors, as also indicated by Khalfan and Gough (2002). In addition, in order to acknowledge the scarcity of empirical research in this area, it suggested further studies that could address IT governance approaches that work best in a public sector context. These studies included examining further organisational practices and success factors to consider effective IT governance implementation in the improvement of public service delivery.
3.2.3 IT governance research on CSFs in the public sector

CSFs are the “limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department or organisation” (Rockart & Van Bullen, 1986). They are used to direct the focus towards the factors that define key areas central to the organisations’ objectives in which to invest their resources and time to ensure success (Ward & Peppard, 2002; Caralli, 2004). Owing to their critical importance, CSFs have been widely researched (Gil-Garcia & Pardo, 2005; Tan et al., 2009) in various organisations from diverse viewpoint: from the specific projects to the whole organisation’s strategic direction (Esteves, 2004; Fortune & White, 2006).

However, in the area of IT governance, and considering CSFs as essential elements for its effective implementation, few CSF studies have been undertaken, while IT governance has become critical to most organisations today (Sethibe et al., 2007). These include a study of Guldentops (2004), which showed five CSFs for governing IT. His study concentrated on committees, aligning IT and business strategies and operations, cascading goals and strategies down through the enterprise, applying best practices and implementing an IT governance framework. The ITGI has also established several CSFs across sectors with an emphasis on IT as an integral part of the enterprise. This also applies to awareness among the involved people and communication across the organisation (ITGI, 2003).

Additionally, ITGI funded a study of IT governance in practice, which involved 50 CIOs that pointed out six CSFs (ITGI & PwC, 2006b). These CSFs included communication, senior management support, change management, enforcement, evolution as opposed to revolution, defining and tracking benefits and avoiding over-engineering.

Furthermore, CSFs have been worked out particularly for governance of IT in the public sector. It included Weill (2004), who indicated eight CSFs from a study that covered public sectors in different parts of the world. Like other studies, but within a different context, he pointed out that the involvement of senior managers, awareness, simplicity and designing IT governance are integral parts of the enterprise and accountability. Different to others, his
CSFs included ownership, transparency, making choices, exceptional handling and providing the right incentives.

Moreover, a study of IT governance-related CSFs in the public sector was undertaken in an Australian government agency (Tan et al., 2007). Although based on the ITIL framework, which places rather more emphasis on IT service management, they found CSFs related to previous studies. These included senior management commitment, which is important for transforming organisational culture, and service-oriented focus. Others are benefit and performance management, change management and awareness and training. Different from others, the study also indicated the need for appropriate guidelines and relations to third parties, and the use of an integrated toolset. In addition, it pointed out that these CSFs should be taken with caution when considered for a different context to the studied public sector organisation as circumstances could be different.

3.3 Research gap on effective IT governance in TaPSOs

Many of these studies have looked at IT governance practices in terms of mechanisms including their influence on effective IT governance (Martin et al., 2005; Warland & Ridley, 2005; Lawry et al., 2007; Ali & Green, 2007). Some have also indicated approaches and others concrete CSFs to consider for effective IT governance in the public sector (Loukis & Tsouma, 2002; Weill, 2004; Tan et al., 2007; Hoch & Payán, 2008).

However, none have taken a CSFs holistic view to IT governance, i.e. all five IT governance focus areas (ITGI, 2003; Buckby et al., 2008; Wilkin & Chenhall, 2010). This is in terms of examining their effect on IT governance performance and the respective framework for effective IT governance in the public sector. Such way of examining these features, together with IT governance practices and their maturity, are even completely unstudied when it comes to the public sector in a typical developing country environment such as Tanzania (Khalfan & Gough, 2002; Walsham & Sahay, 2005). Such an environment is characterised by a lower level HDI, poor IT infrastructure (CIA, 2010; UNDP, 2010), a sensitivity to cultural issues and a willingness to change needs (Imran & Gregor, 2005; Bakari, 2007).

Existing standards and frameworks, apart from lacking a holistic view of CSFs, also have some limitations with respect to the research problem, goal
and context of the targeted environment, TaPSOs. For example, as indicated already, ITIL focuses on IT service management, ISO 17799 on information security management and the closer ISO 38500 on IT projects and operations. In addition, COBIT focuses on controls and has 318 control objectives and other tools that are overwhelming. Moreover, COBIT smaller version i.e. COBIT quick-start aims at SMEs and where IT uses is not critical (ITGI, 2007c). This creates a gap between the existing frameworks and context of this research, TaPSOs, especially from a holistic view of IT governance with a focus on the few critical aspects and contextualised actions for success.

These shortcomings, especially the non-availability of studies of IT governance-related practices, CSFs and respective frameworks for effective IT governance in such an environment, have also been demonstrated by their absence in IT governance global status reports. For example, in the survey by Steuperaert (2004), it was indicated that 20% of respondents (276) were from the public sector but none were from such an environment. This also applies to the related IT governance global status report in 2006 (ITGI & PwC, 2006a) in which out of 695 respondents, 17% were from the public sector. However, in ITGI and PwC (2008), in which out of 749 respondents 24% were from the public sector, an improvement was indicated. This included the Africa region in which Tanzania is situated but again with only 2% from South Africa, a country whose socio-economic development attributes are not considered to be those of a typical developing country (CIA, 2010).

Moreover, these shortcomings are supported by consolidated research on the current landscape and future prospects of information systems in developing countries (Walsham & Sahay, 2005). This has emphasised the need for future research to investigate critical issues for increasing IT contributions in these countries through contextualised research. As Ribbers et al. (2002) and Patel (2003) proposed, one size does not fit all and a mixture of existing practices and contingencies (Weill & Olson, 1989) influences the envisaged improvement. Therefore, this literature review in relation to the topic and the studied environment contributed to ascertaining the foundation and gap for the goal of this research and its four questions.
4. Results

This research work had four questions (RQ1 to RQ4). These questions were addressed through research activities 1 to 4 and published in five papers (Papers I to V). The obtained results were summarised in response to the research questions and activities (Figure 8). These results are:

- IT governance practices and maturity in TaPSOs presented in section 4.1 and more details in Papers I and II.
- CSFs for effective IT governance in TaPSOs presented in section 4.2 and more details in Paper III.
- The CSFs correlated effect on IT governance performance in TaPSOs presented in section 4.3 and more details in Paper IV.
- A CSFs framework for implementing effective IT governance in TaPSOs (CEITG framework) presented in section 4.4 and more details in Paper V.

![Figure 8. Research results and the relationships among them](image)

These results are related to each other as shown in Figure 8. Further to the relationship indicated in sub-section 2.2.1, the designed CEITG framework was supported by the identified CSFs and their correlated effects on IT governance performance. This also applies to the support from the determined
IT governance practices and maturity. These four results are described in the subsequent sections.

4.1 IT governance practices and maturity in TaPSOs

The first result is regarding IT governance practices and maturity in TaPSOs context. This was achieved by responding to the research question on how and to what extent IT governance practices are implemented in TaPSOs (RQ1). To answer this question we explored IT governance practices in TaPSOs in terms of IT governance mechanisms and the related problems and consequences. Also we determined the IT governance maturity in terms of the maturity levels of IT processes. Apart from these results we compared the obtained IT governance maturity in TaPSOs to those obtained by other studies of public sector organisations from a developed country and internationally. In the next section, we discuss IT governance practices and IT governance maturity in TaPSOs.

i) IT governance practices in TaPSOs

The IT governance practices elicited in TaPSOs include the structures, processes and relational mechanisms. Moreover, during research activity 1 we elicited the related problems and consequences. As shown in research activity 1 in sub-section 2.2.2, these IT governance practices were obtained using a guiding construct. This was composed based on Van Grembergen and De Haes’ (2008) research on IT governance mechanisms i.e. structures, processes and relational mechanisms, and Weill and Ross’ (2004) research on structures, specifically on key decision patterns. Several constructs on the problems and consequences of the five IT governance focus areas (ITGI, 2003; Buckby et al., 2008) were also used. These constructs were operationalised, used and analysed in a case study of five TaPSOs. The result of the analysis in these TaPSOs on IT governance practices is shown in Table 10.

Table 10. Summary of the IT governance practices in the five studied organisations

<table>
<thead>
<tr>
<th>Practice category and no. of organisations that practice it</th>
<th>Practice analysis across studied organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Structures (5)</td>
<td>IT functions in the studied organisations are headed by IT directors that report directly to the Chief</td>
</tr>
</tbody>
</table>

67
<table>
<thead>
<tr>
<th>Practice category and no. of organisations that practice it</th>
<th>Practice analysis across studied organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director of IT / CIO on Board (2)</td>
<td>The IT director is on the executive board in all studied organisations that have boards as part of their structures, i.e. MSD and TRA. The analysis of the documents collected from TRA, such as the annual general meeting reports and IT strategic plans, showed that there is a need for the IT director to sit on the executive board.</td>
</tr>
<tr>
<td>IT strategy committee (0)</td>
<td>There is no IT strategy committee in any of the organisations, apart from its important role in governing and overseeing IT-related matters. The analysis of the documents collected from MSD and TRA such as the annual general meeting reports showed several committees at the board level but not an IT strategy committee.</td>
</tr>
<tr>
<td>IT steering committee (1)</td>
<td>There are no IT steering committees except in one organisation, apart from their importance in overseeing major projects and managing IT priorities. For example, the director of MIS at PMO-RALG mentioned that “we do not have an IT steering committee for the ministry; however, recently we proposed a high-level IT steering committee to cut across the ministries that heavily interact with the...”</td>
</tr>
</tbody>
</table>
Practice category and no. of organisations that practice it | Practice analysis across studied organisations
---|---
**IT project committees (4)** | *LGAs through various IT applications. This has been done in order to minimise the duplication of efforts and improve information flow.*
| At the level of major IT projects, there are generally committees that include IT and business people to oversee their implementation, although not as actively as they should be. For example, a manager of operation and production systems in TRA said, ‘An example is a drivers’ licenses system project committee that has been vital in overseeing the processing and issuing of drivers’ licenses in the country and of which I am a member. Though there could be some improvements because sometimes we did not follow-up timely on some agreed issues as we should have, it has contributed to the success of this [important] project.” In some organisations, other committees handle common issues that have been vital for the governance and wide use of IT such as procurement committees in most of them, security and change controls committees in MSD and website board in MoFEA.

