UNIVERSITY OF KWAZULU-NATAL

READINESS ASSESSMENT OF THE KWAZULU-NATAL DEPARTMENT OF EDUCATION TO DELIVER ON THE MANDATED ICT STRATEGY

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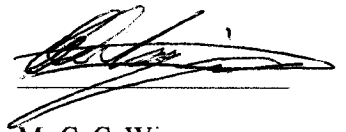**Professor M. Maharaj**

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DECLARATION

This dissertation is a presentation of my original research work. Wherever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions.

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Abstract

ICT has the potential to truly transform the institutions that govern and provide social services. Its role in the public sector can, according to Le Dantec and Edwards (2010), be conceived as that of a boundary object, or perhaps more clearly as a bridge between citizens, government and public/private institutions that act on the behalf of both. Existing literature does suggest that while substantial benefits can be gained from Information Technology (IT), according to Kanungo and Jain (2011), the projects themselves often incur additional expenditures and delays. What frustrates deployment even further is that many systems either don't deliver on the requirements or expectations, or end up too complex for operational pieces. The implications of this is that a proper roadmap for implementation and an in-depth understanding of these obstacles is needed in order to ensure that ICT implementations are able to deliver effectiveness, efficiency and responsiveness for government. This study evaluates the KZN Department of Education in terms of its e-Readiness levels with regard to the implementation of its IT Strategy, and further identifies challenges in implementing this strategy. Recommendations arising out of this study are then presented. The Technology Acceptance Model was utilised in order to evaluate the usage of ICT by staff in the Department. Additionally, the e-Readiness Assessment Framework, as developed by Yesser (2007) for self-assessment in the Saudi e-Government rollout plan, was used to evaluate the Department's e-Readiness level. Challenges in terms of Human Resources, Finance, Governance, and Infrastructure were identified through interviews with key officials in Human Resources, Finance, Information Technology (IT) Services, Information Communication Technology and Maths Science Technology (ICT & MST), and Education Management Information Systems (EMIS). Questionnaires were also circulated to the primary system users in HR and Finance. The study found that the IT Strategy does align well with the Department's strategy, and in terms of technical interdependencies between the initiatives. It also revealed however, that finance constraints may not be the primary inhibiting factor to ICT implementation, despite the limited budget availability. Rather it recommends that issues around the governance structures for ICT in the Department and HR issues in the form of insufficient staffing and unskilled staff are the priority issues to be addressed prior to attempting any implementation of complex system development.

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CHAPTER 1.   INTRODUCTION

1.1   Introduction

E-government has been classified by Kanungo and Jain (2011) as the use of ICT in order to improve efficiency, increase customer orientation, improve the internal management of the government, and offer more flexibility and convenience in the services. This is part of an intention to enhance the public's participation in government and in effect enhance democracy within the country. The benefits include efficiency and cost reduction, accountability and transparency, citizen centric focus, economic development, accessibility and availability. However e-Governance requires extensive efforts to increase citizen awareness and use of these services.

A study of e-Governance in Tanzania by Raup-Kounovsky et al. (2010) found that many government departments experience challenges in developing and implementing the necessary ICT policies and procedures. Dwivedi et al. (2011) identify these environments as ones bound to undergo major process and Information System related problems and further highlight that it is "the absence of a comprehensible and well-executed process reengineering strategy" which "significantly impedes e-Government implementation and success".

The South African Presidential Review Commission (PRC) identified a few key findings that needed regulation, according to Hartley and Seymour (2011). Firstly, government systems are not interoperable; there is also a distinct lack of co-ordination in the procurement of IT products and services, as well as a mismatch between procurement needs as opposed to procurement wants. These issues result in an environment fraught with duplication, and fruitless expenditure on projects which should not be prioritised.

Furthermore, IT is a fast-paced, rapidly developing environment, which contrasts significantly with a typical bureaucratic government office. This means that government, according to Kanungo and Jain (2011), often lacks the requisite organisational setup and resources for taking complicated IT decisions, and therefore make use of an extended committee approach, an approach which tends to significantly delay decision making.

This chapter will highlight the motivations for undertaking this study, examine the focus of the study and the specific problems and questions that need to be answered. Finally it will define

the objectives that were used to answer the questions, and present briefly the limitations of the study.

1.2 Motivation for the Study

This dissertation examines the current and future desired state of Information Communication Technology (ICT) within the KwaZulu-Natal Department of Education. It evaluates through the use of proven e-readiness assessment tools, the readiness of the Department to embark upon a strategy which has been mandated for implementation, with the purpose of ultimately enhancing service delivery. The obstacles to achieving this will be identified and recommendations made for solutions. The study will assist the ICT related components of the KZN Department of Education to be better aligned, and the Department's management to get a better understanding of how ICT and e-Governance can enhance service delivery. Further it will recommend interventions needed in order to facilitate the desired strategic initiatives within the Department, and ultimately enhance service delivery from the Department to the citizenry. This study will contribute to the body of knowledge on third world public sector e-Governance readiness, and highlight specific challenges to the South African environment.

1.3 Focus of the Study

This study will focus on issues of e-Readiness, acceptance levels of ICT by public servants, as well as the challenges inherent in the KZN Department of Education's environment. The challenges will be prioritised based on the impact that they have on the feasibility of implementing the IT Strategy. Challenges, which have not been highlighted as major obstacles will not be directly dealt with.

1.4 Problem Statement

The Presidency of South Africa in the report on improving government performance has acknowledged underlying factors which currently lead to poor service delivery. One of these is that of inadequate inputs, particularly in relation to people, technology and infrastructure, as highlighted by Chabane (2009). In response to this the presidency plans to implement a major project to define and map the data architecture of government administrative systems and available datasets. As part of the response, the Department of Public Service Administration has issued an ICT framework for implementation, which the Department has utilised to develop an IT Strategy. This is the backdrop to the second problem whereby the IT Strategy is struggling to be implemented.

This dissertation intends to answer the question:

What is the KZN Department of Education's state of readiness for adopting the ICT Strategy as developed and mandated by Department of Public Service Administration and the level of acceptance of technology within the workplace?

1.5   Research Sub-Questions

In order to analyse the problem statement fully, the following sub-questions were designed:

1. What is the current role of ICT in the Department?
2. What is the desired strategic role of ICT in the Department?
3. What challenges exist that inhibit the implementation of the ICT Strategy?
4. How best can the Department proceed with successful implementations of the ICT initiatives.

1.6   Objectives

General: To evaluate the current role of ICT, the alignment to the mandated strategy, the readiness to implement this strategy, and to identify the limiting factors, prioritise and recommend solutions

Specifically:

- Evaluate the strategic alignment to the mandated ICT Strategy document.

- Evaluate the fit of the ICT Strategy

- Identify the obstacles, and recommend solutions

1.7   Summary

This study examines the KZN Department of Education's ICT environment and the IT Strategy that has been adopted. This was done in order to identify challenges in the implementation and make recommendations for overcoming these challenges. In order to begin this journey the current ICT environment needs to be understood, particularly how ICT can be utilised within the Public Sector.

CHAPTER 2. ICT IN THE PUBLIC SECTOR

2.1 Introduction

The availability of Information Communication Technology (ICT) in today's fast paced world has presented unique opportunities and challenges for public service enterprises. This dissertation examines the obstacles to technology adoption within the KZN Department of Education, South Africa and the scientific literature regarding the potential value in implementing this technology. Further, it will investigate the lessons learned globally to better understand what is required to enhance service delivery in the administration of the KwaZulu-Natal Department of Education, South Africa.

2.2 Technology Adoption in the Public Sector

ICT is a rapidly evolving discipline and is being increasingly leveraged in the public sector to make public services more efficient, transparent and accessible to citizens. However there is much debate about the real impact of such developments within the public sector as repeated failed implementations and poor adoption have plagued the environment (Weerakkody et al., 2011).

2.2.1 History

The beginning of the drive for ICT in public administration began in the 1990s with the "reinventing government" movement (Savoldelli et al., 2012). This precipitated the creation of a large body of inter-disciplinary scientific literature on this topic. A growing body of institutional and policy-oriented reports were developed including practitioner-generated analysis, case studies, and measurement efforts. As yet, however, there is very limited evidence that these gains have been achieved and e-Government's potential remains hypothetical. Savoldelli et al. (2012) highlight this aspect in discussing the proliferation of computers, with very little impact in productivity statistics.

During the mid '90s firms finally began to realise the gains from the investments they had made years before. This delayed realisation was due to a number of causes, inaccurate measurement, as well as lag time whereby the ICT benefits are only realized over time. Additional causes included the redistribution of profit, where positive results for some projects are offset by negative results on others, and finally the mismanagement of ICT. This was highlighted by Savoldelli et al. (2012), who suggested that part of the issue lies in the relationship between the significant high expenditure necessary to implement the projects and

the limited impact which is evident so far. Additionally, they also suggest that it could be as a result of e-Government initiatives being aimed at delivering to citizens, and thus the gain is both hard to measure, and not necessarily resulting in a reduction in cost.

2.2.2   Benefits for the Public Sector

As the priorities of public sector differ so comprehensively from those of the private sector the reasons for implementing technology may not be clear. Numerous scholars have contributed on this matter and there is general consensus on this, Dwivedi et al. (2011) describe this value as being able to increase government's transparency to citizens and businesses, which in turn improves and broadens the information which can be collected and generated by governments. This should further impact bureaucracy to decentralize governance, particular from the perspective of the citizenship, thereby potentially evolving the public understanding of and relationship with the state (Chongthammakun & Pal, 2012). Hartley and Seymour (2011) further note that the technology development should focus particularly on the standardisation, security, integration and expansion of data systems in order to provide improvements.

The South African government is no different to other governments worldwide, striving to stamp out corruption, enhance service delivery, and earn the trust of the citizenry. This is widely believed, according to Hartley and Seymour (2011), to be hampered by weaknesses in information and control systems, as is the case in many other developing countries. Hartley and Seymour (2011) attribute this to weak supervision and communication systems, as well as a general lack in information. Ultimately they suggest that without access to accurate information about local communities, service delivery will be severely impeded.

2.2.3   Eliminating Boundaries

ICT has the potential to truly transform the institutions that govern and provide social services. Its role in the public sector can, according to Le Dantec and Edwards (2010), be conceived as that of a boundary object, or perhaps more clearly as a bridge between citizens, government and public/private institutions that act on the behalf of both.

Le Dantec and Edwards (2010) further elaborate on how the cost when crossing this bridge in actuality is more than just learning about what is new. Rather it also includes the cost of changing the way in which things are currently done in order to accommodate knowledge developed by other parties to this collaboration. As may be deduced from Le Dantec and Edwards (2010) and Hartley and Seymour (2011), the costs of implementation go well beyond

a simple project implementation cost of any one particular technology and it is the lack of understanding around this that limits the perceived return on investment value and creates uncertainty around the value of future ICT related projects.

2.2.4   The Technology Acceptance Model (TAM)

Another consideration when determining the potential value of ICT related projects is the degree of use to which they will be put. Davis et al. (1989) developed a model called the Technology Acceptance Model which postulates that the level of usage of a computer or system is dependent on the strength of a person's intention to do so. This is called Behavioural Intention to use (BI) within the TAM model. The TAM defining characteristics are:

U – Perceived usefulness – subjective probability that making use of the system will increase job performance

E – Perceived ease of use – degree to which the user expects the system to be free of effort

A – Attitude towards using – dependant on a combination of U and A

BI – Behavioural intention to use – calculated based on person's attitude (A) and the perceived usefulness (U)

Whilst TAM is an older model, its value has been retained through many customisations done over the years, of particular interest being an integration of technology acceptance and technology readiness in a paper by Godoe & Johansen (2012).

2.2.5   Counter Argument to Implementing ICT in Public Sector

The key argument against implementing ICT in the public sector stems from the uncertainty around the actual value obtained in relation to the expenditure, as well as the unclear efficiency improvements as described by Dwivedi et al. (2011). There is consensus in the literature suggesting that while substantial benefits can be gained from Information Technology (IT), the projects themselves are "often fraught with cost overruns and delays" and "once deployed, many systems fail to meet functional requirements or are too complex to be feasible for many organizations" (Kanungo & Jain, 2011, p. 40). Without a proper roadmap for implementation and an in-depth understanding of these obstacles; cost overruns, delays, and system complexities will over-shadow any attempts to revolutionise government.

2.3 Governance Structures

IT governance has gained a role in international conversations about responsible stewardship of public funds. However, as the IT Governance Institute stated, "We shouldn't focus on the process—governance—but what you want governance for" (Raup-Kounovsky et al., 2010, p. 214). These days many organisations look to enterprise IT Governance for better IT to Business alignment, project prioritisation, inter-agency cooperation and portfolio management. To do this requires a decision-making framework which will "meet the needs and expectations of a wide range of stakeholders: elected leaders, business and programmatic executives, and IT leaders and their staff" (Raup-Kounovsky et al., 2010, p. 211).

Two primary tools, according to Raup-Kounovsky et al. (2010), have been developed to direct governance: Control Objectives for Information and related Technology (COBIT) and Value from IT Investments (Val IT). These however do not fully represent a good governance design as specific environmental differences need to be taken into account and the reporting and monitoring processes need to be customised to the requirements. In order for decisions to be made, governance must also identify the arrangement of authority patterns for IT activities across an organisation; another primary concern in the current organisational structure in the education department (Raup-Kounovsky et al., 2010).