**IT organisation structure (5)** | This is mostly centralised and, in some cases, it has staff distributed to work directly in a user department or branch. For example, one of the assistant directors of IT services at MoFEA said, “The governance structure here and the systems we manage are centralised. However, for IT effectiveness and because of the relatively lower IT know-how of business people we have allocated some IT staff to work directly with the business people in most computerised business processes such as government payroll and the financial management system.” In addition, both decisions and input rights with respect to key IT decisions to be made were found to be distributed across the studied organisations.

**ii) Processes**

**Strategic information systems planning (1)** | Not directly applied except in one organisation where management thought it was important for aligning IT/business goals and strategies. For ex-
<table>
<thead>
<tr>
<th>Practice category and no. of organisations that practice it</th>
<th>Practice analysis across studied organisations</th>
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<tbody>
<tr>
<td><strong>Information economics and portfolio management (0)</strong></td>
<td>ample, the director of IS at MSD mentioned that</td>
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<td></td>
<td>“we do not have an IT strategic plan. We have</td>
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<td></td>
<td>commissioned consultants to assist us in</td>
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<td></td>
<td>developing it, and they have been slow in</td>
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<td></td>
<td>taking it up. Meanwhile, we have IT plans that</td>
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<td></td>
<td>are part of the corporate strategic plan.”</td>
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<tr>
<td><strong>IT BSC (1)</strong></td>
<td>Not practiced in the studied organisations and</td>
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<td></td>
<td>almost no respondents mentioned it. However, it</td>
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<td></td>
<td>is important for both IT/business people that</td>
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<td></td>
<td>are involved in IT projects and the selection</td>
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<td>of IT investment portfolios. Its practice, which</td>
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<td>involves traditional return of investment and</td>
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<td></td>
<td>non-tangible benefits, can increase the chance</td>
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<td>for IT to add value to the business while</td>
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<td></td>
<td>minimising the duplication of efforts in</td>
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<td></td>
<td>TaPSOs. For example, the director of MIS at PS-</td>
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<td></td>
<td>PSM said, “We have several fragmented and</td>
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<td></td>
<td>duplicated IT initiatives in and across our</td>
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<td></td>
<td>government institution, but some efforts are</td>
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<td></td>
<td>required to minimise this trend for economies</td>
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<td></td>
<td>of scale and better information flow.”</td>
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<tr>
<td>**COBIT and related IT governance frameworks such as ITIL</td>
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<tr>
<td>(1)**</td>
<td>Generally this practice was not applied except</td>
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<td></td>
<td>in one organisation where it is practiced from</td>
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<td></td>
<td>the top of organisation down to the departments</td>
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<td></td>
<td>and individuals including IT. In this way, the</td>
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<td>organisation has improved its alignment of IT</td>
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<td></td>
<td>and business goals as well as communication</td>
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<tr>
<td></td>
<td>among IT and business people. For example, the</td>
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<tr>
<td></td>
<td>chairperson of the board said, “A BSC enables</td>
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<td></td>
<td>us to see the overall performance of the</td>
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<td></td>
<td>authority much easier than before including</td>
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<td></td>
<td>the contribution of IT.” This also applies to</td>
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<td></td>
<td>the director of IT who enthusiastically</td>
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<td></td>
<td>mentioned that “the BSC has improved the</td>
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<td></td>
<td>reporting mechanisms and track of the IT</td>
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<tr>
<td></td>
<td>achievements back to the business goals.”</td>
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<tr>
<td></td>
<td>This practice is not applied and there is a</td>
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<td></td>
<td>lower awareness of frameworks such as COBIT</td>
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<tr>
<td></td>
<td>and others. However, one organisation has</td>
</tr>
<tr>
<td></td>
<td>started to implement some aspects of ITIL as an</td>
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<tr>
<td></td>
<td>IT service management framework. This also</td>
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<tr>
<td></td>
<td>applies to the use of PRINCE2, which is a</td>
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<tr>
<td></td>
<td>project management methodology. For example, the</td>
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<tr>
<td></td>
<td>manager of systems</td>
</tr>
<tr>
<td>Practice category and no. of organisations that practice it</td>
<td>Practice analysis across studied organisations</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>IT alignment/governance maturity models (0)</td>
<td>Not practiced and very few respondents aware of them, even though they are an important practice.</td>
</tr>
<tr>
<td>Service level agreements (1)</td>
<td>The practice is applied only in one case even though it is important for the quality of IT services. For example, the director of MIS at PO-PSM said, “As part of the ongoing public service reform program, the directorate has created and uses a client charter as a service level agreement with the user departments and the public. Recently introduced, this allows for the timely delivery, measurement and improvement of IT services.”</td>
</tr>
<tr>
<td>Activity-based budgeting (5)</td>
<td>The practice is applied in most organisations based on the MTEF, which is a government-wide tool for planning activities, resources and associated performance for ministries. The analysis of the collected documents such as corporate strategic plans, annual budget plans and progress reports from the TaPSOs indicated the use of the MTEF to link corporate objectives, planned activities and respective expenditure with the required inputs for the ministries. This has been applied to the studied organisations that do the same through activity-based budgets and yearly business plans.</td>
</tr>
<tr>
<td>SWOT analysis (5)</td>
<td>Mostly applied across the studied organisations but not as detailed as it should be in most IT plans, which are just a small part of corporate strategic plans. Only one of the organisations had an IT strategic plan, thus its SWOT was more detailed. For example, the analysis of the collected documents such as corporate and IT strategic plans from the studied TaPSOs indicated different levels of IT-related SWOT analyses. The SWOT analysis that</td>
</tr>
</tbody>
</table>
### Practice Analysis Across Studied Organisations

<table>
<thead>
<tr>
<th>Practice Category and No. of Organisations That Practice It</th>
<th>Practice Analysis Across Studied Organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT plans (4)</td>
<td><em>Practice analysis across studied organisations was included in the corporate strategic plan was shallow with few statements, while the one included in the IT strategic plan was comprehensive, cutting across business processes, people and technology.</em> It is widely practiced as an alternative to a fully fledged strategic information system planning. These limited IT plans normally were prepared as an input to the corporate strategic plans. For example, the analysis of documents collected such as corporate strategic plans and IT progress reports showed that <strong>there is no IT strategic plan in most of them; rather IT plans are embedded in the corporate strategic plans.</strong></td>
</tr>
</tbody>
</table>

#### iii) Relational Mechanisms

<p>| Active Participation and Collaboration Between Principle Stakeholders (5) | It is widely practiced mostly through management mechanisms such as management meetings and IT project-based committees that increase the shared understanding of business/IT goals. This also applies to informal meetings between business and IT people, which are moderately practised at different levels to clarify IT/business issues, especially when a new IT-enabled project is initiated or implemented. For example, the permanent secretary of PMO-RALG said, <strong>“The development of major IT initiatives and their subsequent implementation are presented and discussed in management meetings, which comprise business/IT departments, thus assisting in the joint understanding of these initiatives. However, I would like to see more use of IT in the ministry and among us, the management.”</strong> |
| Cross-functional Business/IT Training and Rotation (5) | It is widely practised through workshops and training on matters of interest among IT and business people mainly on the development, use and management of IT-enabled business applications and enabling infrastructure. For example, the director of customer services and sales at MSD said, <strong>“IT/Business training in supported infrastructure and applications such as the efficient use of IT in communication and customer care training has been essential in improving service to the...</strong> |</p>
<table>
<thead>
<tr>
<th>Practice category and no. of organisations that practice it</th>
<th>Practice analysis across studied organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partnership rewards and incentives (1)</td>
<td>“It is not widely and systematically practised. However, occasionally some people are rewarded for outstanding performances in innovative solutions. For example, the director of IT at TRA said, “Occasionally, some people are rewarded because to outstanding performances related to the development of innovative IT/business solutions as in the case of IT personnel who received a prize of several hundreds of dollars because of the development of an innovative and useful business application in one of the tax regions.””</td>
</tr>
<tr>
<td>Business/IT co-location (2)</td>
<td>Not widely practised. However, in some cases, co-location has been applied and this has reduced resistance to IT-enabled changes. For example, the director of IT at MSD said, “This practice has assisted in reducing resistance to use of IT in one of our stations.” This also applies to the modernisation programme manager at TRA who said, “This practice has been applied here by co-allocating IT personnel to be managers of one of the main IT-enabled business applications. While there are still improvements to be done for its optimal IT value, this has contributed to the success of its widespread use today.”</td>
</tr>
<tr>
<td>&quot;Virtual meeting&quot; for business and IT people e.g. Intranet use (2)</td>
<td>Although there are already some sorts of Intranets in some of these organisations which could increase IT/business partnership and internal efficiency, they have not been widely used because of IT-related awareness, cultural and enforcement issues. For example, the principal administration officer at PO-PSM said, “The Intranet is in place, training has been provided to us and we have been told it can facilitate internal communication/dialogue but we have not seen it being used.”</td>
</tr>
</tbody>
</table>
To respond to the first research question, we discussed how IT governance is implemented by taking into consideration the analysis of structures, processes and relational mechanisms, as shown in Table 10. Taking into account the related problems and consequences found in the studied organisations and based on the five IT governance focus areas (ITGI, 2003; Buckby et al., 2008), an analysis has also been drawn below.

Structures were generally found to be relatively well established with directors of IT reporting directly to the CEO. In addition, by using the structure construct of Van Grembergen and De Haes (2008) we found a new practice in this category that emerged during the data analysis, i.e. IT project committees. We found that at the level of major IT projects, committees were generally established to oversee implementation, which included IT and business people. This also applies to related committees to handle common issues such as security, change controls and website content. These appeared to be good practices for increasing IT effectiveness because of the participation of both IT and business people in IT decision making and monitoring. This also applies to the participation of the IT department at the executive level in the overall corporate strategy and decision making process.

However, we found some weaknesses that are fundamental and that hampered the appropriate use, management and contribution of IT in these organisations. For example, there were no IT strategy committees at all. This also applied to IT steering committees with the exception of one of the organisations. Given the importance of such committees in overseeing and providing leadership in IT investment and operations, their absence slowed down the required IT investment and benefits to business. Also, although there were committees at the level of major projects to oversee individual project implementation, they were not as active as they should be. For example, inadequate follow-ups and enforcement on the matters discussed in IT-related committees and other meetings featured in the interviews. Furthermore, there were a lack of clear roles, responsibilities and accountability in some of these organisations. This, among others, led to difficulties in holding individuals accountable for their results. It also led to the ad-hoc practice and solution and thus the failure to optimally integrate IT into the business despite high IT spending.
Part of structures is also the patterns in the IT governance key decisions because one of the key determinants of effective IT governance is where the IT decision making authority/style is located in the organisation with respect to the key decisions being made (Weill & Ross, 2004). These authorities are Business monarchy, IT monarchy, Feudal, Federal, Duopoly and Anarchy, while the decisions are IT principles, IT architecture, IT infrastructure, Business application needs and IT investment and prioritisation. Taking into account the practices in place in terms of who provides input and makes decisions, the findings showed that both are distributed across the five studied organisations (Figure 9).

<table>
<thead>
<tr>
<th>Authority/Style</th>
<th>IT principles</th>
<th>IT architecture</th>
<th>IT infrastructure</th>
<th>Business application needs</th>
<th>IT investment &amp; prioritisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A group of business executives (Business monarchy)</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>IT executives (IT monarchy)</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Business unit leaders (Feudal)</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>IT/business executives &amp; business units leaders (Federal)</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>IT executives and a business group of a process to computerise (Duopoly)</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Individual business process owner (Anarchy)</td>
<td></td>
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<td>1</td>
<td>1</td>
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</tbody>
</table>

Figure 9. Patterns in IT governance key decisions in the studied organisations
Specifically, these five organisations indicated that IT provided most of the inputs to all decisions except on the business application needs where inputs equally come from business-related groups. The making of decisions indicated a different trend. This was mostly carried out by executive management comprising IT/business people, which if actively utilised is likely to increase the effective of IT decision making, monitoring and usage.

Looking at related studies and taking the case of the MIT-CISR study of the public sector (Weill & Ross, 2004), similarities were observed, especially on decisions where federal dominates in both cases. However, differences appear in decisions related to IT architecture and infrastructure, as carried out by the IT monarchy. In our case, it was the same, namely federal. By analysing these differences, mature IT applications and respective governance practices, especially on structures, might be one of the determinants.

**Processes** were generally found to be relatively weak, especially in the application of best practices such as IT BSC, COBIT and ITIL, which are important to ensure IT delivers and meets the business’ objectives. This also applied to strategic information systems planning, which was not directly applied as this practice was found only in one organisation. In others, IT planning was just a small part of corporate strategy, which does not necessarily include all the necessary details for a robust technology and its alignment with business strategy and operations. No wonder a significant number of interviewees and documents pointed out the existence of fragmented IT initiatives and applications, senior executives’ limited support of IT and weak ownership by business people working on IT-enabled business applications projects. This also applied to their consequences, which included the failure of IT initiatives to deliver innovative benefits and IT investment loss (Maimu, 2006).

When it comes to operations, weaknesses were also found in service level agreements. These agreements were mostly applied to external service providers as part of their contracts but were hardly applied internally as part of ensuring quality and timely IT services to users with the exception of one organisation. Also, such a weakness was indicated by information economics and portfolio management, which were not practiced at all despite its importance in the prioritisation process for IT investments and projects in which business and IT are involved (Van Grembergen & De Haes, 2008).
indicted by a significant number of respondents and documents analysed, these were coupled with inadequate or absent IT policies, controls and procedures including IT governance-related guidelines. These led to inadequate mechanisms to manage choices in evolving technology and the lower acceptance of new IT applications, and thus project cancellations, business destructions and weakened customer satisfaction.

In the process construct we used (Van Grembergen & De Haes, 2008), new practices in this category emerged during data analysis, i.e. activity-based budgeting, SWOT analysis and IT plans. Activity-based budgeting was applied in most studied organisations through the MTEF which is a government-wide tool for planning activities, resources and associated performances. Using this in line with an improvement in the indicated weaknesses can increase the contribution of IT in these organisations. This also applies to the use of SWOT analysis and IT plans, although in most cases these were not as detailed as they should be, because they were being applied as part of the corporate strategic plan rather than as a fully fledged IT strategic plan.

Although most organisations indicated a weakness in the use of best practices, it was encouraging that one organisation had tried to implement some parts of ITIL on incident and problem management. This also applies to the BSC for defining, monitoring and cascading strategies from the corporate level to individuals and PRINCE2 for project management. In fact, several respondents from this organisation indicated a relatively higher contribution of IT to business success.

Relational mechanisms were generally found to be practiced. Active participation and collaboration between principle stakeholders and cross-functional business/IT training (Van Grembergen & De Haes, 2008), were among those widely practiced. This was mostly carried out through management and IT project committees meetings and through IT/business training workshops on matters of interest, respectively. Such levels of practices were because of the availability of corporate structures that allowed such interactions. If such interactions are embraced effectively, they can increase the level of integration and success of IT in these organisations.

Several weaknesses were also revealed in this mechanism. For example, performance/partnership rewards and incentives were rarely awarded be-
cause of outstanding performance. This inconsistency contributed to discouraging success and increasing staff turnover, thus lowering IT performance.

In the relational mechanisms construct, we used Van Grembergen and De Haes (2008) and noted that a new practice in this category emerged during the data analysis, i.e. "Virtual meeting" for business and IT people. This was because of the existence of some Intranets in some of these organisations, which can increase the IT–business partnership. However, it was not widely used because of cultural and enforcement issues. Such inadequate cultural change and the necessary enforcement still hamper the widespread use of IT and thus limit the delivery of the promised benefits in TaPSOs. Paying attention to them can increase the IT–business partnership and its efficiency, as also pointed out by Ribbers et al. (2002).

ii) IT governance maturity in TaPSOs

The IT governance maturity in TaPSOs and a comparison with others was another result of research activity 1. This result included the following:

- The average maturity level across the five studied public sector organisations (Table 11).
- Individual organisations’ maturity levels (Figure 10).
- The comparison of TaPSOs’ maturity levels to others: public sector organisations in a developed country and internationally (Figure 11).

As shown in research activity 1 in sub-section 2.2.2, the maturity analysis in TaPSOs was based on the generic maturity model (Table 9). This also included the use of the 15 most important COBIT IT processes (Guldentops et al., 2002; Liu & Ridley, 2005) as well as focus groups in five Tanzanian public sector organisations. Concerning the generic maturity model, this ranges from level 0 (non-existent), meaning a complete lack of any recognisable processes, to level 5 (optimised), meaning processes have been refined to a level of good practice (ITGI, 2007b). The use of these 15 IT processes and the average of maturity level in the studied organisations are shown in Table 11. The results of this phase showed that the average maturity level across the five studied public sector organisations (Table 11) was 1.95 with a range between 1 and 2.3 and that 60% of the maturity levels were below 2. This means the lower end was found to be at an initial stage
(level 1), i.e. on average the organisations recognised that the issue exists and needs to be addressed but it is still addressed with ad-hoc approaches that tend to be applied on an individual or case-by-case basis. The higher end was found to be at the repeatable stage (level 2), which means that different people undertaking the same tasks follow similar procedures; however, there is no formal communication of standard procedures. Also, there is still a high degree of reliance on the knowledge of individuals and, therefore, errors are likely to occur. In summary, the results show that these concerns need to be resolved in order to improve maturity and IT governance performance.

Table 11. Average maturity level across the five studied organisations for the 15 most important COBIT processes (based on Guldentops et al., 2002; ITGI, 2007b).

<table>
<thead>
<tr>
<th>Abbr.</th>
<th>IT Process Name</th>
<th>Average Maturity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO1</td>
<td>Define a strategic IT plan</td>
<td>1.99</td>
</tr>
<tr>
<td>PO3</td>
<td>Determine technological direction</td>
<td>1.88</td>
</tr>
<tr>
<td>PO4</td>
<td>Define the IT processes, organisation and relationships</td>
<td>2.19</td>
</tr>
<tr>
<td>PO5</td>
<td>Manage the IT investment</td>
<td>1.97</td>
</tr>
<tr>
<td>PO6</td>
<td>Communicate management aims and direction</td>
<td>2.00</td>
</tr>
<tr>
<td>PO9</td>
<td>Assess and manage IT risks</td>
<td>1.87</td>
</tr>
<tr>
<td>PO10</td>
<td>Manage projects</td>
<td>1.98</td>
</tr>
<tr>
<td>AI1</td>
<td>Identify automated solutions</td>
<td>2.19</td>
</tr>
<tr>
<td>AI2</td>
<td>Acquire and maintain application software</td>
<td>2.00</td>
</tr>
<tr>
<td>AI6</td>
<td>Manage changes</td>
<td>2.09</td>
</tr>
<tr>
<td>DS1</td>
<td>Define and manage service levels</td>
<td>1.53</td>
</tr>
<tr>
<td>DS4</td>
<td>Ensure continuous service</td>
<td>2.04</td>
</tr>
<tr>
<td>DS5</td>
<td>Ensure systems security</td>
<td>1.45</td>
</tr>
<tr>
<td>DS11</td>
<td>Manage data</td>
<td>2.25</td>
</tr>
<tr>
<td>ME1</td>
<td>Monitor and evaluate IT performance</td>
<td>1.91</td>
</tr>
</tbody>
</table>

Moreover, we found that some processes performed better or worse than did others. Those that performed well include Manage Data – DS11, which also
attained the highest maturity level. The reason could be associated with the great deal of attention that has been paid over many years to managing data in IT departments/units that originally were set up to manage a significant amount of government information in an effort for better public service delivery.

Another process that performed relatively well was IT Processes, Organisation and Relationships – PO4. This was a surprising result because a previous study of these organisations indicated a major weakness in processes (Nfuka et al., 2009). However, this result could be explained from the perspective of the locally applied practices, mainly the MTEF, which is a government framework for planning activities, resources and associated performance. This could also be explained by the defined IT organisations and the necessary relationships. In fact, in recent years and in line with the overall improvement in public sector performance, there has been an effort to restructure IT in TaPSOs (Mutagahywa et al., 2007) and an increased focus on instituting IT departments or units that report directly to the CEO and that are part of the management team.

Processes that performed poorly included Ensure Systems Security – DS5. The reason for such a low performance could be because of the inadequate security management in place in terms of standards, policies and procedures, thus hampering corrective actions. Examples include an IT security management study in related organisations in Tanzania (Bakari, 2007) and an e-government review and envisioning in the Tanzanian public sector (Mutagahywa et al., 2007; Miller, 2007).

Another process that performed relatively poorly was Define and Manage Service Levels – DS1. This could be because of the absence of service level agreements for internal IT service delivery in most organisations (Nfuka et al., 2009), thus hampering the high quality and timely provision of services to user departments and clients in general.