Governance therefore becomes an extremely useful tool for getting organisational buy-in for ICT related initiatives, based on the demonstrable alignment to the organisation's strategy. Two orientations of governance frameworks have been identified by Raup-Kounovsky et al. (2010) to be highly successful within the public sector, these are the Federated IT Governance Framework and the Centralised IT Governance Framework. Although these recommended models are a derivative of the governance structures utilised in the United States of America, they still remain applicable in a global context as they refers to a mechanism for decision making, allocation of resources, and unifying strategy which go beyond contextual considerations, just as COBIT does.

2.3.1   Federated IT Governance Framework
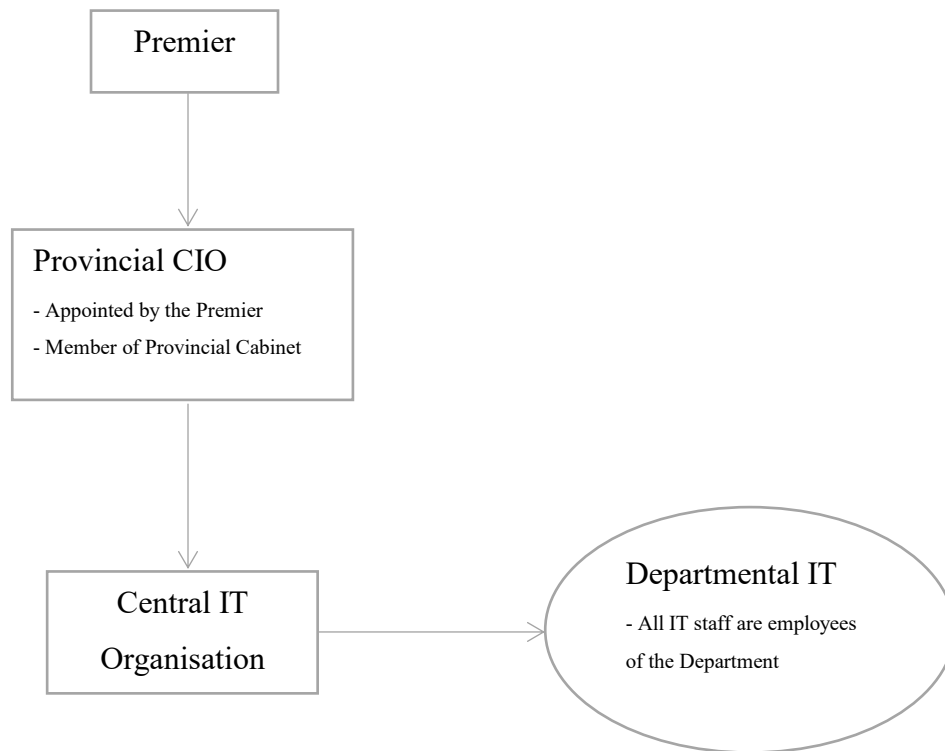
Figure 1: Federated IT Governance Framework (Raup-Kounovsky et al., 2010)

In this framework, each Department employs its own IT staff and is responsible for managing its internal IT operations. The state Chief Information Officer (CIO), in KZN, South Africa is represented by the IT Manager of KZN Premier, who also is the chairman of the Provincial Government IT Officer Counsel. This official is responsible for providing IT services, oversight, and planning for the state enterprise (Raup-Kounovsky et al., 2010). What has worked in the USA, according to Raup-Kounovsky et al. (2010) is to bring the state CIO up to be a direct advisor to cabinet, thereby indicating political support for the use of IT within government, as well as to make mandatory a unified approach to technology.

2.3.2   Centralised IT Governance Framework

In this framework, all of the IT staff in the state government belongs to the central IT organization, led by the state CIO (Raup-Kounovsky et al., 2010). As above this also requires a level of political support for the use of IT within government and an elevated level of the state CIO in order to provide an effective strategic role.
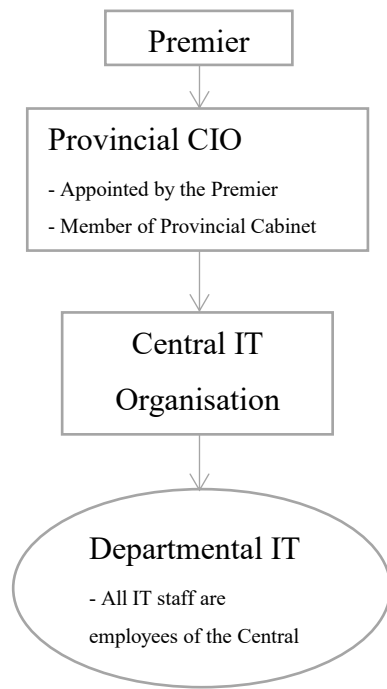
Figure 2: Centralised IT Governance Framework (Raup-Kounovsky et al., 2010)

The key to the success of such a model however, is that the central agency has to become, in the words of a state CIO from the USA "a very, very service-oriented organization" (Raup-Kounovsky et al., 2010, p. 214). This dissertation will attempt to examine the relationship with SITA and its effectiveness and lay the groundwork for future studies which will need to make recommendations to cabinet.

2.3.3 State Information Technology Agency (SITA)

SITA was established in 1999 to consolidate and coordinate the State's information technology resources in order to achieve cost savings through economies of scale, increase delivery capabilities and enhanced interoperability (SITA SOC Ltd, 2015). The roles of SITA encompass the strategic implementation of ICT for government, managing the IT procurement and delivery process, and supporting the delivery of e-Government services to all citizens via ICT.

SITA was brought into existence through the SITA Act, which separates SITA's services into mandatory services (i.e. SITA must provide), and non-mandatory services (i.e. SITA may

provide). And it is in this context that Departments, such as the KZN Department of Education, engages with SITA.

The primary reasons for the creation of SITA, according to SITA SOC Ltd (2015), were the government's difficulty in:

• recruiting, developing and retaining skilled IT personnel;

• managing IT procurement and ensuring that the government gets value for money;

• using IT to support transformation and service delivery;

• effectively utilising expensive IT resources; and

• integrating IT initiatives.

Davids (2011) explains that SITA emphasises the importance of considering the needs of clients and aligning services accordingly in order to realise e-Governance.

2.4   E-Governance

E-government has been classified by Kanungo and Jain (2011) as the use of ICT in order to improve efficiency, increase customer orientation, improve the internal management of the government, and offer more flexibility and convenience in the services. This is part of an intention to enhance the publics participation in government and in effect enhance democracy within the country. The benefits include efficiency and cost reduction, accountability and transparency, citizen centric focus, economic development, accessibility and availability. However e-Governance requires extensive efforts to increase citizen awareness and therefore use of these services. This means that at present, particularly in South Africa, the concept of e-Governance is not getting much traction. e-Government is primarily based on ICT, it provides the necessary infrastructure for seamless communication and flow of information within government and its stakeholders (Dwivedi et al., 2011). Dwivedi et al. (2011) thus are suggesting that resources should be focused on creating the infrastructural backbone whilst expanding the public access and empowering the citizenry through marketing campaigns and training campaigns to both want to use the new systems, and be able to.

In Malaysia, e-Government was deployed in order to move the government services online. There the dual objectives are to reinvent the government of Malaysia in terms of service delivery through the use of ICT, and to catalyse the successful development of the Multimedia

Super Corridor (MSC) with ICT as one of the leading sectors of the economy (Kaliannan, et al., 2007). This type of Internet and Web-based networking, according to Kaliannan et al. (2007) can be classified into services between government agencies and: citizens (G2C), businesses (G2B), employees (G2E) and other non-governmental agencies.

This has been reflected in South Africa via the stewardship of the Department of Public Service and Administration (DPSA). Davids (2011) illustrates the three key issues which the DPSA advises that e-Government initiatives address:

1.   E-Governance, this regards the application of ICT to internal government and includes electronic interactions between national, provincial and local governments.

2.   E-services: this is in line with the government to citizen (G2C) classification already mentioned and relates to the application of ICT to change the services experienced by the citizen.

3.   E-business: in this conceptualisation, government itself represents a business entity as the reference is to the application of ICT to produce business-to-business transactions, and other contractual relations. These transactions include electronic tender and electronic payment and thus the underlying systems.

The figure below describes the inter-related cycle of e-Service adoption. In this figure the resultant improvement in public service delivery and outcome achievement results in an improvement in citizen satisfaction, which in turn improves the relationship and trust between citizen and government. This improved relationship and transparency between citizens and government results in a fully integrated structured policy planning process incorporating a performance management and true participation by stakeholders and citizens, ultimately supporting a wide adoption of e-Government services and according to Savoldelli et al. (2012), a well-established "Digital Society". The key to this remains the successful implementation of initial e-Service initiatives.

Figure 3– e-Government services adoption virtuous cycle (Savoldelli, et al., 2012)

e-Government adoption however is dependent on multiple different integrating relationships as demonstrated by Savoldelli et al. (2012). As already indicated the primary starting dependency is that of both a high service quality and product quality. These however cannot be aimless products or services, they must provide a meaningful public value of a given service. This value by itself is in general not sufficient. The value of a service according to Savoldelli et al. (2012), is that which is perceived by the citizen, and these perceptions are affected by the value of the service/product deployed as well as the transparency of the related decision making process. Positive perceptions from the citizenry increases the citizens' trust in policy makers and public administration and in turn stimulates e-Government adoption. As mentioned before increased levels of citizen trust and transparency encourages a higher level of public participation in the decision making process, which in turn according to Savoldelli et al. (2012), improves the quality of the products and services as government is able to closely match their value offering to the needs of the citizens.
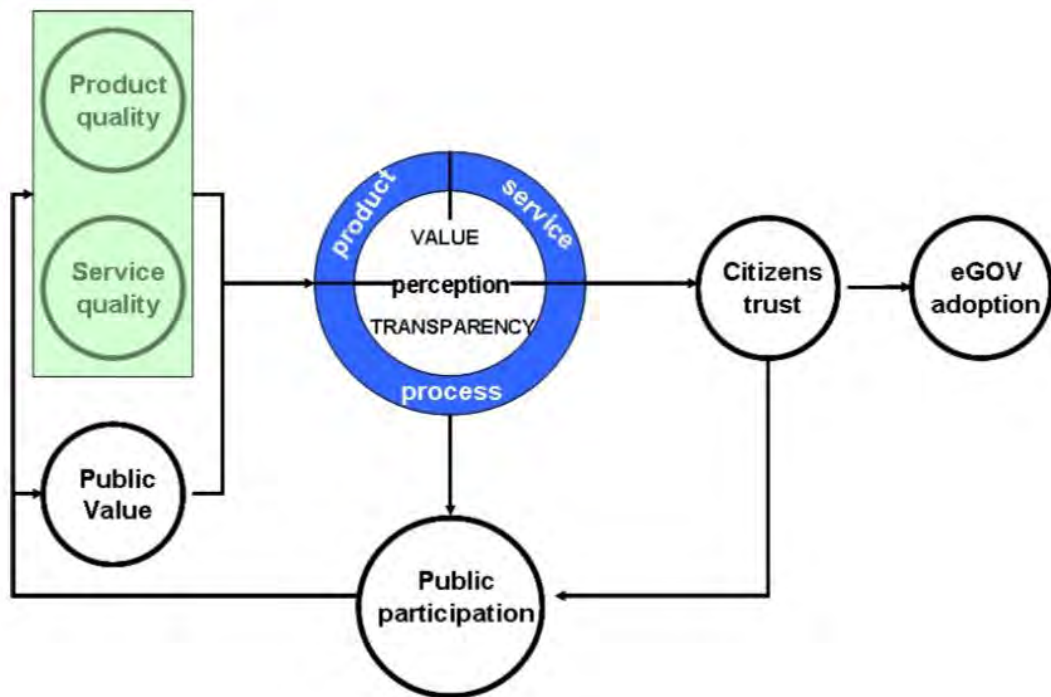
Figure 4- Key drivers of e-Government adoption: adaptation from Parasuraman&Grewal
(Savoldelli et al., 2012)

2.4.1 E-Governance in the Third World and the South African Context

2.4.1.1 Governance and Structural Challenges

A study of e-Governance in Tanzania by Raup-Kounovsky et al. (2010) found that many
government departments experience challenges in developing and implementing the necessary
ICT policies and procedures. Dwivedi et al. (2011) identify these environments as ones bound
to undergo major process and IS related problems. Further they highlight that it is "the absence
of a comprehensible and well-executed process reengineering strategy" which "significantly
impedes e-Government implementation and success" (Dwivedi et al., 2011, p. 15).

A top down approach is critical to make changes in the public sector as without directives
emanating from the highest office, the authority necessary to make the changes will always be
lacking. Chongthammakun and Pal (2012) have shown that there is little to no hope that ICT
can change the flows and structures of power in bureaucracies in the developing world. Further
they go on to demonstrate how the structure of the organisation needs to be aligned in terms of
reward systems, policies, work practices, culture, and norms to the underlying technology and
in order to avoid application resistance have suggested that "system developers need to get top

management support as well as all-level user involvement in the design process" (Chongthammakun & Pal, 2012, p. 38).

In order for IT to be highly effective in the public sector environment it is critical that IT-managers are given more powers in taking decisions. Top management motivates the IT-personnel, however undue interference by top management in IT related projects should be avoided (Kanungo & Jain, 2011).