Figure 10 presents the organisations’ maturity levels. We found that some organisations scored better than others. Notably, TRA scored higher maturity levels in most processes and its highest score was on IT Strategic Plan – PO1 and Communicate Management Aims and Direction – PO6. The explanation of the good performance in these processes, different to the other studied organisations, could be associated with the relevant IT governance mecha-
nisms in place and the way they are applied in the organisation. For example:

- For the process IT Strategic Plan – PO1, we found that the practices in place include an IT strategic plan and related policies.
- For Communicate Management Aims and Direction – PO6, it has implemented a BSC that provided monitorable reporting mechanisms.

Such practices are also in accordance with recent findings in these organisations that have indicated that TRA has relatively better practices compared with the other studied organisations (Nfuka et al., 2009). For the rest of the studied organisations, this implies that the effort to institute and sustain such IT governance practices might increase their governance maturity levels and contribute to the improvement of the governance of IT in these organisations. This is even more important now because there is a constantly increasing number of IT-enabled business applications, for example the national ID project that is essential for e-government (Maimu, 2010) and the upgrade of the government’s HR system to be accessible and used by all MDAs (PO-PSM, 2010).

![Figure 10. Organisations' maturity levels for the 15 most important COBIT processes](image)
Furthermore, TaPSOs’ maturity levels in public sector organisations were compared with a developed country and internationally (Figure 11). In this case, the developed country was Australia and its IT governance maturity was obtained using the same IT processes (Liu & Ridley, 2005). As indicated in Figure 11, the maturity pattern of this research seemed to be relatively lower than any of them. The maturity levels of the processes of Australian public sector organisations ranged from 2.5 to 3.5 with most beyond a maturity level of 3 (60%). The maturity levels of the international public sector organisations were also obtained earlier (Guldentops et al., 2002), and these ranged from 2 to 3 with most beyond 2.5 (87%).

This difference amounted to more than one and a half maturity levels in all processes. According to the generic maturity model, this means that their processes are relatively well defined with procedures standardised and documented. This is in contrast to the case of TaPSOs from the perspective of a developing country, which prompted the possibility to learn from them and advance.

Notably, the highest difference was in processes such as IT security, i.e. Ensure Systems Security – DS5 and Assess and Manage IT risks – PO9,
indicating that TaPSOs’ systems are less controlled and secure. Given the increasing use of IT in TaPSOs, an improvement is essential. Similarly, in the case of Define and Manage Service Levels – DS1, as seen earlier, the higher difference could be attributed to the less established service levels, which are very important to user satisfaction and efficiency.

Other processes are Manage Projects – PO10 and Determine Technological Direction – PO3, which were found to be relatively less established. These processes require improvements in the number and magnitude of IT applications and infrastructure projects in order to conceptualise, rollout and deliver their promised benefits in TaPSOs.

Furthermore, Define the IT Processes, Organisation and Relationships – PO4 and Manage the IT Investments – PO5 are yet other important processes where the differences are quite high. This could be because of the less established IT processes and IT-enabled investment programmes together with the corresponding roles and responsibilities for IT governance-related best practices.

Finally, regarding Ensure Continuous Service – DS4 and Manage Changes – AI6, the difference was also high; hence, their improvement could make IT more reliable, increase internal performance and make public service delivery more efficient.

The results shown in this section, apart from determining the IT governance practices and maturity previously unexplored in TaPSOs, provide a focus on identifying CSFs for effective IT governance and the design of the CEITG framework.

4.2 CSFs for effective IT governance in TaPSOs

The second result relates to the CSFs for effective IT governance. This was achieved by responding to the research question that asks which CSFs enable effective IT governance in TaPSOs (RQ2). As shown in research activity 2, we identified 11 CSFs for effective IT governance in TaPSOs. These CSFs were obtained using a literature-based construct by harmonising the studies found to be relevant to IT governance-related CSFs. This harmonisation was because of their similar and different levels of granularity. This resulted in 17 CSFs (Table 12) that formed a guiding questionnaire.
Table 12. The construct of harmonized IT governance-related CSFs from the research literature

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<tbody>
<tr>
<td>1 Standardise, integrate and manage IT systems to optimise costs and information flow</td>
<td>v</td>
<td>v</td>
<td>v</td>
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<td>v</td>
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<td>2 Provide IT infrastructure to facilitate the creation and sharing of IT services &amp; applications</td>
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<td>3 Manage the mitigation of risks appropriately</td>
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<tr>
<td>4 Develop competitive IT professionals</td>
<td>v</td>
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<td>v</td>
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<tr>
<td>5 Institute &amp; enforce policies/guidelines for optimal use of IT infrastructure and services</td>
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<tr>
<td>6 Encourage &amp; support two-way communication and partnerships between IT &amp; business</td>
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<td>7 Provide awareness/education for IT governance from a strategic to an operational level</td>
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<tr>
<td>8 Define &amp; align IT and corporate strategies and cascade them down into the enterprise</td>
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<tr>
<td>9 Commit scarce resources effectively to improve IT processes &amp; alignment with business</td>
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<td>v</td>
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<tr>
<td>10 Demonstrate IT leadership</td>
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<tr>
<td>11 Involve and get support of senior management</td>
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<tr>
<td>12 Define the key decisions to be made and who is best positioned to make them</td>
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<tr>
<td>13 Institute clear IT decision-making and priority-setting processes</td>
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<td>v</td>
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<tr>
<td>14 Institute structures that ensure accountability/flexibility to the IT organisational needs</td>
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<td>v</td>
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<tr>
<td>15 Engage key stakeholders</td>
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<td>v</td>
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<td>v</td>
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<tr>
<td>16 Institute performance measures and benchmarks to track and demonstrate success</td>
<td>v</td>
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<tr>
<td>17 Manage organisational changes</td>
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</table>
This guiding questionnaire was used and analysed in the case study of five organisations from the Tanzanian public sector. Both the research literature and the resulting empirical data analysis were guided by the IT governance focus areas, which ensured a holistic view, in this case meaning an approach to IT governance focus areas as a whole (ITGI, 2003; Buckby et al., 2008; Wilkin & Chenhall, 2010). This also considered the state of IT governance practices (Nfuka et al., 2009) and maturity (Nfuka & Rusu, 2010a) in TaPSOs.

As indicated in research activity 2, empirical data from these five TaPSOs were analysed quantitatively and qualitatively, i.e. ranking responses (Figure 1 of Paper III) and taking into account comments from the face-to-face interviews and relevant information from the collected documents. In this process, one factor was dropped and two were merged. Thus, the remaining 15 CSFs were also adjusted as per their contextual elements. One of the dropped CSFs was “Define the key decisions to be made and who is best positioned to make them.” This was dropped from the ranking process (Figure 1 of Paper III) because the majority of respondents were not in favour of this factor, making it not critical in TaPSOs. The reason for this was supported by the existence of formalised mechanisms such as management meetings and procurement committees to make corporate decisions including IT as was indicated by the interviews, documents collected and Nfuka et al. (2009). The analysis of the interviews also suggested joining two factors namely “Standardise, integrate and manage IT systems to optimise costs and information flow” and “Provide IT infrastructure to facilitate the creation and sharing of IT services and application.” This resulted in the CSF: “Consolidate, standardise and manage IT infrastructure and applications to optimise costs and information flow across the organisation.”

This is because both CSFs needed to be consolidated equally in terms of infrastructure and applications provisions, and standardisation and management. Furthermore, both CSFs aimed to optimise costs and increase information flow across the organisations to improve IT performance. The analysis of the interviews and collected documents also suggested improvements in the CSFs including the change of the CSF “Developing competitive IT professionals” to “Attracting, developing and retaining competitive IT professionals.” This is because the salaries in the Tanzanian public sector (as indi-
cated by respondents) are relatively lower than are those in the private sector, thus attracting and retaining IT professionals is becoming a main concern. This is also getting worse as the private sector grows its investment in IT (TIC, 2008) and as IT jobs become better paid in multinational companies.

The improvements to the CSFs also include the change from “Demonstrate IT leadership” to “IT leadership to understand the business goals and IT contribution and bring it to management attention.” This change came out of the interviews because the IT awareness and culture of management are still relatively low, as also shown by Nfuka et al. (2009). This is because they decide, provide direction and oversee the progress of corporate activities including the integration of IT in the business. The capacity to bring understanding and IT contribution convincingly to management was also indicated to be immature in these organisations as additionally has been shown by a relatively lower IT governance maturity (Nfuka & Rusu, 2010a). The analysis of the interviews also indicated several contextual elements of these CSFs different to their original environments. For example, “Engage key stakeholders” indicated that the engagement was beyond IT and user/business departments in the organisations as these TaPSOs work in collaboration to deliver many aspects of their service delivery.

According to Rockart and Van Bullen (1986), CSFs should be “a limited number of areas in which satisfactory results will ensure a successful competitive performance for the individual, department or organisation.” CSFs should also meet the central objectives of an organisation (Ward and Peppard, 2002). Therefore the remaining 15 CSFs were the subject to a validation process in five TaPSOs as indicated in research activity 2. In this process, four CSFs were not accepted by the majority of respondents (Figure 2 of Paper III), so given their criticality we considered only those CSFs accepted by the majority. The dropped CSFs were “Institute clear IT decision-making and priority-setting processes”; “Consolidate IT risk mitigation strategies”; “Commit scarce resources effectively to improve IT processes and align them with business goals”; and “Manage organisational changes.”

Considering these results together with the previous data analysis, we come up with a final list of 11 CSFs for effective IT governance in TaPSOs (Fig-
These considerations were further summarised along the IT governance focus areas, i.e., IT strategic alignment, IT value delivery, risk management, IT resource management and performance management (ITGI, 2003).

i) Strategic alignment

1) IT leadership to understand business goals and IT contribution and bring it to management attention

From the survey questionnaire, 93% of respondents indicated this CSF to be important in TaPSOs (Figure 1 of Paper III). This also applies to the validation process with 100% (Figure 2 of Paper III). Also, the interviewees showed its criticality. For example, the assistant director of IT services at MoFEA said, “Our government institutions are still characterised by relatively lower awareness of the available IT opportunities.” He continued, “IT management competencies to bring such understanding and required actions convincingly to management is vital but apparently still inadequate.”

In addition, the collected documents and Nfuka et al. (2009) support this. For example, in most studied organisations, there were no IT strategic plans or IT steering committees to nurture IT contribution comprehensively. This CSF is also important because of the shown need for IT integration in public sector reforms. However, for this IT integration to be realised a good understanding of the business goals, IT contribution and buy-in by management is required, as also pointed out Van Grembergen et al. (2007).