2.4.1.2 Adoption Challenges

Dwivedi (2011) elaborates on the challenges which may inhibit the adoption of new technology, namely data security, accessibility and perceived confidentiality, as well as social, political, economic and motivational factors. The findings "suggest that the application is resisted because of the disparity between those who will benefit from an application and those who must do additional work to support it" (Chongthammakun & Pal, 2012, p. 38). Thus a critical part of technology adoption is to ensure that all users understand how it will make their work better (and how it will improve the public's perception of their work).

The implementation of systems allows for the replacement of the current tedious physical reporting systems which are in place. Inevitably documents in this type of system get lost and services are delayed indeterminably. Chongthammakun and Pal, (2012) conducted an interview with an official, which highlighted that post implementation of ICT systems, the use is highly dependent on the staff themselves. Further they identified that without proper training and understanding, the old ways of doing things will resurface.

2.4.1.3 Regulatory Challenges

As the public sector is such a regulated and enforced environment, the rigidity of relevant procedures, rules and regulations create tensions in the development and use of technology. The South African Presidential Review Commission (PRC), according to Hartley and Seymour (2011) identified a few key findings that needed regulation. Firstly, government systems are not interoperable; there is also a distinct lack of co-ordination in the procurement of IT products and services, as well as a mismatch between procurement needs as opposed to procurement wants. These issues result in an environment fraught with duplication, and fruitless expenditure on projects which should not be prioritised. Hartley and Seymour (2011) highlight this by identifying that the processes and systems which exist across government are

often repeatedly duplicated. They then suggest that the only solution to this can be an improvement in communication, co-ordination, and support between government bodies.

Furthermore, IT is a fast-paced, rapidly developing environment, which contrasts significantly with a typical bureaucratic government office. This means that government, according to Kanungo and Jain (2011), often lacks the requisite organisational setup and resources for taking complicated IT decisions, and therefore make use of an extended committee approach, an approach which tends to significantly delay decision making.

2.4.1.4 Leadership Challenges

"To achieve success in public service delivery, specific leadership skills are required, particularly in South Africa" (Hartley & Seymour, 2011, p. 118)

Kim and Ulziikhutag (2011) have identified five requirements for successful implementation of ICT. Firstly, the importance of having central leadership, which is lacking in terms of other ministry's support; secondly, the implementation of good policies such as the government wide NDS (National Development Strategy), and the ICT Vision and strategy. The third requirement is that, support is needed from politicians and new ICT laws and policies for things like e-signatures, and IT security, need to be created; and fourthly, it is important to initiate and maintain ongoing cooperation with supporting countries and international organisations, as is evidenced in the cooperation cases from Korea, WB and ADB's. Finally, an aggressive connectivity plan and government subsidy program is needed to bridge the digital divide and provide services to rural areas.

2.4.1.5 Budget Constraint Challenges

"Budget constraints, the increased focus on efficiency, and the opening up of some areas of the public sector to competition in the wake of NPM-reform have put some pressure on public administrations" (Estermann et al., 2009, p. 164). This suggests that due to budget constraints and the need for improved efficiency in the public sector that ICT opportunities have to be exploited. This comes as a bit of a surprise as in South Africa the traditional view of ICT projects is that of a cost-centre with a general reluctance to invest due to uncertain returns on investment. The Presidential Review Committee has also noted that "the South African government is a large consumer of IT goods and services and is not achieving economies of scale. The South African public sector organisations operate under tight budgets, which put further constraint on service delivery to improve to citizens lives" (Hartley & Seymour, 2011,

p. 120). From the IT perspective, SITA was created in order to leverage on these economies of scale. However in practice, it appears that the Departments get the exact same pricing as SITA, and to procure via SITA involves a standard ten percent mark-up for the service.

2.4.1.6 Resistance to change

Historically the issues surrounding change management and the resistance to change resulting from significant ICT implementations has been handled rather poorly. Le Dantec and Edwards (2010) elaborate on how the cost when implementing new technology in actuality is more than just learning about what is new. They suggest that accommodation must be made for the cost of changing the way in which things are currently done in order to accommodate knowledge developed by other parties to this collaboration. As can be seen therefore the costs of implementation go well beyond a simple project implementation cost of any one particular technology and without understanding this, project scope creep will abound, and the success of the implementation compromised through lack of use.

Davids (2011) has highlighted the need for building the ICT capacity of employees, marketing and customer relationship management are considered as important for the successful implementation of e-Government. Furthermore it has been acknowledged by the DPSA in Davids (2011), that developing an Internet portal does not automatically mean that citizens will make use of online services. So as can be seen, resistance to change does not just exist internally to government, but within the citizenry itself.

2.4.1.7 South Africa moving forwards

The Presidency of South Africa in the report on improving government performance has acknowledge underlying factors which currently lead to poor service delivery. One of these which will be a core theme of this dissertation is that of inadequate inputs, particularly in relation to people, technology and infrastructure, as highlighted by Chabane (2009). In response to this the presidency plans to implement a major project to define and map the data architecture of government administrative systems and available datasets.

Davids (2011) has cited Lesame in describing several key areas which pose challenges to implementing e-Government in South Africa. Firstly there is a need for technically skilled people within government to manage and maintain the new technologies. Limited financial resources and energy for sustaining the country's infrastructure pose substantial challenges to enhancing service delivery and technical skills. The second area highlighted is that there is not

sufficient research and development of government's ICT infrastructure in order to provide a solid backbone for technology.

The third challenge relates to the literacy levels of citizens in South Africa. This is further complicated by the fact that South Africa has eleven official languages and in order to deliver content freely and fairly to all citizens then it must be done in the home language of that particular citizen. The fourth point for consideration is the relative value of e-Government services in an environment where citizens have very poor access to ICT. According to Davids (2011), less than five per cent of South African citizens actually own a computer, and less than three per cent have access to the Internet reinforcing the digital divide. The final point made by Davids (2011) follows suit in that in general ICT equipment remains unaffordable to the majority of South African citizens, solidifying the digital divide into the future.

Significant investment therefore is needed in South Africa to overcome these challenges and enable e-initiatives. Resource utilisation as a whole has its own challenges due to issues such as waste and inefficient leveraging, additionally political pressures often dictate where resources must be utilised and these areas may not be in line with the strategy. Additional resource constraints include the availability of trained manpower and properly structured organizational routines for IT use or IT service delivery (Kanungo & Jain, 2011).

2.4.1.8 Gauteng Online

The Gauteng Online project is perhaps indicative of the way in which many ICT projects are handled. "The Gauteng Online project was initiated in 2002 through the provincial Department of Education and implemented by various service providers. In April 2007, the programme was transferred to the GDF, and the contract awarded to SMMT (now Cloudseed). After Cloudseed's original contract expired on 31 March, it was extended for a further three months, at a cost of R126 million. During this time, Gauteng finance MEC Mandla Nkomfe said the department is looking to redesign the project, so that all learners would have their own devices, such as tablets, smartphones and netbooks" (Jacobs, 2013, para. 6 & 7). After 12 years and billions of rands spent on this project there has been little to indicate wide-spread success. In fact it now appears that the project itself is to be redesigned; certainly the impact on education where the biggest difference needs to be made is at present minimal.

Matakanye Matakanye, spokesman for the National School Governing Body, which represents poor schools, said "he did not understand why the tender had been advertised again"

Matakanye said, "the schools body had seen no benefit from the project. 'We call the project Gauteng Offline,' There is never any connectivity; we're always told the server is down. Most of the labs are white elephants" (Timse, 2013, para. 23 & 24). The final vision is a good one, but decisions seem to be being made without a full understanding of the underlying technologies and requirements. It is the same with e-Government, the required infrastructure and resources which underlie the collaborative technologies do not exist currently, and as such the first port of call must be to develop these areas.

2.5   Transformational Government

To coin a term phrased recently by Dwivedi et al. (2011) "transformational government" is a key to the development of ICT in the KZN Department of Education. "Transformational government implies reengineering back office processes and IT systems" (Dwivedi et al., 2011, p. 13).

Transformational government differs from e-Government in that transformational government takes a broader view. This view includes both organisational and socio-technical areas and facilitates radical change in terms of the existing structures, operations and even the culture of government (Dwivedi et al., 2011). It can be seen as almost a prerequisite to e-Government implementation as the back office processes and systems need to be fully established before any collaboration can be supported technically. This is therefore a good starting point when crafting a strategy for ICT implementation.

2.5.1   Maturity / e-Readiness

The maturity of an organisation into which ICT advancements are to be implemented is of critical importance. The environment itself is a major decider of both the success of these implementations and the choice as to what should be priorities in the plan. Estermann et al. (2009) highlight a pattern in maturity models which can be reflected in distinct stages, initially two stages "web presence/interaction" and "transaction" and a third stage "integration/transformation". These first two stages involved predominantly jumps in technology in order to narrow the "gap" of maturity, with the third stage requiring a complete shift in organisational culture and structure.

When looking at the South African government and more specifically the KZN Department of Education, an understanding of the level of maturity of the organisation is needed in order to determine what stage of development is needed. A study by Princely Ifinedo has been cited by

Dwivedi et al. (2011) which defines the contributing factors to e-Government maturity as being directly related to the availability of:

• Quality Human Resources

• Technological infrastructure

• Capacity to innovate

• Sufficient funding

• Legal and policy framework to support e-Governance, and

• Transparency

As shown by Savoldelli et al. (2012) however, maturity is not necessarily the biggest obstacle to a successful e-Government implementation, that despite the technological barriers to e-Government adoption being reduced in the mature government, e-Government services are still not fully adopted and no clear evidence exists of the benefit of ICT to citizens. There continues to exist the same constraints applicable to all new technological implementations, civil servants and policy makers create these new barriers in the form of resistance to change, causing an evident lack of trustworthiness in the citizens towards political institutions. "The consequences of these barriers is an unstructured and untrustworthy decision making process, that slow down adoption, which in turn weaken the capability to effectively and timely absorb and use public funds" (Savoldelli et al., 2012, p. 292).

Savoldelli et al. (2012) further went on to illustrate a maturity model which is useful in plotting the maturity of an organisation based on certain key elements, namely: process orientation, citizen centricity, people and organisation drivers, and technology and information drivers to arrive at 6 stages of defined government maturity, depicted below.
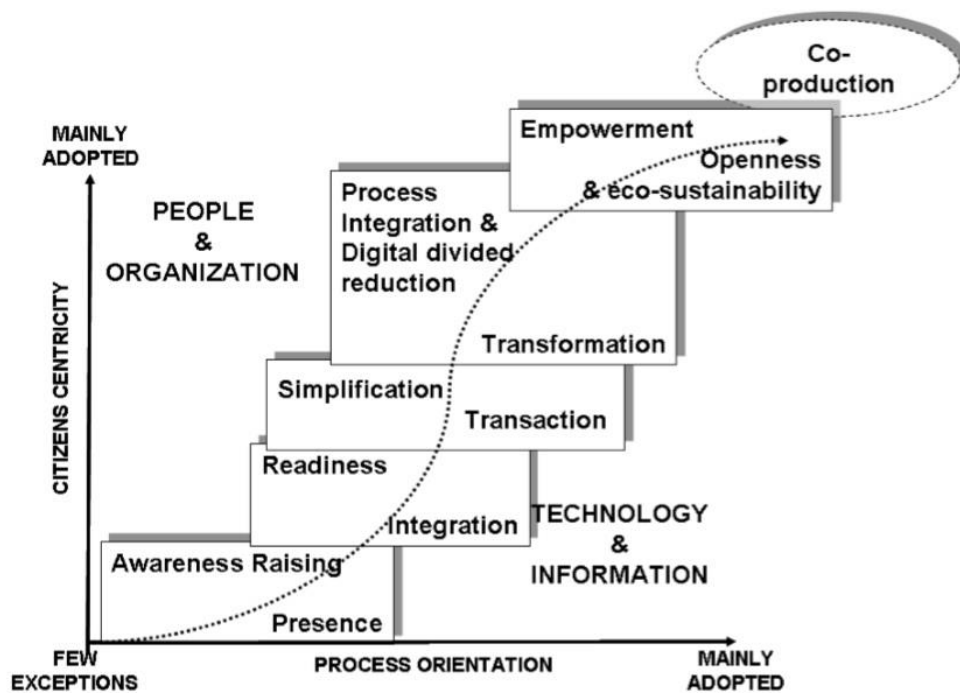
Figure 5 - E-Government Maturity Model (Savoldelli et al., 2012)

2.6   The KwaZulu-Natal Department of Education

The KZN Department of Education, as stated in the Head of the Department's Strategic Direction KZN Department of Education (2010), sees its birth in the mandates of the South African Constitution and the Bill of Rights, wherein it is stated that every child has a right to basic nutrition, shelter, basic health care services and social services.It further states that everyone has a right to basic education, including adult basic education, and to further education which the state through reasonable measures must make progressively available and accessible.

The KZN DoE aims to "free the potential of all learners in the education and training system which will in turn lead to improved learner attainment, enhance skills development and contribute to a better quality of life for all in the province" (KZN Department of Education, 2010).

2.6.1   Current KZN Education Environment

According to KZN Department of Education (2010) the province of KwaZulu-Natal covers an area of ninety-four thousand, three hundred and sixty-one square kilometres (94,361 km^2). The population is estimated to have been ten million, six hundred and ninety-four thousand, four hundred (10,694,400) in 2014, and apart from increased density around the few major towns,

the Durban Metropolitan in particular, significant numbers of people come from rural areas. These areas are characterised by low population density and extreme poverty. In order for schools to be viable however, KZN Department of Education (2010) states that there is a minimum number of scholars required, or the school will be shut down. This means that often very poor children have to walk long distances just to reach school in the mornings.

This scenario led to priority being given to meet the basic needs of scholars and to providing access to infrastructure for learning. Key areas were identified, according to KZN Department of Education (2010) as follows:

1.   Hunger and nutrition. Children who are hungry experience difficulty concentrating during class.

2.   Access to basic services and infrastructure. Where there is no electricity, there is an impact on the child's ability to do homework and there's often an increase in the amount of domestic work which the child must perform. Access to adequate sanitation and water is also a critical concern, the absence of which can lead to illness.

3.   Inadequate housing. Classrooms and houses both suffer from this. When a room is overcrowded there are substantial distractions affecting both teaching and learning, as well as the child's ability to study.

4.   Transportation. Seventy-eight percent (78%) of children walk to school in South Africa, and of these seventeen percent (17%) are under the age of ten, and walk longer than half-an-hour just to get to school, according to a caregiver survey (KZN Department of Education, 2010).

In general terms the problems in the environment have been broadly categorised by the Department as being based on either the socio-cultural environment internally and externally to schools, the enabling policy context, and the system failing in its primary objective. Further problems have been identified in the inaccurate diagnosis of problems, and ineffective remediation strategies and solutions. Additionally most schools do not have the conditions required for effective attainment of learning outcomes (KZN Department of Education, 2010). In this context there are some key ways in which ICT could be leveraged in the author's opinion to alleviate some of these areas. Inaccurate diagnosis of problems stems in general from insufficient information regarding the specific problem and the environment in which it presents. Furthermore remediation without information and monitoring also becomes steadily

more challenging to deliver upon. Both of these situations can be assisted through the use of ICT information systems, decision making is improved through streamlining information, and enhancing the sharing of knowledge and organisational learning (Gupta et al., 2008).

At a greater level of specificity KZN Department of Education (2010) has further identified problems around the capacity of the bureaucracy to support schools effectively, and the management and governance of schools. The capability and commitment of teachers as well as the involvement of both parents and community seem to be lacking, whilst the adequacy of fixed infrastructure in all areas poses significant challenges across the Province. Finally, the adequacy of teaching and learning inputs is another area of concern, resulting inevitably in inadequate levels of learner attainment. Whilst as stated before by Chongthammakun & Pal (2012), ICT can be leveraged to assist with issues stemming from bureaucracy, and management and governance due to its impact on information streamlining and sharing of knowledge, there are further implications from these issues. Firstly ICT requires a solid infrastructural backbone on which to run, as highlighted by Davids (2011). In the absence of this the information cannot flow throughout the organisation, and secondly in order to utilise ICT systems it requires a certain level of capability at all points of interaction with the system, in order for it to function effectively. These capabilities are over and above any existing capabilities which teachers may or may not already have, and introducing a paradigm shift for teachers already struggling with their current roles and functions may be doomed to failure from the start.

In 2005 the Human Science Research Council undertook a study to examine the portion of time teachers spent on their administrative responsibilities, and the resultant impact on teaching time. They found that as a result of Continuous Assessment policies and the rest of the OBE assessment regime approximately thirty percent of teaching time was being lost by eighty percent of teachers due to these burdens (KZN Department of Education, 2010).

2.7   Conclusion

Despite the numerous challenges which have been presented and the real difficulties which have been experienced from the global context, the potential value of ICT and e-Government as a concept is irrefutable. A number of mechanisms have been identified which need to be examined and fulfilled. The right governance framework needs to be created at a National level for implementation in all Departments, either Federated or Centralised. A workable organizational structure must be facilitated and fully populated to deliver on IT services,

additionally the role of a central controlling agency must be clarified and enhanced, a role neither filled by the Provincial Government Information Technology Officer Counsel (PGITOC) nor by SITA.

Strong political commitment is needed together with a strategic decision making role for the government CIO being escalated to the level of cabinet in order to successfully craft strategy which align to the business strategy. And finally the lack of resource availability in terms of regulations, people, and budget must be addressed urgently. A possible centralisation of all government IT budget as has been done in the Western Cape may, together with the realignment of the CIO provide the necessary tools. Should these areas be addressed then these challenges can be overcome. The private sector and the first world public sector continue to advance, it is now for South Africa to focus its resources and commit to a plan of action which will map the pathway to successful e-Government and transparent service delivery.

In order to evaluate the KZN Department of Education in its current environment and to establish what the level of e-Readiness and acceptance of ICT is, a diverse yet proven methodology was required for the research. The selection of this methodology is described in the following chapter.

CHAPTER 3.   RESEARCH METHODOLOGY

3.1   Introduction

Four research questions were identified which need to be addressed. A strategy is dependent on understanding where an organisation is currently positioned as well as where it wants to be positioned in the future. In line with this it was important to identify firstly, the current role of ICT within the Department as well as the desired role of ICT. This was done through a combination of examining the existing ICT Strategy document that falls within the broader IT Governance Framework, and through in-depth interviews with key staff members.

Identifying the challenges in implementing the ICT Strategy, as per research question 3, can be broadly described as e-Readiness issues, as well as technology acceptance issues. This is an acknowledgement of both the infrastructural and system challenges, as well as potential difficulties surrounding the staff use of technology and their levels of acceptance of new technology.

The final question deals with recommending a way forward for the Department in order to reach its strategic goals. This involves the application of the theory detailed in Chapter Two to the data acquired in the previous research questions to provide real value to the KZN Department of Education.

3.2   Research Design

The chosen methodology for this dissertation is a mixed method design. This design encompasses both quantitative and qualitative methods for collection and analysis of the research data, the purpose thereof to better understand the research problem more completely. Caracelli and Greene (1993) defined mixed-method design as including at least one quantitative method (designed to collect numbers) and one qualitative method (designed to collect words), where neither type of method is inherently linked to a particular inquiry paradigm or philosophy.

Bryman (1984) has defined quantitative methodology to be a positivist natural science approach applied to social phenomena. He further elaborates that quantitative methodologies exhibit "a preoccupation with operational definitions, objectivity, replicability, causality, and the like" (Bryman, 1984, p. 77). In contrast to this there is a preference within qualitative methodologies for a contextual understanding of a situation, whereby there is a commitment to "see through the eyes of one's subjects" (Bryman, 1984, p. 78). In comparison, quantitative

research emphasizes fixed measurements and hypothesis testing, whereas qualitative research is more fluid and flexible allowing, according to Bryman (1984), discovery of unanticipated findings and the ability to change one's research plans accordingly.

The reasoning behind choosing a mixed methodology is because neither quantitative methods nor qualitative methods can adequately describe the complex issues which surround the implementation of the ICT Strategy and ICT in general within the KwaZulu-Natal Department of Education's Administration. Di Pofi (2002) elaborated on how organisational researchers are now recognising the value of such an integrated approach as should only either quantitative or qualitative methodologies be employed, an incomplete view would be obtained. Through the use of both methods in combination, various different areas of challenges can be assessed to provide a broader and more complete result. "Quantitative methods frequently play the leading role in assessing program outcomes, while qualitative methods are chosen for the supporting role of examining program processes" (Caracelli & Greene, 1993, p. 196).

The research in this study took a concurrent approach to the two methodologies within the mixed approach. Both quantitative and qualitative data was captured concurrently as the focus of each research tool differed slightly, however priority is being given to the qualitative data as it represents the major aspect of data collection and analysis and provides a deeper insight into the key challenges being experienced, whereas the quantitative data provides a broader insight into the environment as a whole.

3.3   Variables in the Quantitative Analysis

The research question in the quantitative phase was centred on three key aspects of the environment of the KZN Department of Education. Firstly the research looked at the current use of ICT by the Department as a whole, secondly the attitude of key system users towards ICT in general, and finally insight into the challenges in utilising and implementing ICT which staff experience daily. The model utilised for this analysis is the Technology Acceptance Model. Administrative staff in the KZN Department of Education from the Head Office, District Office, and Circuit Office were surveyed for this research. The independent variables have been defined as ICT penetration into the Department, willingness to utilize ICT, and the challenges as they are identified by the staff, whilst the dependent variable is the Department's e-Readiness, or more specifically its readiness to implement the ICT Strategy which has been adopted. These variables will be measured on a continuous 5-point Likert-type scale in the questionnaire.

3.4   Target Population and Sample

The target population for the quantitative research portion of this dissertation is the public service officials of the KwaZulu-Natal Department of Education, who are the primary transversal system users and therefore make the most extensive use of the ICT systems within the Department. These officials are therefore primarily HR and Finance users. Participation was garnered, with the approval of the Head of Department, via the supervisors of each section. According to these supervisors, the total number of officials which fall into this category are three hundred and eighty (380) Basic Accounting System (BAS) users and eight hundred (800) Personnel Salary (Persal) users, for a total population of one thousand, one hundred and eighty. Convenience sampling involves "the selection of the most accessible subjects" (Marshall, 1996, p. 523). The convenience sample was based on location and included all the officials which are based at Truro House, Durban. This building, according to the supervisors, contains three of the Department's twelve districts and due to its desirable location, within the Durban Metropolitan close to choice living areas, these districts also each have the highest numbers of officials.

The qualitative research portion made use of purposeful sampling, which was defined by Marshall (1996) to be a selection of individuals who are best able to answer the research questions. For the purposes of this dissertation, it was important to engage with the key decision makers in the adoption of ICT, which included the various ICT components, as well as Human Resources, and Finance for a total of five key interviewees.

3.5   Quantitative Data Collection

The focus of this part of the research was to identify the current state of ICT within the Department, the attitudes and experiences of the officials with regard to the systems, as well as to identify challenges which system users are experiencing. To do this a cross-sectional design was utilised in order to capture the data at one point in time across the officials surveyed. Data was collected through the use of a questionnaire originally sourced from the Technology Acceptance Model, which was then customised for ease of use and to include issues of IT penetration and challenges perceived. This data is predominantly in the format of a five point Likert scale apart from IT penetration which will be measured as a defined ratio.

The questionnaire comprises of two sections. The first section consists of 12 statements around the official's experience when utilising ICT equipment and systems. This was measured on a five-point Likert type scale from "Strongly disagree" to "Strongly agree" and provided data

regarding the acceptance and use of existing ICT systems within the Department, whilst also being an indication of the level of acceptance and usability of any new ICT systems being considered for development. The second section examined the current state of IT infrastructure in terms of numbers of computers and the level of system centralization in the Department. It then examined the roadblocks which hinder IT / E-governance initiatives and the severity of these roadblocks. The severity is measured on a five-point rating from 1 ("Not Severe") to 5 ("Very Severe) and the data assisted in measuring the infrastructural readiness of the Department, as well as identifying challenges that may need to be overcome in order to facilitate a successful implementation of ICT.

The survey questionnaire was paper-based due to the restrictions in the Department for Internet access. The questionnaires were given to the relevant supervisors of each District Office's HR and Finance sections, and they were requested to facilitate their staff completing the questionnaires. Attached to the questionnaire was the approval letter from the Head of the Department, and the Informed Consent Letter, the second page of which has been signed by the participants and retained for records purposes.

3.6   Quantitative Data Analysis

Prior to undertaking the statistical analysis, the data was screened on a univariate level. Outlying cases were then also excluded in order to prevent them from affecting the overall result unduly. The data from the questionnaires was captured into an Excel spreadsheet and from that graphical representations were created. An explanation of their significance is included in the chapter on Presentation of Results, Chapter Four. The interpretation of the data is based on the IT Readiness Assessment for Government Organisations which was developed by the Saudi e-Government Program (Yesser, 2007).

3.6.1   Reliability and Validity

One of the limitations of the questionnaire is that it was not piloted to test for shortcomings prior to distribution, however this limitation is mitigated somewhat by the questionnaire having been developed, piloted and tested in previous research papers. The researcher is of the opinion that some of the questions presented show a degree of repetitiveness which reduces their relevance, this was highlighted by a number of respondents. However in the interests of maintaining the validity of the original questionnaire these questions were retained.

Validity of the data was ascertained via a direct comparison to the themes which resulted through the qualitative research, additionally the theoretical concepts from the literature review have identified common challenges in the environment and these will also be compared to ensure concept validity.

3.7   Qualitative Data Collection

In-depth semi-structured interviews were conducted with five key management officials, using the Interview Protocol included in Appendix D, and were recorded onto cellular telephone via the Voice Recording facility. These were thereafter typed out into a transcript for further analysis. Theme analysis was performed on the transcripts to identify common trends and to deep dive into the challenges being experienced in implementing ICT. Key governance documentation and ICT Strategy documentation became apparent during the interviews and these were sourced to provide background information on ICT governance structures, as well as the ICT Strategy for the next few years. The participants did not receive the interview questions prior to the scheduled meeting, however they were informed that the interview would be recorded and transcribed verbatim.

3.8   Qualitative Data Analysis

As has been mentioned previously, the data obtained through the interviews and documentation was coded and analysed for themes manually within Microsoft Word. This process followed a number of iterations, highlighting key challenges in the environment as well as potential solutions to these challenges. These were then collated in order to match challenges to solutions and eliminate solutions and intended implementations that were infeasible.