2) Involve and get support of senior management

From the survey questionnaire, 81% of respondents stated that this CSF is important (Figure 1 of Paper III). This also applies to the validation process with 100% (Figure 2 of Paper III). Also, the interviews showed that while the support of senior management is important, so was their involvement. For example, the senior systems analyst at PO-PSM said, “Senior management willingness and support to IT is vital for the widespread use of IT in the organisation. This is because users here tend to conform to their expectations.” She continued, “Also, we should see senior management, for example, using email to call meetings, the Intranet to access to internal documents/information and applications to make decisions.”
<table>
<thead>
<tr>
<th>Contextual Elements</th>
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<tbody>
<tr>
<td>IT leadership understand business goals/imperatives</td>
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<tr>
<td>Top/business management understand IT opportunities</td>
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<tr>
<td>IT leadership competencies</td>
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<tr>
<td>Political support</td>
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<td>Committed top management</td>
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<td>Action-oriented involvement</td>
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<td>Resource prioritisation</td>
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<td>IT/business communication</td>
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<td>IT opportunities/business goals</td>
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<td>IT/business cooperation</td>
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<td>Broader view of needs &amp; approach to applications/e-government</td>
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<td>Leapfrog widely use of IT</td>
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<td>Shared services</td>
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<td>IT strategic plan/communication</td>
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<td>IT/business alignment</td>
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<td>IT integration in performance reforms</td>
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<td>Active IT committees</td>
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<td>Role &amp; responsibilities/categories</td>
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<td>Experts/managers accountability</td>
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<td>IT usage enforcement</td>
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<td>Sharing IT resources</td>
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<td>Return on IT investment</td>
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<td>Controls/value preservation</td>
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<tr>
<td>Meagre IT resources utilisation</td>
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<tr>
<td>Lower IT process maturity and inadequate guidelines</td>
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<tr>
<td>Optimise costs, information flow &amp; increase responsiveness</td>
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<tr>
<td>Provide IT facilities</td>
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<tr>
<td>Standardized/sharable IT resources</td>
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<tr>
<td>IT governance awareness/know-how</td>
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<td>Change of mindset</td>
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<td>Best practices</td>
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<td>Reasonable remuneration</td>
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<tr>
<td>IT/business competencies</td>
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<td>Innovation/sustainability</td>
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<td>Active performance measures</td>
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<td>Demonstrate IT success/contribution</td>
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<td>Performance-aligned rewards/penalties</td>
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<tr>
<th>Critical Success Factors</th>
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<tr>
<td><strong>Strategic Alignment</strong></td>
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<tr>
<td>IT leadership to understand the business goals and IT contribution and bring it to the management attention</td>
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<tr>
<td>Involve and get support of senior management</td>
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<tr>
<td>Encourage and support IT/business communication and partnership</td>
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<td>Engage key stakeholders</td>
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<tr>
<td>Define and align IT strategies to corporate strategies and cascade them down in an organization</td>
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<tr>
<td>Consolidate IT structures to ensure responsiveness and accountability</td>
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<tr>
<td><strong>Value Delivery &amp; Risk Management</strong></td>
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<tr>
<td>Consolidate, communicate and enforce policies and guidelines for cost-effective acquisition and use of IT across the organization</td>
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<td><strong>Resource Management</strong></td>
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<tr>
<td>Consolidate, standardize and manage IT infrastructure and application to optimize costs and information flow across the organization</td>
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<tr>
<td>Provide IT governance awareness and training for optimal IT use</td>
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<tr>
<td>Attract, develop and retain competitive IT professionals</td>
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<tr>
<td><strong>Performance Measurement</strong></td>
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<td>Consolidate performance measures and benchmarks to track and demonstrate success</td>
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</table>

**Figure 12. The 11 CSFs for effective IT governance in TaPSOs**
Moreover, Nfuka et al. (2009) and the collected documents such as computerisation reports support this. For example, the problem is highly rated with regard to the lower acceptance of business people to new IT applications. An increase in senior management involvement and support could minimise such a weakness, which would then have consequences such as IT investment losses in TaPSOs that have lower IT resources. The further improvement of this CSF might increase management commitment towards the strategic use of IT, as also indicated by Teo and Ang (1999) and Nfuka and Rusu (2007).

3) Encourage and support IT/business communication and partnership
From the survey questionnaire, 93% of respondents indicated the importance of this CSF (Figure 1 of Paper III). This also applies to the validation process with 70% (Figure 2 of Paper III). In the interviews, several respondents indicated that although encouragement is required for smooth IT/business cooperation, so is facilitation and support among IT and user departments. For example, the director of MIS at PMO-RALG said, “Communication and partnership is crucial here, and it should be encouraged and supported given the wide coordination function of the ministry. Also, practices such as communication among IT/business people through informal meetings, mailing lists etc. increase projects ownership right from the start.”

Nfuka et al. (2009), Nfuka and Rusu (2010a) and the collected documents such as IT project committee minutes also support this. For example, they indicate a greater emphasis on the business or IT rather than on IT/business alignment. Moreover, they indicate a lower awareness and understanding of business people concerning IT opportunities and a lower awareness and understanding of IT people regarding business imperatives. Similarly, we found that TaPSOs (which are characterised by bureaucratic complex relationships) not only require IT structures and processes but also relational mechanisms to allow cascaded communication across the organisations. Therefore, this CSF is essential because of its effectiveness in IT governance implementation, as was also shown by Luftman et al. (1999) and Van Grembergen and De Haes (2008).

4) Engage key stakeholders
In the survey questionnaire, 93% of respondents supported this CSF (Figure 1 of Paper III). This also applies to the validation process with 100% (Figure
The interviews also indicated its criticality. For example, the chairperson of the TRA Board said, “Such engagement if done early assists as we have seen in some of our projects.” She continued, “This helps determine a broader view of needs and the approaches to solutions. Given widespread public sector organisations such as TRA, any perfection here will leapfrog the wide use of IT.”

Generally, the collected documents such as strategic plans indicated that the studied organisations are characterised by a mutual dependence for success and therefore a need to focus on this CSF. A focus on it is also important because of ongoing effort to establish e-government (Mutagahywa et al., 2007; Miller, 2007). Its success requires the participation of relevant stakeholders in such a highly collaborative process, as also was pointed out by Ribbers et al. (2002).

5) Define and align IT strategies with corporate strategies and cascade them down in an organisation

From the survey questionnaire, 81% of respondents supported this CSF (Figure 1 of Paper III). This also applies to the validation process with over 80% (Figure 2 of Paper III). Its criticality is also supported by Nfuka et al. (2009), which pointed out the lack of comprehensive IT strategic plans in most of the studied organisations. This pattern was also seen in a subsequent study of IT governance maturity (Nfuka et al., 2010a) that showed the process to be in between ad-hoc and repeatability (Nfuka et al., 2010a) and a need for attention to reduce such ad-hoc practices. The CSF also expresses that having an IT strategic plan is not enough. For example, the Director of IT at TRA mentioned that “we learnt that having an IT strategy is ineffective if it is not cascaded down to individuals.” He continued, “The recently deployed balance scorecard has assisted us in this endeavour given the number of departments, branches and staff involved country-wide.”

In general, the studied TaPSOs were characterised by the use of corporate strategic plans to plan, budget, implement and monitor their activities. Therefore, aligning IT strategies with these corporate strategic plans and cascading them down in an organisation is essential because it can assist the more widespread use of IT, as was also shown by Henderson and Venkatraman (1993).
6) **Consolidate IT structures that ensure responsiveness and accountability**

In the survey questionnaire, 81% of respondents indicated the importance of this CSF (Figure 1 of Paper III). This also applies to the validation process with about 70% (Figure 2 of Paper III). Its criticality is also supported by the collected documents such as IT/corporate strategic plans and Nfuka *et al.* (2009). For example, they indicated several IT governance implementation mechanisms to put in place such as committees. Moreover, many of the organisations do not have the most important ones such as IT steering committees to effectively integrate IT into the business. Furthermore, where such committees are present, they have not exploited them optimally. The interviews showed a similar trend. For example, the *director of IT* at TRA said, “Though we have structures such as an IT steering committee, we are still working on improving further its responsiveness and accountability including effectiveness in timely reporting back and forth.” An assistant director of IT services at MoFEA also said, “There is an insufficient professional categorisation of IT staff, in many cases with no clearly stated roles or responsibilities.” Furthermore, some respondents mentioned that IT people are found doing unrelated work, leaving less attention to their core IT matters and thus hindering IT contribution in these organisations.

A deliberate effort to address such incidents will certainly address the concerns of this CSF in an environment that is characterised by complex and multiple levels of IT responsibility and decision making. Its criticality was also shown by Peterson (2003) and De Haes and Van Grembergen (2008).

**ii) Value delivery and Risk management**

7) **Consolidate, communicate and enforce policies and guidelines for the cost-effective acquisition and use of IT across the organisation**

From the survey questionnaire, 93% of respondents supported this CSF (Figure 1 of Paper III). This also applies to the validation process with 70% (Figure 2 of Paper III). Its criticality is also supported by Nfuka *et al.* (2009) and the collected documents such as IT policies and frameworks. For example, IT governance practices indicated limited management instruments. Even when are in place, they are not used consistently. For example, the *IS manager* at MSD said, “This CSF is central to the successful and wide use of IT as a communication and enforcement tool for policies with a mechanism for reward and punishment.” This concern was also expressed by the assis-
tant commissioner at MoFEA, who said, "Some controls and enforcements are needed and these can increase widespread IT use even with the existing IT infrastructure and applications. For example, direct access to applications by management for informed and quicker decision making."

Given the widespread nature of TaPSOs, having strategies in place is not enough for an increased use and contribution of IT. Thus, it needs to be complemented by enforced policies and guidelines for optimal IT value creation and preservation in an organisation, as indicated by ITGI (2003), Guldentops (2004) and ITGI and PwC (2006).

iii) Resource management

8) Consolidate, standardise and manage IT infrastructure and applications to optimise costs and information flow across the organisation

In the survey questionnaire, 93% of respondents supported this CSF (Figure 1 in Paper III). This also applies to the validation process with 70% (Figure 2 in Paper III). The support of this CSF was also indicated by the interviews. For example, the director of MIS at PS-PSM said, “We have several fragmented IT initiatives in our institutions; some efforts are required for economies of scale and better information flow.” In addition, the director of MIS at PMO-RALG said, “The infrastructure needs to be extended and facilities such as PCs added to increase inclusiveness, thus facilitating enforcement across the board.” Further improvement on this CSF is essential, as also showed by the collected documents such as IT implementation reports. This means that the IT value obtained from effective IT governance should also be related to the efficient use of IT resources in terms of the provision and management of a reliable and cost-effective IT infrastructure as was also indicated by Peterson (2004). This also applies to IT innovation that can ensure a timely and cost-effective delivery of IT applications, thus contributing to responsiveness and information flow.