3.8.1   Establishing Credibility

A process of verification was undertaken to ensure the validity of the data. As with the quantitative portion of the research, a comparison could be made with the results from the questionnaire. A qualitative study is undertaken within a specific context, which renders replication in another context impossible. However, the five target persons for the interviews were high-ranking senior officials with unique insight and involvement within the ICT implementation process. The various interviews were converged with the Strategy and Governance documentations and the themes identified shared with participants for feedback.

3.9 Research Permission and Ethical Considerations

In compliance with the regulations of the University of KwaZulu-Natal, permission for conducting the research, including the Ethical Clearance Certificate was issued prior to beginning the research. An informed consent form was developed for both the questionnaire respondents and the interviewees. The form stated that the participants are guaranteed certain rights, agree to be involved in the study, and acknowledge their rights are protected. A statement relating to informed consent was affixed to the questionnaire and presented directly to the interview participants.

The anonymity of participants was protected by numerically coding each returned questionnaire and keeping the responses confidential. While conducting the individual interviews with the selected respondents, they were assigned fictitious generic names for use in their description and reporting the results. All of the data relating to the questionnaires is kept in a secure cloud based storage, and the physical copies in a secure location. The data will be destroyed after a reasonable period of time. Participants have been advised that their confidentiality will be ensured and that copies of the research will be disseminated to the professional community, as well as to the Head of the Department.

3.10 The Role of the Researcher

The involvement of the researcher in data collection for this dissertation differs between the quantitative and qualitative styles. In the quantitative research portion, the researcher administered the survey via the supervisors and undertook the analysis of the data using rigorous statistical analysis techniques. In the qualitative research portion, the researcher had a more participatory role to play as the interviews were conducted face-to-face. The researcher is an employee of the IT Services Directorate within the KwaZulu-Natal Department of Education and has thus been exposed to many of the challenges identified during the research. Additionally, relationships with the interviewees already existed, and this could have skewed the statements to what the interviewees anticipated the researcher wanted to hear. The interpretation of the data is also potentially affected by any existing biases which the researcher may have, despite attempts to be completely objective. Acknowledging this, all findings were strictly limited to themes identified by the interviewees and attempts were made to use specific statements that were made by the interviewees.

3.11 Summary

Chapter 3 has dealt with the structuring of the research for this dissertation. A mixed method research approach was taken based upon a simultaneous quantitative and qualitative approach. Each part of the approach was designed to target different sources of information. The quantitative portion was aimed at specifically HR and Finance system users and the information which was being sought revolved around the current attitudes and use of ICT in the Department, as well as looking at the infrastructure of ICT and the challenges, both internally and externally, which impact on the implementation of ICT. The qualitative portion targeted key decision-making officials in the Department. Firstly, management from within the three priority ICT sections; namely IT Services, ICT & MST, and EMIS; and secondly management from both HR and Finance. This was done in order to deep dive into the experiences of these key officials to understand how the Department is currently functioning with regard to ICT, as well as the specific challenges which are being experienced daily. These interviews were then recorded and transcribed, and a thematic analysis performed on them, whilst the data from the quantitative questionnaires was consolidated and analysed. The results from these two analyses are presented in the following chapter.

CHAPTER 4.   PRESENTATION OF RESULTS

4.1   Introduction

Rich data resulted from the semi-structured interviews which were held with key officials in the KZN Department of Education. The interviews were recorded, transcribed, and analysed for common themes and trends. Thereafter the individual themes were combined and recorded below. Wherever possible the exact wording was retained, the researcher merely rearranged statements and sentence construction to ensure meaning and sense was retained. The transcripts are attached in Annexure A. The questionnaire data was also aggregated in order to analyse the statistical meaning behind the responses, this was done using Microsoft Excel. Descriptive statistics were garnished through the Data Analysis function within Excel, and graphical representations of the data created. The quantitative data, including each statement's response analysis is included in Annexure B. The questionnaire responses themselves have been retained. Annexure D contains a copy of the questionnaire and interview protocol used.

4.2   Qualitative Results – Theme Analysis

4.2.1   SITA

SITA is the outsourced partner; however are a part of government. Outsourcing to SITA was mandatory as a result of the SITA Act however according to respondent 1; SITA's house is not in order. It doesn't effectively provide the needed skilled services and their pricing is inflated. There is a tendency for SITA to predominantly outsource a large portion of services to third parties. Training has also not been a particular focus of SITA's and is an area which the Department is focusing on more. According to respondent 5, the Department also relies upon SITA to do ICT procurement and project management and due to the shortages in staffing SITA is also performing the role of webmaster.

There are currently Service Level Agreements in place with SITA, but these are being reviewed in order to give the Department better services and more recourse if services are not delivered. Issues that have been identified, by respondent 5, include SLA reports that need to be more detailed, services that are being compromised due to SITA human resources being shared between too many Departments, and a SITA procurement process that introduces significant delays. The final comment by respondent 5 on the matter was that there is a need for SITA to begin performing more of an advisory role as a strategic partner. It is envisioned that SITA can engage via the IT Services Directorate, with all Departmental business units, to help enhance performance and overcome challenges.

4.2.2 Human Resources

Staff shortages have been a key element of all the interviews, and force more reliance on SITA. Further the lack of skills within the Department is also, according to respondent 5, forcing a greater reliance on SITA, but as was mentioned by respondent 1, SITA's house is not in order either. Critically there are insufficient project management skills to drive e-Governance initiatives as well as no staff to handle website updates internally. The organogram which was devised recently did not cater for ICT, according to respondent 3, however it is being reviewed now. There is an intention to provide IT support technicians at District level and a desire to use internal IT specialists to the full, particularly in system development, however, respondent 3 acknowledges that it is understood that additional staffing is needed to achieve this. At this moment in time, respondent 3 states that there is a process underway to eliminate duplicate and unnecessary posts and to move those posts to areas like ICT, however there is no participation in this process from ICT components. What is concerning is that, according to respondent 1, unqualified people are being employed into key vacant post both in Head Office and at District level, whilst within the ICT components the functions and roles continue to grow rapidly but the staffing structure of the components is not keeping pace.

Systems for leave management as well as recruitment and selection are needed. Users are open to the introduction of new systems, according to respondent 3, however training is needed. Respondent 1 highlights the fact that staff at EMIS has to learn on the job how to use a SQL instead of Access database. Moving forwards there is a need to train people on big data and the use thereof. At the school level there is almost a complete lack of support. According to respondent 4, it is not part of the SITA services and there appears to be a lack of intergovernmental cooperation, as one of the purposes for creating small business ICT incubators was to ultimately provide ICT support in rural areas and schools. Personnel need to be skilled to understand the importance of capturing data regularly and accurately, and in the use of SASAMS and EMIS. As it is, according to respondent 1, there is a lack of commitment from principals to attend training, preferring instead to send admin staff who don't understand the full school picture properly. One of the issues stemming from schools is the accuracy of the EMIS data, some of which is thought to potentially be a deliberate misrepresentation of school learner numbers to obtain additional funding. Respondent 2 highlights that at the end of the

day, meeting the basic expenditures of the Department has to take priority, for example paying the existing salaries, and so financial constraints are taking a larger importance in this picture.

4.2.3 Finance

Budgetary constraints have been mentioned in almost every interview, in general most account these constraints as the root cause behind the lack of ICT project implementation and training. At present there seems to be no money at all, especially for buying all schools a computer, which is needed for SASAMS data capturing for EMIS. Historically, according to respondent 3, when the funds were available back in 2008 the Department chose to prioritise employment of teachers, instead of investing in ICT infrastructure as did the Gauteng Province. This decision has had long lasting effects as it also created the current salary burden that continues to hinder budget availability. Compounding this is that budget in all public sectors has had to be cut across the board.

There is some hope however, according to respondent 2. ICT is one of the key pillars this year and so is one of the initiatives which Treasury is being approached for additional budget. There is budget set aside for this year, according to respondent 2 for improving the ICT capability within the Department, as well as for training so some progress should be possible. Discussions have suggested that budget can be made available for key priority initiatives, however identifying these to the decision makers may be a challenge in itself.

4.2.4 Management buy-in

ICT is being prioritised now as a result of government's initiative to get most schools connected, according to respondent 1. Management support is crucial in order to communicate effectively an understanding of how IT can enhance service delivery, but more than that, the processes involved in obtaining project approval are so time consuming, that without management's intervention, delays on significant projects could stretch into years, according to respondent 5. IT needs to be seen as strategic partners of the various business units and management need to ensure that all IT related projects are channelled through the correct structures to ensure alignment.

It appears that management are not unilaterally aware of the ICT strategy and the initiatives contained therein, nor the benefits of implementing them, this is partially because the strategies have not been effectively communicated to them. There is an ICT Steering Committee, according to respondent 5, however it is not feeding in at a strategic level within the

Department as it has not been elevated sufficiently. There is a breakdown in communication between the business units and management, whereby it is perceived that management doesn't understand what needs to be done. Ideas, according to respondent 1, are being generated at lower levels however there seems to be a lack of traction for these ideas and no response from management. This is evident where despite a policy being ratified on e-Learning, which is aligned with white paper 7 (Department of Education, 2004), the content has not been communicated effectively enough to ensure a common definition, according to respondent 4, of what e-Learning and e-Content is. Furthermore, changes to the way in which the Department does a number of things, such as procuring computers, needs to be discussed at a strategic level in order to re-evaluate best practice and cost effectiveness, yet facilitating this conversation seems challenging in itself.

4.2.5 Governance

One way to facilitate the necessary conversations and ensure alignment of the strategy is through the appropriate governance structure. There are a number of ICT related business units however there seems not to be sufficient consolidation. Other business units within the Department are, according to respondent 5, not involving IT in the development and procurement of systems at a strategic level. Proper governance will help to correct that however without the proper governance structures in place, the high level conversations around e-Governance and e-Learning are not happening with any degree of effectiveness. Respondents 1, 2, and 3 have even stated that there are no e-Governance initiatives in the Department currently.

An ICT Steering Committee exists in the Department, but is not meeting regularly. A proper governance structure has not as of yet been created and as a result, ideas are not reaching management and management decisions are not reaching staff. Without appropriate governance, discussions around ICT, such as how to procure ICT equipment, may not be effective in arriving at robust decisions. Proper governance is needed to communicate the IT strategy, according to respondent 5, as ineffective/insufficient governance structures prevent effective alignment of ideas with top management. At present there is no IT representation at strategic meetings.

The National government is developing systems for adoption by all provinces, however extensive delays in delivering on these systems, according to respondent 3, frustrate the process and cause some provinces to go their own way, whilst others like Education are forced

to continue relying on paper-based systems. The EMIS system was developed nationally and cascaded to provinces, but this was done without the involvement of the provincial IT sections, according to respondent 5, which has created some system integration challenges. Inter-governmental functionality is also lacking, in respondent 4's opinion, particularly around the creation of incubation centres which will offer support to schools. The Provincial Government Information Technology Officer Council provides a platform for standardisation and synergy within the province, however there is a lack of integrated systems despite the intentions of the PGITOC, according to respondent 5.

Often quite contradictory statements resulted from the questions, for example, respondent 2 stated that EMIS is building up the e-Governance collection of data in terms of the schools whilst respondent 1 indicated that EMIS is not being involved in e-Governance initiatives at all. Additionally respondent 4 suggested that the overall governance is centralised and that there is a need for a change to an in-house support structure as each Department's needs and functions are completely different. As can be seen information is not flowing throughout the Department causing these misalignments and confusion.

4.2.6   Information Flow

Human Resources wants to convert to ICT driven kind of processes over the next 5 years, according to respondent 3, however no central IS exists yet to consolidate data. The Department also needs a Business Intelligence portal, as per respondent 2, for accessing the data. A dashboard is being planned for development with EMIS for school and learner information, however this and other information is not cascaded down to IT, so alignment and support of these types of strategic initiatives is impossible, according to respondent 5.

The data being kept in the EMIS system is questionable due to the connectivity challenges and because it doesn't really link up with any of the existing systems, according to respondent 5. Furthermore the lack of ID numbers of some students at school brings the data into question, according to respondent 1, as this makes verifying the existence of a student via ID number impossible. This leaves the system open to misrepresentations of the number of learners, done primarily to obtain additional funding. There is also a lack of understanding of the EMIS capturing requirements and fields, which impacts on the data quality received.

The data flow around the EMIS system is also very cumbersome, according to a number of respondents. EMIS information is requested by a number of sections in the Department and

reports have to be manually run each time and then emailed to the recipients. Physical inspections at schools are often needed to collect and verify data, additionally this data has to be captured onto physical CDs and manually collected.

4.2.7 Policy

There is no single consolidated strategy for IT, ICT&MST, EMIS etc. according to respondent 2. The strategies of other ICT related business units are not shared. There is an IT Strategy in place as well as the Corporate Governance of ICT Policy Framework, according to respondent 5, which is aligned to the DPSA policy framework. The IT Strategy was developed in light of the current infrastructural needs and prioritised accordingly however lengthy project approval processes hinder ICT initiative implementation.

The current SLA with SITA is being reviewed and a Microsoft Enterprise Agreement is in place. Respondent 4 indicated that a policy on the donation of computers to schools is needed. The financial policies within the Department may not be aligned with current best practice and may not be the most cost-effective solution either. No EMIS update policy is in place to enforce school capturing and uploading and according to respondent 1, the policy for EMIS still needs to be approved in order to enforce school capturing activity.

There is no standard for ICT within schools, according to respondent 4. The Department has developed a standard but it is constantly in need of updating due to changing environments and changing best practices. The policy on e-Learning was only recently ratified at the Education Summit however there remains no shared definition on what e-Learning. There is, however also an e-Learning strategy within the Department.

4.2.8 Infrastructure

When it comes to ICT there is a lack of the basics, or the basics that are had are not adequate, according to respondent 3. Respondent 4 highlights that the penetration of computers within the administration is 100% however penetration of computers within schools is less than 33%. There's insufficient bandwidth and a need for a centralised data warehouse to be created in order to consolidate information. The systems which are developed often don't function well, according to respondent 3, because the servers aren't functioning the way they should, additionally staff are forced to use old obsolete computers.

At the level of schools a number of challenges exist, the telecommunications infrastructure is not sufficient to support e-Learning, according to respondent 4, and the computer refresh rate

at schools, according to respondent 1, is not sufficient to maintain their ICT functionality over time. Government instructed that all computers being replaced should be directed to schools; however the maintenance of these generally extremely old machines is a significant cost burden for the schools and so, in the opinion of respondent 4, not a feasible solution. Additionally once ICT equipment is delivered to schools it is often stolen as a result of weak security infrastructure and measures.

The MEC has come out in support of the use of ICT as a platform so there is hope that with this champion more gains can be made, according to respondent 2.

4.2.9 Change Management

Evidence, from respondents 1 and 5 suggests a challenge in handling change management effectively. The EMIS system at Head Office is running on SQL server; however the historical data is in MS Access still, whilst at school level the database has also remained in MS Access. Issues around change management become more important as initiatives start gaining traction.

4.3   Quantitative Results

4.3.1   Question 1: ICT enables me to accomplish tasks more quickly
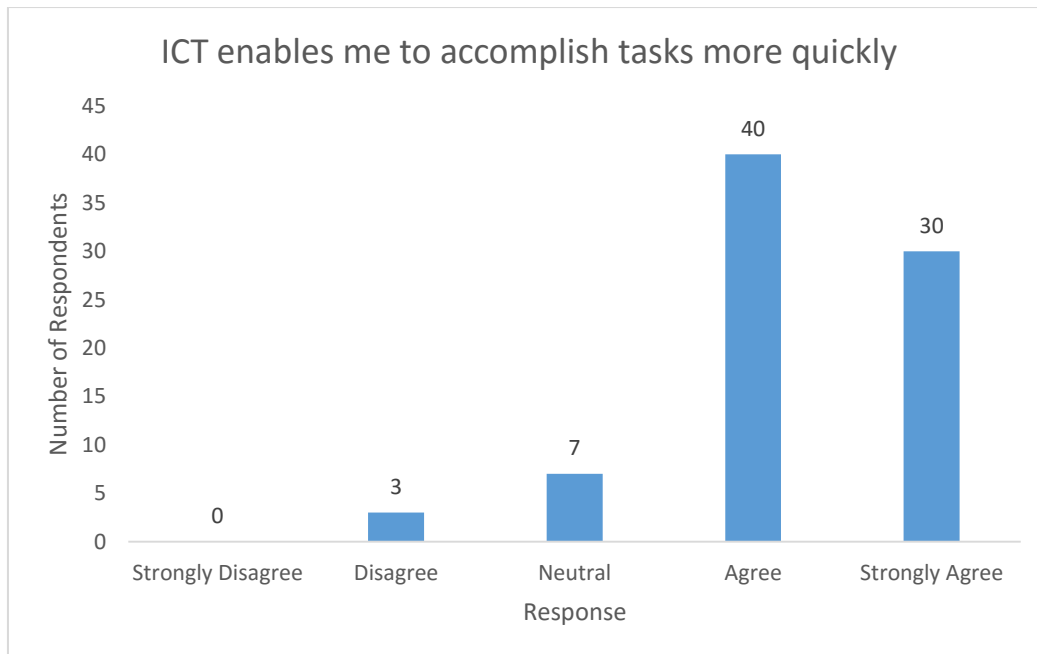
Figure 6: Graph - ICT enables me to accomplish tasks more quickly

Figure 6 shows clearly that the vast majority of respondents would agree with the statement that ICT enables them to accomplish more quickly. The implications of this are that people are more likely to make use of ICT systems or equipment if they believe that doing so will help complete tasks more quickly. Drawing on information from Table 2, below, the sample mean was 4.2125 and it can be said with 95% certainty that were this question asked of the entire population within the Department that the average response would lie between 4.04 and 4.38 which strongly indicates that the majority of staff would agree with this statement. Of note is the 3 respondents who disagreed, which implies that for them, ICT delays accomplishing tasks. Possible reasons for this may be related to failing infrastructure, or lack of training, and possibly change management related ultimately.

Table 1: Statistical Analysis of responses to Question 1

	Question 1
Mean	4.2125
Standard Error	0.084744123
Median	4
Mode	4
Standard Deviation	0.757974483
Sample Variance	0.574525316
Kurtosis	0.963763539
Skewness	-0.915321907
Count	80
Confidence Level(95,0%)	0.168678958

4.3.2   Question 2: Using ICT improves my job performance
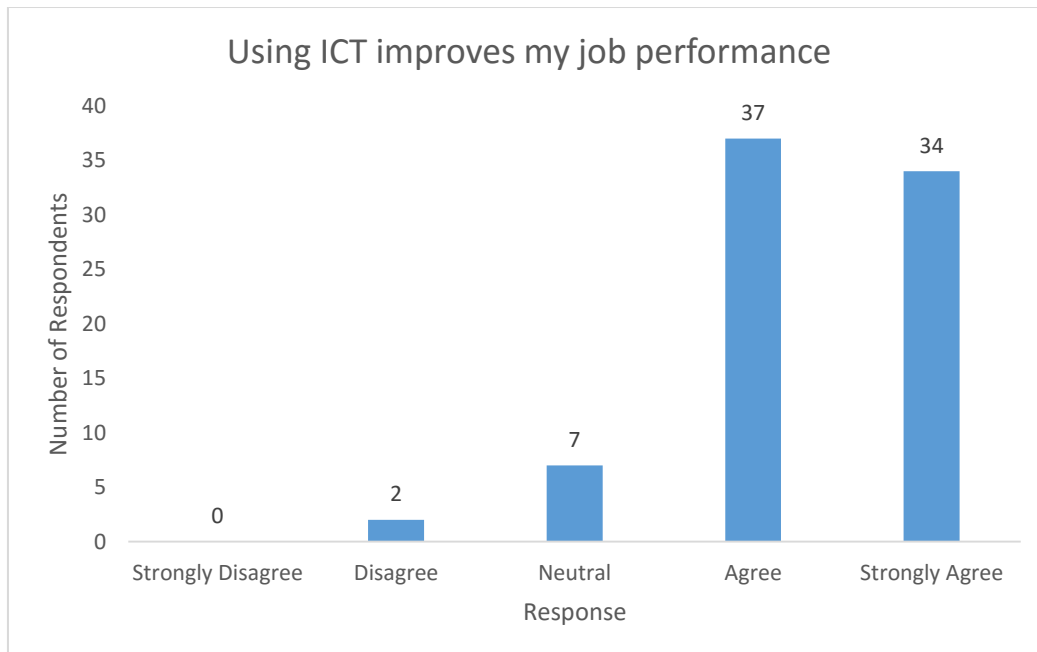
Figure 7: Graph - Using ICT improves my job performance

Figure 7 illustrates strongly that respondents to this question believe that ICT improves their job performance. As opposed to merely speeding up the completion of tasks this question also contains an element of quality for tasks completed with ICT. In fact agreement with this statement exceeds that obtained in the previous question, with the sample mean being 4.2875, see Table 3 below. The confidence interval for 95% certainty is a response between 4.1245 and 4.4505 which strongly indicates agreement with the statement. In this response only 2 disagrees were received, this means that at least one person believes that ICT improves job performance yet doesn't enable tasks to be accomplished quickly. This could well be a reaction based on failing ICT infrastructure whereby tasks are taking longer due to functionality issues, but as a whole being able to use ICT does improve performance.

Table 2: Statistical Analysis of responses to Question 2

	Question 2
Mean	4.2875
Standard Error	0.081895561
Median	4
Mode	4
Standard Deviation	0.732496166
Sample Variance	0.536550633
Kurtosis	0.820638917
Skewness	-0.907105293
Count	80
Confidence Level(95,0%)	0.163009037

4.3.3   Question 3: Using ICT increases my productivity
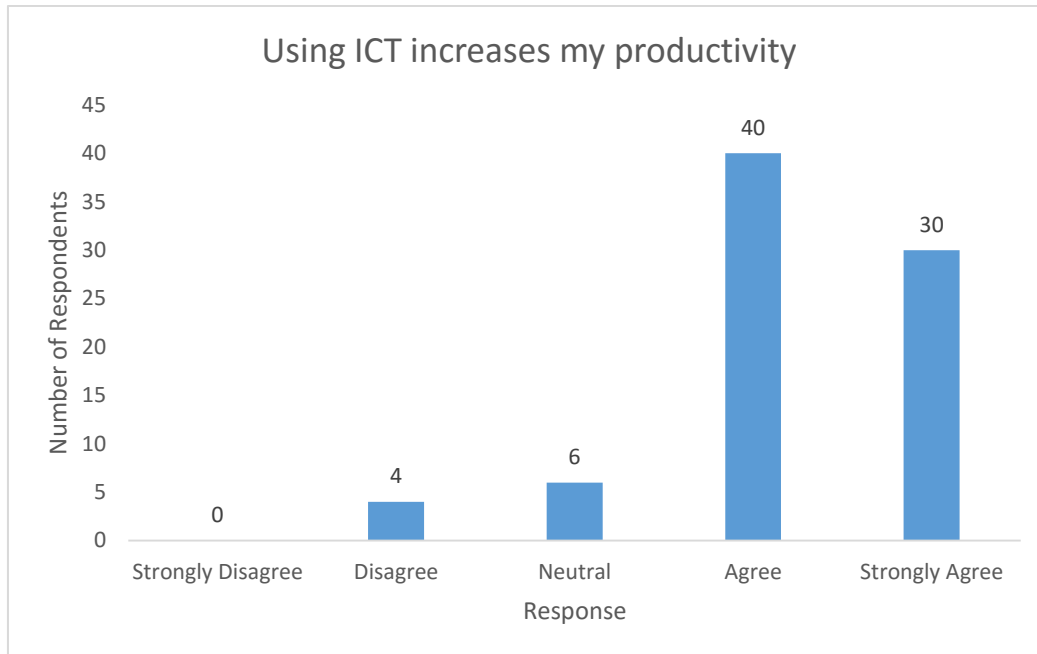
Figure 8: Graph - Using ICT increases my productivity

With a mean of 4.2, see Table 3 below, and a 95% confidence level that the mean of the entire population would fall between 4.03 and 4.37, these results further support indications from the previous question responses that the staff do acknowledge the benefits of using ICT. The specific nuance to this question is the element of productivity, not just about speed or quality, but the notion of effectiveness in the workplace or the rate of output per unit of input.

Table 3: Statistical Analysis of Responses to Question 3

	Question 3
Mean	4.2
Standard Error	0.087872174
Median	4
Mode	4
Standard Deviation	0.785952619
Sample Variance	0.617721519
Kurtosis	1.123739872
Skewness	-1.014022346
Count	80
Confidence Level(95,0%)	0.174905187

4.3.4 Question 4: Using ICT enhances my effectiveness on the job
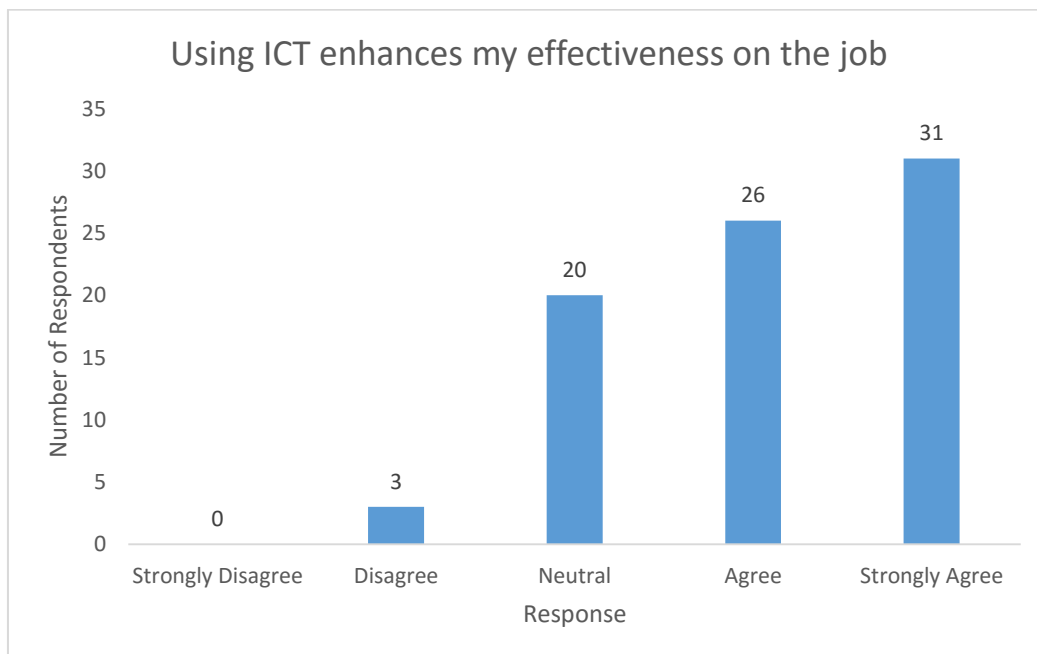
Figure 9: Graph - Using ICT enhances my effectiveness on the job

This statement elicited a far flatter response, as can be seen by the graph above, and the Kurtosis and Skewness factors in Table 4 below. The mean has still remained around a 4 meaning that staff are agreeing with the statement, however the confidence interval is slightly wider in order to maintain a 95% confidence level, not enough to change the overall response however. What it does indicate is that there is more uncertainty as to whether ICT enhances "effectiveness" which can be defined as being the degree to which something is successful in producing a desired result.