9) Providing IT governance awareness and training for the optimal use of IT

In the survey questionnaire, 78% of respondents supported this CSF (Figure 1 in Paper III). This also applies to the validation process with 80% (Figure 2 in Paper III). This CSF was supported by the interviews and collected documents such as training needs assessments, with respect to a change in mindset, informed choices and sustainability of IT value delivery. For example, the director of finance and administration at MSD said, “IT aware-
ness and governance-related knowledge and skills specifically are still low here. They should be provided widely to relevant staff including the board to change their mindsets towards a more sustainable and valuable IT use.” This CSF is also considered critical, as partly has pointed out Warland and Ridley (2005).

10) Attract, develop and retain competitive IT professionals

From the survey questionnaire, 85% of respondents supported this CSF (Figure 1 in Paper III). This also applies to the validation process with 80% (Figure 2 in Paper III). This CSF is supported by the interviews and collected documents such as training needs assessments and IT implementation reports, with respect to the optimisation of IT capabilities and sustainability of IT value delivery. For example, the former director of MIS and later e-government expert at PO-PSM said, “Attracting and sustaining competent IT personnel across government institutions is still a nightmare to solve.” The assistant permanent secretary at MoFEA also said, “Developing IT professionals’ competencies should be continuous as technology and business changes but also follow-ups on its use on the ground should be made to increase value in government.” Moreover, the CSF was indicated to be an engine of innovation and effectiveness in organisations, as also partly pointed out by Luftman et al. (1999).

iv) Performance management

11) Consolidate performance measures and benchmarks to track and demonstrate success

From the survey questionnaire, 93% of respondents showed the importance of this CSF (Figure 1 in Paper III). This was also indicated in the validation process with 70% (Figure 2 in Paper III). In addition, it was supported by Nfuka et al. (2009) and the collected documents such as the progress reports of the implemented IT applications. For example, one of the problems indicated is the weak measurement of IT performance and value to business with consequences such as non-measurable returns on IT investments. Nfuka and Rusu (2010a) noted that most of the studied TaPSOs have weak IT governance practices including the non-existence of a broad performance management system such as a BSC (Kaplan & Norton, 1992). Further improvement along this CSF is very important for measuring management performance beyond conventional accounting given the characteristics and widespread nature of the public sector, as also pointed out by Sethibe et al. (2007).
In summary, the result is 11 CSFs for effective IT governance in TaPSOs (presented in Figure 12) that include the contextual elements that were part of the drivers in identifying them in TaPSOs. For example, a broader view of the needs and approaches to the applications of CSF – engage key stakeholders. According to these contextual elements, we have observed that the majority of CSFs are in the IT governance focus area of strategic alignment. This is because IT and business alignment is still a major concern in TaPSOs where IT issues are taken as technical and left to the IT people (Bakari, 2007, Nfuka et al., 2009). In fact, a success in this focus area could be a huge milestone as it is the main driver of IT governance and, therefore, influences the remainder of the CSFs.

Equally important in TaPSOs are the contextual elements and respective CSFs in other focus areas. In the area of value delivery and risk management, the concern includes the need for clearly defined and enforced guidelines for IT value creation and preservation. In the resource management area, the concern includes optimised IT infrastructure, applications and sustainable competencies in order to synergically conceptualise, use and manage them. In the performance management area, the concern includes active performance measures, aligned incentives and the demonstration of success and contribution of IT to responsive and efficient government.

4.3 The effect of CSFs on IT governance performance in TaPSOs

The third result concerns the effect of the identified 11 CSFs on IT governance performance. This was achieved by responding to the research question “What is the effect of the CSFs on IT governance performance in TaPSOs?” (RQ3). We came up with a model of CSFs for effective IT governance (Figure 13) in order to determine the statistically correlated effect of these CSFs on IT governance performance (Figure 14 and Table 13).

The identified 11 CSFs for effective IT governance in TaPSOs were further investigated and their correlated effects on IT governance performance determined. This was investigated based on the research model shown in Figure 13.

This model included the 11 CSFs as hypotheses/independent variables. The model also included IT governance performance (Weill & Ross, 2004) as a dependent variable. Although, based on five organisations’ case studies in
which CSFs were identified, it is reasonable to believe that there is a correlated effect of these CSFs on IT governance performance, this was not widely statistically confirmed in TaPSOs.

As shown in research activity 3 in sub-section 2.2.4, different to earlier research activities (research activities 1 and 2), this was achieved mainly based on a wide empirical survey in TaPSOs. This also applies to use of a second generation of SEM, namely PLS (Fornell & Larcker, 1981; Wold, 1985; Urbach & Ahlemann, 2010).

SEM provided the measurement and structural models that ensured the necessary validity and hypothesis tests for credible results as shown in Figure 14, where validity was assessed by item reliability and the lowest item loading score was 0.658, thus above the minimum requirement of 0.4 (Hair et al., 2006).

![Figure 13. Research model of CSFs for effective IT governance in TaPSOs]

Its internal consistency was also checked through composite reliability, which ranged between 0.844 and 1, Cronbach’s alpha (between 0.773 and 1)
and average variance extracted (between 0.521 and 1), which were all above the thresholds of 0.5, 0.7 and 0.5, respectively (Fornell & Larcker, 1981). Figure 14 also shows that 87% of the variance in IT governance performance can be explained by the 11 hypotheses, thus above 50% (Hair et al., 1995). It also shows the positive path coefficients in the range of 0.170 to 0.515 which, according to Cohen (1988), is between a small and strong relationship strength.

Figure 14. Statistical correlation of CSFs on IT governance performance and average variance extracted (between 0.521 and 1), which were all above the thresholds of 0.5, 0.7 and 0.5, respectively (Fornell & Larcker, 1981). Figure 14 also shows that 87% of the variance in IT governance performance can be explained by the 11 hypotheses, thus above 50% (Hair et al., 1995). It also shows the positive path coefficients in the range of 0.170 to 0.515 which, according to Cohen (1988), is between a small and strong relationship strength.

Figure 14. Statistical correlation of CSFs on IT governance performance
These results indicated a significant small to high positively correlated effect on IT governance performance (Table 13).

Table 13. Testing hypotheses - strengths and significances of path coefficients

<table>
<thead>
<tr>
<th>Construct</th>
<th>Path Coeff. ((\gamma))</th>
<th>t-values (t)</th>
<th>Path coefficient significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>SenMan (H2)</td>
<td>0.515</td>
<td>4.645**</td>
<td>Path coefficient significance</td>
</tr>
<tr>
<td>ITCorStr (H5)</td>
<td>0.396</td>
<td>2.973**</td>
<td>(Hair et al., 1995):</td>
</tr>
<tr>
<td>ITStruc (H6)</td>
<td>0.316</td>
<td>2.654**</td>
<td>* Significant at 0.05 (t&gt;1.96);</td>
</tr>
<tr>
<td>ITLeadp (H1)</td>
<td>0.201</td>
<td>2.925**</td>
<td>** Significant at 0.001 (t&gt;2.58)</td>
</tr>
<tr>
<td>ComPar (H3)</td>
<td>0.392</td>
<td>2.290*</td>
<td>Path coefficient strength (Cohen,</td>
</tr>
<tr>
<td>PolGuid (H7)</td>
<td>0.285</td>
<td>2.460*</td>
<td>1988):</td>
</tr>
<tr>
<td>PerfMeas (H11)</td>
<td>0.210</td>
<td>2.351*</td>
<td>(&lt; 0.1 small, &lt; 0.3 moderate, &lt;</td>
</tr>
<tr>
<td>ITGAwTr (H9)</td>
<td>0.201</td>
<td>2.149*</td>
<td>0.5 strong)</td>
</tr>
<tr>
<td>KeyStak (H4)</td>
<td>0.180</td>
<td>2.463*</td>
<td></td>
</tr>
<tr>
<td>ITPrf (H10)</td>
<td>0.176</td>
<td>2.037*</td>
<td></td>
</tr>
<tr>
<td>ITInf (H8)</td>
<td>0.170</td>
<td>2.338*</td>
<td></td>
</tr>
</tbody>
</table>

The CSF with the most significant correlated effect was ‘Involve and get support of senior management’. This is certainly because of its importance in resource prioritisation and the strategic use of IT given the scarce resources and still competing basic needs in TaPSOs (Nfuka et al., 2009). This also applies to the fact that users tend to conform to their bosses’ expectations and what they follow-up closely (Nfuka & Rusu, 2010b).

Moreover, it is supported by Weill and Ross’ (2004) study, which found that IT is an important part of business strategies and operations and thus implies a need for a greater involvement at such a level for a higher IT governance performance. The CSF with the least significant correlated effect was ‘Consolidate, standardise and manage IT infrastructure and applications to optimise costs and information flow across the organisation’. This was a surprising result as it had been a major concern in TaPSOs (Nfuka & Rusu, 2010b) and elsewhere (Peterson, 2004). However its relatively non-significant correlated effect was certainly because priorities in TaPSOs are still basic, such as awareness, structures and alignments.

This determined statistically correlated effect between CSFs and IT governance performance has a positive influence on the CSFs of IT governance performance in TaPSOs. This confirmed that the suggested model of CSFs is effective for IT governance and, therefore, is a foundation for IT governance improvement as described in the next section.
4.4 A CSFs framework for implementing effective IT governance in TaPSOs

The fourth result concerns the design of a CSFs framework for implementing effective IT governance in TaPSOs (CEITG framework). This was achieved by answering the question on how CSFs can be implemented for effective IT governance in TaPSOs (RQ4). As indicated in research activity 4 in sub-section 2.2.5, based on design science research (Hevner et al., 2004; Peffers et al., 2008), we developed and evaluated a CEITG framework. This CSFs framework has a holistic view, in this case meaning an approach to IT governance focus areas as a whole (ITGI, 2003; Buckby et al., 2008; Wilkin & Chenhall, 2010), as shown in Figure 15.

Considering that the objective of a solution in design science research relates to a new artifact intention (Peffers et al., 2008), the CEITG framework’s objective is to implement effective IT governance in TaPSOs. This emphasises the need for the participation of both IT and business management personnel. With this framework, these personnel should be able to realise their roles, and plan, apply and continually improve IT governance implementation in their organisations.