Table 4: Statistical Analysis of Responses to Question 4

	Question 4
Mean	4.0625
Standard Error	0.099593716
Median	4
Mode	5
Standard Deviation	0.890793275
Sample Variance	0.793512658
Kurtosis	-0.867657169
Skewness	-0.455012971
Count	80
Confidence Level(95,0%)	0.198236333

4.3.5   Question 5: Using ICT makes it easier to do my job
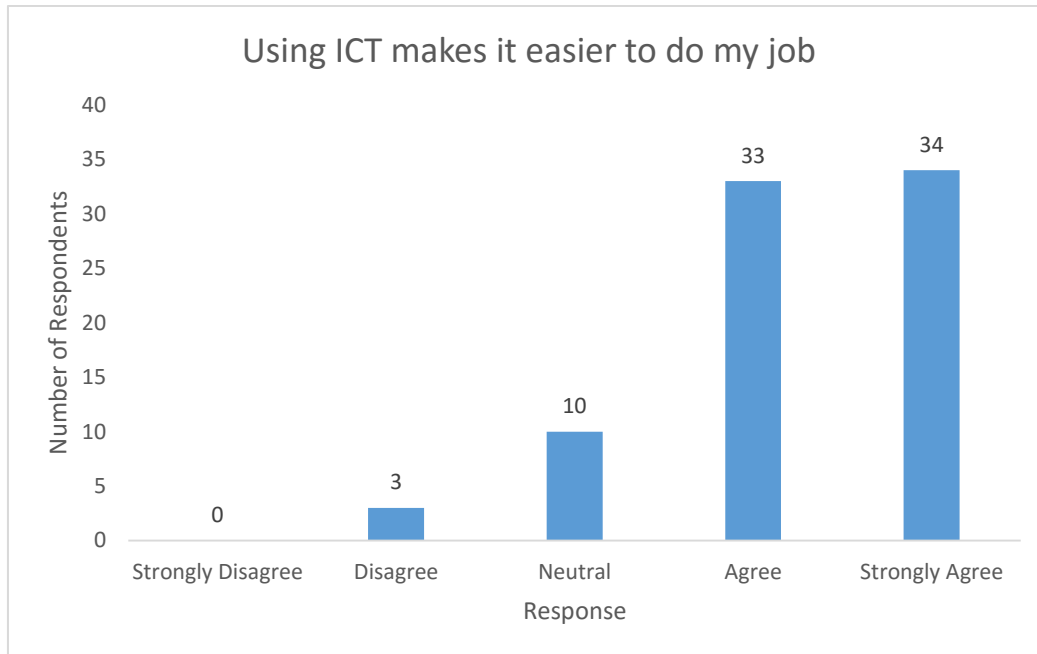
Figure 10: Graph - Using ICT makes it easier to do my job

Adoption of ICT in an environment where ICT is viewed as making it easier to do your job is far more consistent. With a mean of 4.225 and confidence that the average response from the entire population will lie between 4.045 and 4.405 there is a significant agreement with the statement and therefore acceptance of ICT by staff should be high.

Table 5: Statistical Analysis of Reponses to Question 5

	Question 5
Mean	4.225
Standard Error	0.090663867
Median	4
Mode	5
Standard Deviation	0.810922275
Sample Variance	0.657594937
Kurtosis	0.305992893
Skewness	-0.875914234
Count	80
Confidence Level(95,0%)	0.180461912

4.3.6 Question 6: Overall, I find ICT useful in my job
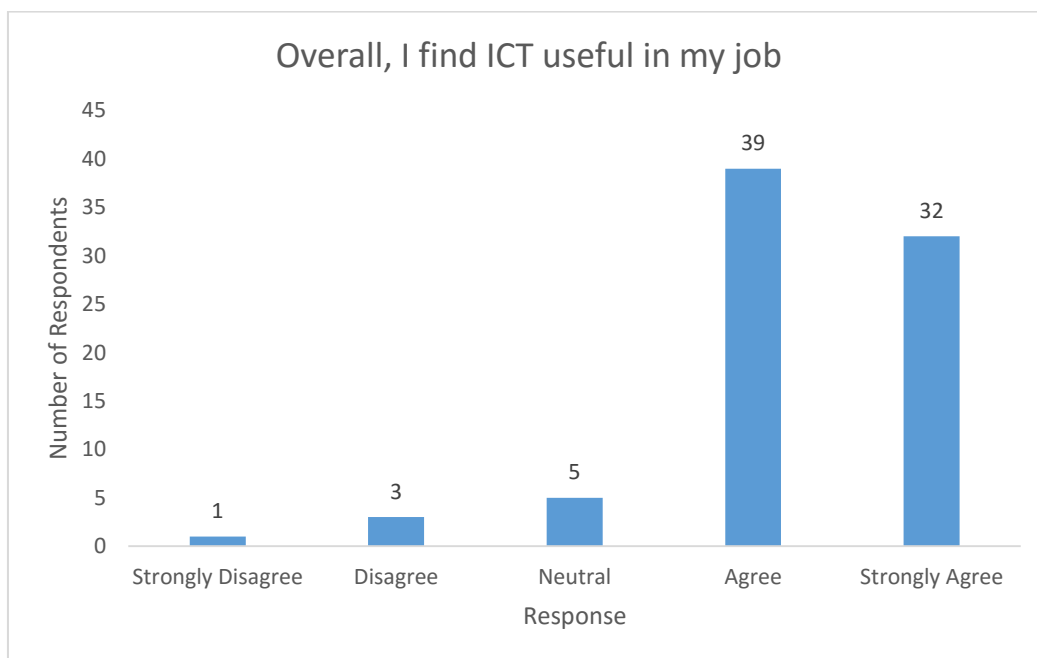
Figure 11: Graph - Overall, I find ICT useful in my job

The usefulness of ICT is about more than just the attitude of staff to ICT, but includes an element of matching the available ICT systems and tools to the requirements of the staff member. The general consensus in the responses is that of agreeing that ICT is useful in their jobs, with a mean of 4.225 and a 95% confidence interval of 4.041 to 4.409, agreement is clear. What is concerning are the Disagree and Strongly Disagree responses. Although these could also relate to infrastructure challenges, there is also a possibility that there's a strategic mismatch and that the ICT systems provided are of no use for a specific job function.

Table 6: Statistical Analysis of Responses to Question 6

	Question 6
Mean	4.225
Standard Error	0.092392599
Median	4
Mode	4
Standard Deviation	0.826384531
Sample Variance	0.682911392
Kurtosis	2.874242162
Skewness	-1.410837574
Count	80
Confidence Level(95,0%)	0.183902869

4.3.7 Question 7: Learning to operate the computer/system is easy for me
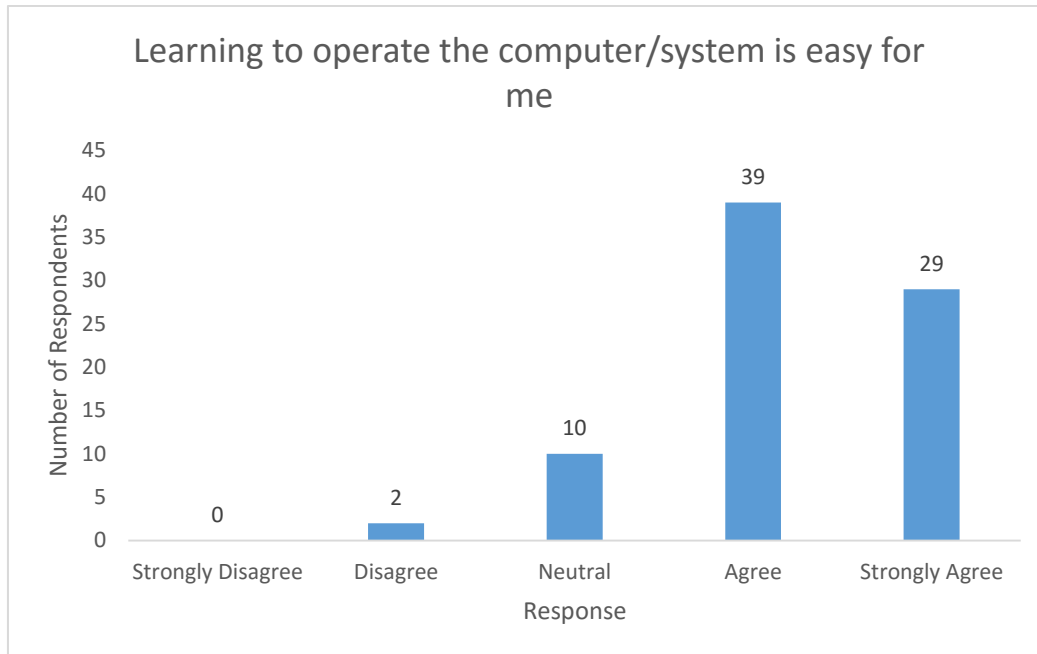
Figure 12: Graph - Learning to operate the computer/system is easy for me

Learning to make use of new technologies and systems is critical in the adoption process. These responses are an indication of the uptake speed that can be expected when introducing new ICT initiatives into the environment. Whilst most agree that learning to operate the computer/system is easy, with a mean of 4.1875 (Table 7 below) and a confidence level of 95% for 4.021 to 4.3535 the response is clearly above an "Agree" of 4, there remains a fair spread. The 29 "Strongly Agree" responders would probably fall into a category of early adopters, with the bulk "Agree" responders beginning to use new technology with only a small amount of training. The Neutral responders would probably need extensive training to be able to use the system effectively, whilst the "Disagree" responders will struggle for the longest time and require the most attention in order to make the change.

Table 7: Statistical Analysis of Question 7

	Question 7
Mean	4.1875
Standard Error	0.083616344
Median	4
Mode	4
Standard Deviation	0.74788732
Sample Variance	0.559335443
Kurtosis	0.3036209
Skewness	-0.694663436
Count	80
Confidence Level(95,0%)	0.16643417

4.3.8   Question 8: I find it easy to get the computer/system to do what I want it to do
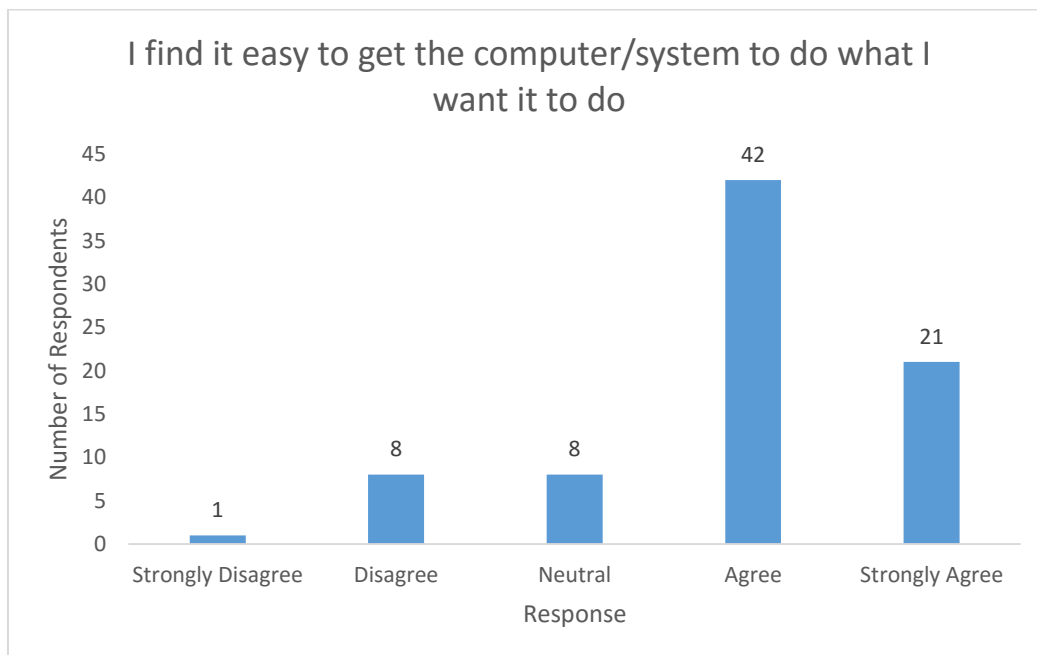
Figure 13: Graph - I find it easy to get the computer/system to do what I want it to do

This question demonstrates a measure of the active computer skills of the staff. The majority of staff (42 of 80) fall under the Agree category which would probably indicate a fair competency with computers. 21 respondents are what could be termed "power users", those people with above average computer related ability. The mean for this question is lower than all the previous questions at 3.925 which suggests that a key issue could be the ability of staff to utilise ICT effectively in the current environment, particularly in light of 8 Disagree responses and 1 Strongly Disagree. This strongly suggests a need for training and empowerment of staff to use ICT within the workplace.