Structurally, the established CEITG framework consists of 11 guiding CSFs alongside the five IT governance focus areas and activities (checkpoints) necessary for implementing effective IT governance in TaPSOs. It also consists of the roles required and the types of IT resources transformed for each activity to attain the envisaged improvement. Furthermore, given the need to successfully fit within an environment of its application, there is a linkage to it (Schoderbek et al., 1990). In this case, the environment consists of IT governance-related best practices, public infrastructure and the organisation itself. Altogether, they provide a guide advocating that CSFs-related improvements are required in the five IT governance focus areas as a whole to enable effective IT governance implementation. Moreover, given that these activities are important for realising our objective, the 11 guiding CSFs in the CEITG framework should address the problem, i.e. IT governance ineffectiveness (Figure 15). Also a description of these 11 guiding CSFs in CEITG framework along five IT governance focus areas from point of view of the activities follows.
Figure 15. CSFs framework for implementing effective IT governance in TaPSOs (CEITG framework)
i) Strategic alignment

The studied TaPSOs had several concerns in this focus area based on ensuring the linkage between business and IT plans (Luftman et al., 1999; ITGI, 2003; Bowen et al., 2007; Lee et al., 2008). These concerns and the guiding CSFs and activities to address them were related to the IT leadership competencies, senior management support, IT/business communication and partnership, key stakeholders, IT strategies and IT structures. A description of the activities of guiding CSFs in this focus area follows.

Guiding CSF 1: IT leadership to understand business goals and IT contribution and bring it to the attention of management

From the research results, this can be achieved by (1.1) Sensitising IT leadership on business imperatives and viable IT intervention, (1.2) Sensitising management on IT potential and business contribution and (1.3) Developing focused IT leadership competency. Given the fact that competency is a cluster of related knowledge, skills and attitudes that enable a person to act effectively in a job or situation (Kraiger et al., 1993), we argue that IT leadership competency should include the business and IT competencies (IBM, 2009) necessary for viable IT intervention. This also applies to the awareness of IT potential that should include the contribution of IT from both existing usage and new possibilities.

Guiding CSF 2: Involve and get support of senior management

From the research results, this can be achieved by (2.1) Instituting a senior management role in the IT decision making and monitoring process, (2.2) Demonstrating viable business value proposition from IT to gain the support of senior management, the board and politicians and (2.3) Motivating senior management to use IT actively. We further noted that the weakness of the prioritisation of the IT-related resources found in the environment can be taken care of not only by (2.2) but also by embedding the five key IT decision domains that include IT investment and prioritisation (Weill & Ross, 2004) in (2.1). We also observed that with the exception of some revenue collection and generation, (2.2) is mostly concentrated on public service delivery improvement for a more responsive public sector. This also applies to the case of operating a cost reduction.
Guiding CSF 3: Encourage and support IT/business communication and partnership

From the research results, this can be achieved by (3.1) Developing shared understanding among IT/business personnel on IT/business goals and imperatives, (3.2) Involving business personnel in IT initiatives and vice versa and (3.3) Instituting viable IT/business communication and partnership practice. We argued that (3.3) can focus on a more effective and easy way to implement IT governance mechanisms such as informal meetings (De Haes & Van Grembergen, 2008).

Guiding CSF 4: Engage key stakeholders

From the research results, this can be achieved by (4.1) Establishing key stakeholders’ responsibilities in the IT decision making and monitoring process and (4.2) Developing a common understanding among key stakeholders on shared IT/business goals and imperatives. We argue that in the process of (4.1), carrying out a stakeholder analysis in terms of who they are and what they want is important. This follows stakeholder theory, which also emphasises an inside-in (employees, managers) and inside-out (others) stakeholder view (Freeman, 1984; Ribbers et al., 2002) in terms of the clear roles and goals to engage them.

Guiding CSF 5: Define and align IT strategies with corporate strategies and cascade them down an organisation

From the research results, this can be achieved by (5.1) Defining and aligning IT goals to business goals, (5.2) Involving IT/business people in corporate/IT strategic planning and (5.3) Establishing business-aligned IT strategy, resources and operations. It can also be achieved by (5.4) Prioritising, harmonising and establishing IT projects cost-effectively, (5.5) Integrating IT effectively in related public sector reforms and (5.6) Communicating IT strategies across and down to all levels. We argue that in (5.1) the available linkages between them according to Van Grembergen et al. (2007) and COBIT (ITGI, 2007b) can complement this effort given the general nature of some of them. We also argue that (5.3) can be complemented by taking into account the strategic fit between corporate and IT strategies (Luftman, 2009). This also applies to organisational/IT infrastructure and the functional integration between corporate strategy/organisation infrastructure and IT strategy/infrastructure. In this way, this will ensure not only alignment at a
strategy level but also the associated operations and required resources. Equally in (5.6), a BSC approach (Kaplan & Norton, 1992; Van Grembergen & De Haes, 2009) can complement these efforts and can be carried out by communicating strategies up to individual responsibilities, thus enabling top-down/bottom-up alignment.

**Guiding CSF 6: Consolidate IT structures to ensure responsiveness and accountability**

From the research results, this can be achieved by (6.1) Instituting clear and adequate IT roles and responsibilities, (6.2) Incorporating an IT head in the management team reporting to the CEO, (6.3) Instituting and actively sustaining an IT steering committee and (6.4) Instituting and actively sustaining IT project committees. We argue that in forming or strengthening (6.3) and (6.4), project committee members should be drawn from both IT and business management. Also, the steering committee should be chaired by the CEO and the relevant head of business department that should chair the project committees. This will ensure a responsive and accountable IT structure and promote IT-enabled business applications acceptance and sustainability.

**ii) IT value delivery and risk management**

The studied TaPSOs had concerns in these two IT governance focus areas of IT value delivery that concentrates on execution of the value proposition all through the delivery cycle and the risk management that embeds accountability to mitigate significant risks in the organisation (ITGI, 2003; Guldentsops, 2004; ITGI & PwC, 2006b; Buckby et al., 2008). The main concern found in the context of this research that guides the CSFs and activities was related to the policies and guidelines for a cost-effective acquisition and use of IT across the organisation.

**Guiding CSF 7: Consolidate, communicate and enforce policies and guidelines for cost-effective IT acquisition and use across the organisation**

From the research results, this can be achieved by (7.1) Establishing essential IT processes and governance frameworks, (7.2) Instituting optimised IT investment, procurement and operational cost and (7.3) Establishing ownership and the efficient use of IT applications. It can also be achieved by (7.4) Establishing IT governance policies and guidelines for IT value creation and preservation, (7.5) Determining and instituting required change management
and (7.6) Enforcing and communicating IT governance policies and guidelines to all levels. We argue that (7.1) can focus on guiding the CSFs provided in this framework to narrow down the essential IT processes and the use of necessary governance frameworks. We also argue that in (7.2) attention should be paid to the optimised acquisition and sharing of IT resources. This can also take into account the e-government review and envisioning in TaPSOs (Mutagahywa et al., 2007; Miller, 2007) and principle three on acquiring validity under ISO 38500 (ISO, 2008).

### iii) Resource management

The studied TaPSOs had several concerns in this focus area in terms of optimising knowledge and IT infrastructure (Teo & Ang, 1999; ITGI, 2003; Peterson, 2004; Supangkat et al., 2006; Buckby et al., 2008). These concerns and thus the guiding CSFs and activities to address them were related to IT applications and enabling infrastructure, IT governance awareness and training and competitive IT professionals.

**Guiding CSF 8: Consolidate, standardise and manage IT infrastructure and applications to optimise costs and information flow across the organisation**

From the research results, this can be achieved by (8.1) Leveraging, providing and managing IT facilities rationally, (8.2) Standardising, sharing and managing IT infrastructure effectively and (8.3) Standardising, integrating and managing IT applications effectively. It can also be achieved by (8.4) Defining and actively managing services offered by third parties and (8.5) Benchmarking and providing efficient IT services in and beyond the organisation. We argue that (8.2) should effectively support (8.3) because of the number and magnitude of IT applications in place to conceptualise, rollout and sustain synergically in and across organisations. This also applies to the need for the integration of web and mobile applications given the increased use of mobile and Internet country-wide (TCRA, 2010).

**Guiding CSF 9: Provide IT governance awareness and training for optimal IT use**

From the research results, this can be achieved by (9.1) Determining and embedding the drivers and state of IT governance practices, (9.2) Determining and embedding the required mindset change and best practices and (9.3) Adopting and undertaking IT governance awareness and training for IT and
business management personnel. Given the state of IT governance in TaPSOs, we argue that (9.1) provides a more focused awareness and training, and thus a greater contribution to improving IT governance implementation.

**Guiding CSF 10: Attract, develop and retain competitive IT professionals**

From the research results, we observed that this can be achieved by (10.1) Attracting and retaining skilled IT personnel for IT/business success, (10.2) Developing broad IT competencies to manage IT resources and (10.3) Establishing and motivating aligned IT innovation practices. We argue that in (10.2) both IT- and business-related competencies (ITGI, 2007a; IBM, 2009) should be considered to be a capital asset enabling successful business strategies and operations.

iv) **Performance management**

The studied TaPSOs had concerns in this focus area in terms of tracking project delivery and monitoring IT services (ITGI, 2003; Weill & Ross, 2004; ITGI & PwC, 2006b; Tan et al., 2009). The main concern found in TaPSOs, thus guiding the CSF and activities to address it, was related to performance measures and the associated benchmarks to track and demonstrate IT success and contribution to the business.

**Guiding CSF 11: Consolidate performance measures and benchmarks to track and demonstrate success**

From the research results, we observed that this can be achieved by (11.1) Setting and monitoring IT/business-oriented performance measures, (11.2) Evaluating and demonstrating business value from IT, (11.3) Establishing performance-aligned rewards and penalties and (11.4) Assessing IT governance performance and continually improving. We argue that given the ‘best value’ rather than ‘profit’ nature of the public sector (Sethibe et al., 2007) (11.1) should be considered because of the need to measure performance beyond conventional accounting. For this, the BSC, which covers corporate contribution, customer, internal processes and skills and innovation (Van Grembergen & De Haes, 2009), might be the solution. The argument is also on ensuring that we have both business and IT metrics given the need to change the perspective of IT and increase the business value from IT in TaPSOs. Moreover, we argue that (11.4) can take into account the four elements of IT governance performance outcome (Weill & Ross, 2004) and focus on cost reduction and public service delivery improvement in TaPSOs.
5. Contributions, limitations and further research

5.1 Contributions

The goal of this research was to analyse how IT governance practices are implemented in TaPSOs and to design a CSFs framework for implementing effective IT governance in TaPSOs. The contributions towards this research goal are in line with the results presented in the previous chapter.

The main contributions of this research are as follows:

- IT governance practices and maturity in TaPSOs, previously unexplored from the perspective of a developing country;
- CSFs for effective IT governance in TaPSOs;
- The effect of CSFs on IT governance performance in TaPSOs;
- A CSFs framework for implementing effective IT governance in TaPSOs (CEITG framework).

All these contributions have addressed the research problem, goal and questions and are further discussed in this chapter.

i) IT governance practices and maturity in TaPSOs

The contribution in this research work is determining IT governance practices in terms of mechanisms such as structures, processes and relational mechanisms and how they are implemented in TaPSOs. This also applies to the associated problems and consequences. The contribution is also important because no previous empirical research has been carried out on IT governance practices in TaPSOs. This contribution also includes the consequences of poor IT governance, which requires a more focused effort to improve IT governance implementation in TaPSOs.

Another contribution is related to IT governance maturity in terms of IT processes’ maturity levels in and across the studied organisations. This contribution has provided the maturity levels for overall and individual IT processes in and across the studied organisations (Table 11 and Figure 10). It also offered the possibility for comparison with others, in this case public sector organisations in Australia as a developed country and internationally from a range of nations (Figure 11). Such a benchmark has not previously
been available for TaPSOs, and thus this could add to the knowledge base in terms of context and IT governance practices.

The contribution on determining the IT governance maturity levels of TaPSOs showed the strengths and weaknesses of IT governance processes. This included suggestions for the further improvement of IT governance in TaPSOs.

ii) CSFs for effective IT governance in TaPSOs

The contribution in this research has identified the CSFs for effective IT governance in TaPSOs with a view of the five IT governance focus areas. This has been carried out to offer CSFs with a holistic view to IT governance improvement, which is an approach that did not exist in the knowledge base. Apart from this holistic view, the identified CSFs were contextualised for TaPSOs. For example, IT leadership (Luftman et al., 1999; De Haes & Van Grembergen, 2008) was re-established as ‘IT leadership to understand the business goals and IT contribution and to bring this to the attention of management’. This was because of the criticality of IT leadership in understanding the business imperatives and the necessary IT intervention while top management need to be aware of its potential. Others were ‘engage key stakeholders’ because of the need for a broader and harmonised approach to applications/e-government and ‘attract, develop and retain competitive IT professionals’ because of the criticality of sustainable skills in such a widespread and low-paying environment. This also applies to ‘consolidate, standardise and manage IT infrastructure and applications in order to optimise costs and information flow across the organisation’ given the critical need for rationalised IT facilities, harmonised IT initiatives and applications and cost-effectiveness.

Furthermore, a CSF such as ‘consolidate, communicate and enforce policies and guidelines for the cost-effective acquisition and use of IT across the organisation’ is necessary because of the critical need for enforcement across the organisation, sharing scarce IT resources and creating and preserving IT value in such a widespread environment.

There was also considered other CSFs concerning the remaining contextual elements in TaPSOs (Figure 12). These include the required political sup-
port, committed top management and prioritisation of scarce resources, the required active committees, accountability from IT and business, change in mindset, integration of IT in poverty reduction strategies and reform programmes, active performance measures and the demonstration of IT’s contribution.

In this way, a list of CSFs (Figure 12) was determined to provide insights for practitioners and researchers. Specifically, these CSFs will allow them to optimise the scarce resources and concentrate on the CSFs that are necessary for effective IT governance and greater IT contribution in public service delivery in TaPSOs. In this way, these CSFs contribute to theory and practice.

iii) The effect of CSFs on IT governance performance in TaPSOs

Another contribution of this research work has been to determine the statistically correlated effect of these CSFs on IT governance performance in TaPSOs. Based on a second-generation SEM technique, namely PLS, this relationship indicated a significantly small to high positively correlated effect on IT governance performance (Figure 14 and Table 13). By establishing the correlated effect of these CSFs on IT governance performance, this research has showed the significant impact of CSFs on IT governance performance in TaPSOs.

Furthermore, the statistical data of the correlated effect has explained the relative impact of different CSFs on IT governance performance. For example, the CSF with the most significant correlated effect was ‘involve and get support of senior management’ and the one with the least ‘consolidate, standardise and manage IT infrastructure and applications to optimise costs and information flow across the organisation’. In this way, this research work has contributed by providing information on the relative significance of the impacts of these CSFs on IT governance performance in TaPSOs, which can be useful for prioritising scarce IT resources.

Generally, these 11 CSFs have shown a significant positively correlated effect on IT governance performance and, in this way, this research contributes to the context and practice. For example, decision makers can optimise
their IT-related plans and use scarce IT resources, which could lead to an improvement in public service delivery. Specifically, these imply:

- The active involvement of senior management, stakeholders and IT/business personnel in IT functions that can increase the prioritisation and optimal use of IT resources in this environment and ensure that IT becomes a important part of business strategies and operations.
- The alignment of IT with business strategies and enabling IT structures. This can enable the successful integration of IT in order to improve public service delivery in and across these organisations.
- The consolidation and communication of IT governance-related policies and guidelines. This can enhance the control, change and enforcement of IT governance-related policies and guidelines for performing IT-enabled functions and thus attain the promised value.
- IT governance awareness and training for attracting and retaining competitive IT leadership and IT professionals. This can strengthen and sustain the required competencies for harmonised, standardised and cost-effective IT applications and enable the IT infrastructure in TaPSOs.
- IT business value-oriented performance measures and benchmarking in this environment. This can strengthen the demonstration of success and the enablement of a continuous business-oriented improvement and a higher contribution of IT to business.

Moreover, this research contributes to theory and practice in terms of widening the scope for CSFs to enable effective IT governance, for instance across the five IT governance focus areas in the case of public sector organisations in a developing country. Furthermore, the research has confirmed a CSFs model for effective IT governance in TaPSOs (Figure 13) that have constraints on IT resources, knowledge and culture. This could be a foundation for analysing and improving IT governance performance.

iv) A CSFs framework for implementing effective IT governance in TaPSOs

The CSFs framework for implementing effective IT governance in TaPSOs (CEITG framework) is another important contribution of this research work. Comprising elements that were elicited using design science research, the CEITG framework has a holistic view and it is based on the CSFs and corre-
sponding activities, roles and kinds of IT resources in each IT governance focus area (Figure 15). In the CEITG framework, we found that the role of both IT and business is essential and that it can enforce the policies and guidelines for the provision and leverage of IT resources.

In contrast to existing IT governance-related standards and frameworks such as ISO 38500, COBIT and ITIL, the CEITG framework has a holistic view that concentrates on a few critical aspects for IT governance improvement in TaPSOs, as shown in Paper V. The CEITG framework focuses on the critical aspects on which IT and business management personnel should concentrate in order to implement effective IT governance in TaPSOs. Specifically, its contribution is on enabling both IT and business management personnel to recognise their roles and plan, apply and continually improve IT governance implementation. The CEITG framework also enables IT and business management personnel to focus on practices that have a higher impact on effective IT governance implementation (Paper IV), which could ultimately improve public service delivery.

v) Other contributions

In addition, this research has contributed to increasing the awareness of IT governance in TaPSOs, particularly for about 60 IT and business management people. This was carried out during the first three research activities in the research fieldwork in Tanzania, which involved individual and small group meetings in five public sector organisations. This was also applied to another 24 IT and business management personnel as part of the last research activity (research activity 4) in the evaluation phase.

From the same perspective, the knowledge acquired from this research work and results of the first two research activities contributed by providing input into the conceptualisation, development and implementation of CEMIPS. CEMIPS, a capacity-building project on effective management and the use of IT in the public sector in Tanzania, mainly financed by SPIDER, was carried out by UCC and other partners in 2009 and 2010 (CEMIPS, 2010). Its two main training streams were the strategic management of IT and technical IT infrastructure management. The former included developing IT governance and related modules in which more than 100 mainly IT and business management personnel were trained.
Furthermore, policymakers in developing countries struggle to achieve their development visions, and one of the areas thought and seen to contribute in such endeavours is the effective use of IT. These findings, therefore, provide inputs into such ongoing strategies for the efficient and cost-effective integration of IT in TaPSOs. These include the IT initiatives in public sector reform programmes and poverty reduction and economic growth strategies (PO-PSM, 2010; MoFEA, 2010; PMO-RALG, 2010) that are coordinated by organisations that were part of this research and of the CEMIPS project.

Moreover, in line with Hevner et al. (2004) the findings of this research have been presented in the most important international conferences on information systems such as the European Conference of Information Systems, Americas Conferences of Information Systems and Hawaii International Conference on System Sciences. Furthermore, this has included presentations of the research papers in the seminars of the Swedish Research School of Management and IT, which is a consortium of more than 10 Swedish universities.

Such sharing and dissemination of the research work was also carried out in various international forums on ICT for Development (ICT4D) in developing countries such as the workshop “Where academia meets practice”, France, April 2008, the “IPID ICT4D post graduate symposium”, Finland, September 2008 and ICT Africa 2008 conference in Cameroon, December 2008. In addition, the research findings were disseminated in the past three years through lectures given on IT governance in the Strategic Management of IT course of the Master’s programme at the Department of Computer and Systems Sciences, Stockholm University.

5.2 Limitations and further research

This research is limited to a single developing country. However, it can contribute to future research that involves more developing countries to broaden the insights into the effects of CSFs on IT governance performance and further improve the CEITG framework. Such consideration can also extend the generalisability to public sector organisations in developing countries.

Furthermore, the research results should be used cautiously as this research has mainly considered organisations from central government i.e. MDAs
given the level of IT deployment at the time this research started in 2007. However, as IT investments are increasingly made in Local Government Authorities, which is another part of the public sector, an extension of the CEITG framework to them might provide more utility to IT contribution in public service delivery as a whole. This extension is also considered to be important given the increasing number of Local Government Authorities and public services to deliver. The effort towards decentralisation by devolution under local government reform programmes, of which IT is considered to be one of the means, is another catalyst.

Although we have shown the effect of CSFs on IT governance performance in TaPSOs, we can look further to study the effect of the CEITG framework on improvement in public service delivery. This could include the use of the four perspectives of the BSC to elicit aspects to measure the effect on public service delivery.
References


25–32.


Grover, V., Henry, R. M., & Thatcher, J. B. 2007. Fix IT-business rela-
ships through better decision rights. Association for Computing Machinery. Communications of the ACM, 50(12), 80-86.


asian Conference on Information Systems, University of Technology, Sydney, Australia, p. 32.


Luftman, J. (2009). Managing Information Technology Resources, J. Luftman LLC.


York: Harcourt.