Table 8: Statistical Analysis of Question 8

	Question 8
Mean	3.925
Standard Error	0.104903512
Median	4
Mode	4
Standard Deviation	0.938285536
Sample Variance	0.880379747
Kurtosis	0.70550892
Skewness	-0.979429658
Count	80
Confidence Level(95,0%)	0.208805218

4.3.9 Question 9: Usage of the computer/system is clear and understandable
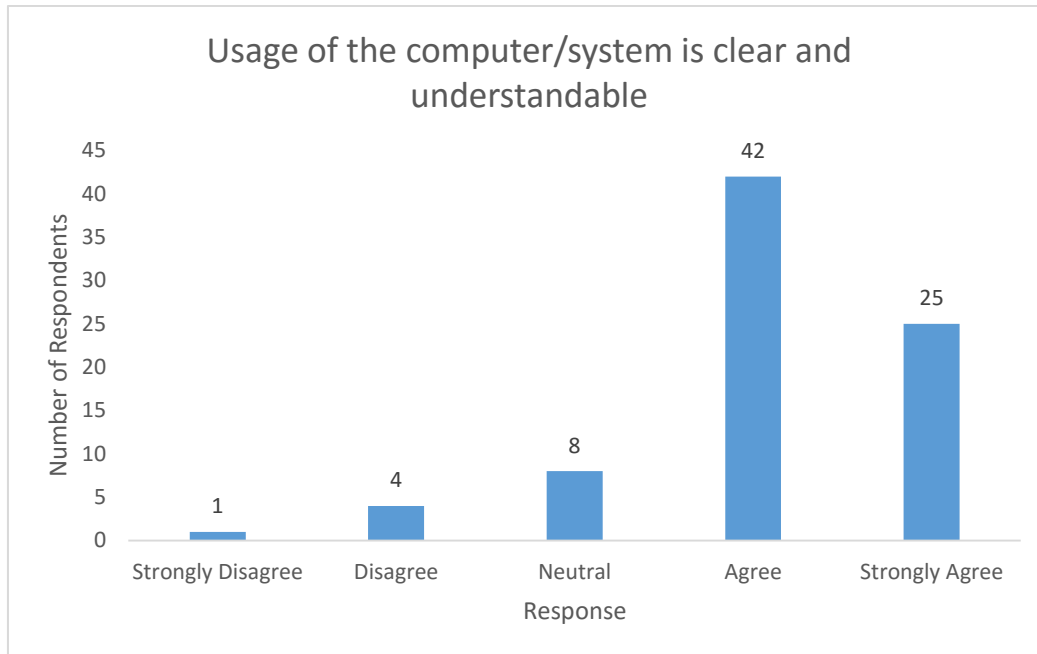
Figure 14: Graph - Usage of the computer/system is clear and understandable

This question is a measure of how well staff understand the computers and systems in the Department and how to use them. On the whole, the majority of system users do find the systems clear and understandable, demonstrated by a mean of 4.075 (see Table 9 below) and a 95% confidence interval of 3.8851 to 4.2649. It does seem, indicated by the 1 Strongly Disagree and 4 Disagree responses that there are some staff that still find ICT systems difficult to understand and therefore use.

Table 9: Statistical Analysis of Question 9

	Question 9
Mean	4.075
Standard Error	0.09542543
Median	4
Mode	4
Standard Deviation	0.853510992
Sample Variance	0.728481013
Kurtosis	1.837911364
Skewness	-1.148062208
Count	80
Confidence Level(95,0%)	0.189939567

4.3.10 Question 10: I find it cumbersome to use the computer/system
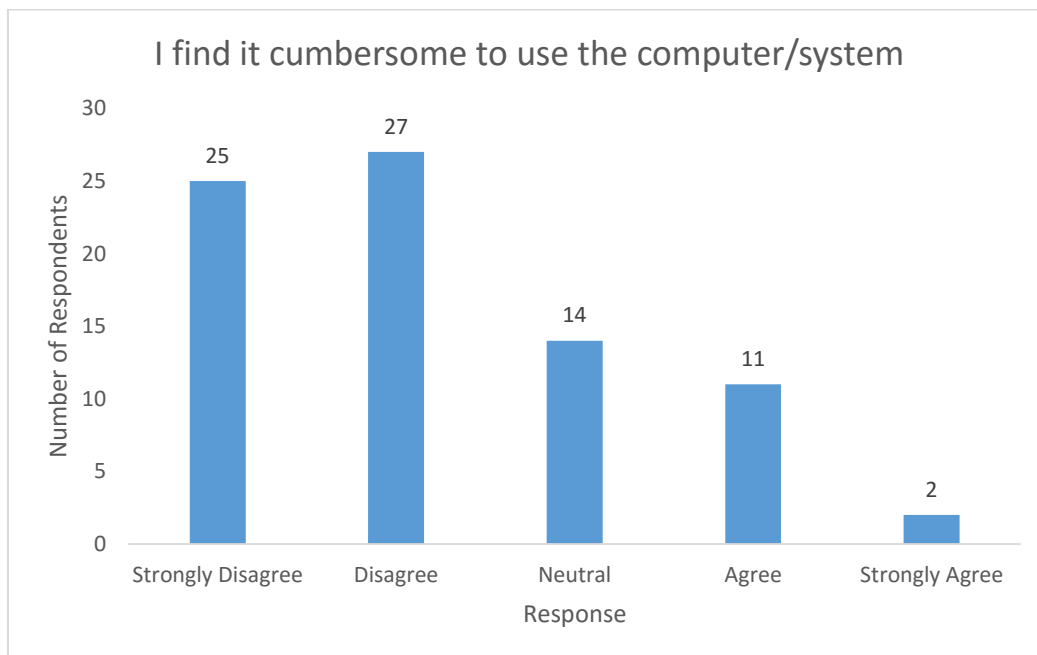
Figure 15: Graph - I find it cumbersome to use the computer/system

This question raised directly the issue raised previously in a positive light. It also serves as a check question to ensure that respondents are answering thoughtfully. The wording of the question also has an impact on the way in which the respondents perceived it, a positive question elicits more positive responses, whilst a negative more negative responses. In this case, there is still a strong indication that staff do not find computers and systems cumbersome, however there are proportionally more responses indicating either a neutral response or agreement with the statement. With a mean of 2.1875, the overall response is still aligned to a disagreement with the statement, however for a 95% confidence level, the interval is also far broader, from 1.934 to 2.44, which is not too short of beginning to be considered closer to a neutral response.

Table 10: Statistical Analysis of Question 10

	Question 10
Mean	2.1875
Standard Error	0.127157022
Median	2
Mode	2
Standard Deviation	1.137326979
Sample Variance	1.293512658
Kurtosis	-0.484157337
Skewness	0.573552825
Count	80
Confidence Level(95,0%)	0.253099721

4.3.11 Question 11: It is easy for me to remember how to perform tasks using computer/system
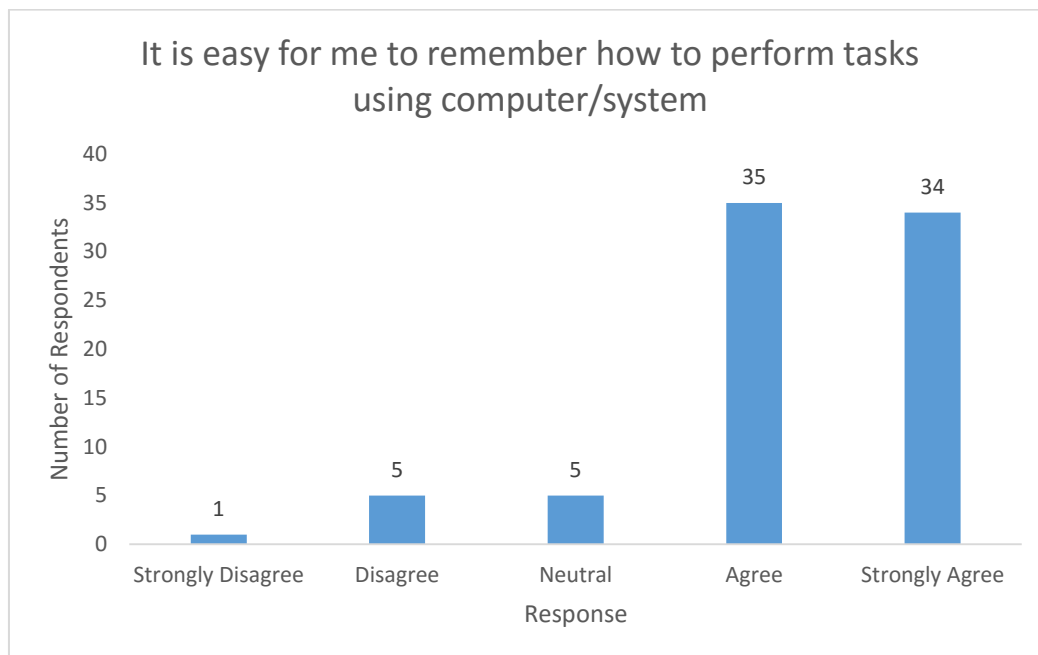
Figure 16: Graph - It is easy for me to remember how to perform tasks using computer/system

This question has a measure of repetitiveness to it. How well can staff members repeat computer or system related tasks? This gives an indication as to the expected usage of a system after training and having been present in the environment for some time. The 6 responses which account for "Disagree" and "Strongly Disagree" is of some concern for the Department as it suggests that within the key transversal system users there are people for whom using a computer or the system is a constant battle. As would be expected for staff that work daily on transversal systems, the mean response is 4.2 (see Table 11 below) with a 95% confidence interval of 4.0 to 4.4, which indicates strongly that remembering how to perform tasks using a computer/system is easy.

Table 11: Statistical Analysis of Question 11

	Question 11
Mean	4.2
Standard Error	0.101257911
Median	4
Mode	4
Standard Deviation	0.90567829
Sample Variance	0.820253165
Kurtosis	1.88290105
Skewness	-1.354753199
Count	80
Confidence Level(95,0%)	0.20154883

4.3.12 Question 12: Overall, I find the computer/system easy to use
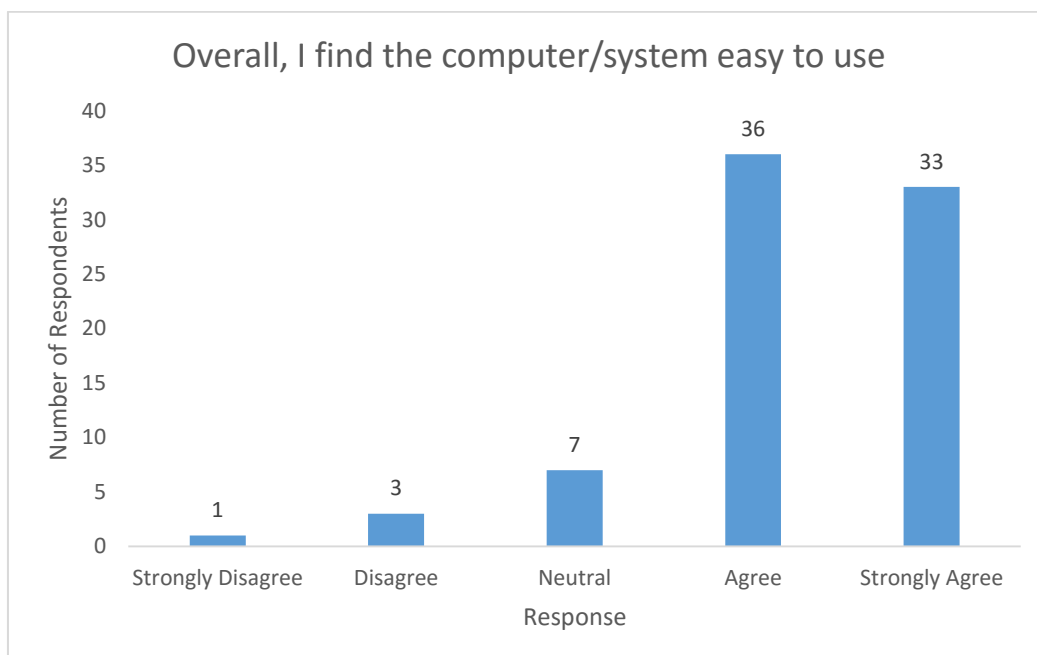
Figure 17: Graph - Overall, I find the computer/system easy to use

This is a simple measure of computer use ability. As was mentioned the sample of respondents was selected from staff that are the primary HR and Finance system users and to find any responses suggesting that they struggle to use the systems is a concern. The data does still indicate strongly that as a whole staff in the Department find computers and systems easy to use. The mean is a strong 4.2125 (see Table 12 below) with a 95% confidence level on an interval from 4.02 to 4.4.

Table 12: Statistical Analysis of Question 12

	Question 12
Mean	4.2125
Standard Error	0.095290611
Median	4
Mode	4
Standard Deviation	0.852305139
Sample Variance	0.726424051
Kurtosis	2.22156569
Skewness	-1.30747883
Count	80
Confidence Level(95,0%)	0.189671218

4.3.13 How would you categorise the Department's IT infrastructure capabilities?
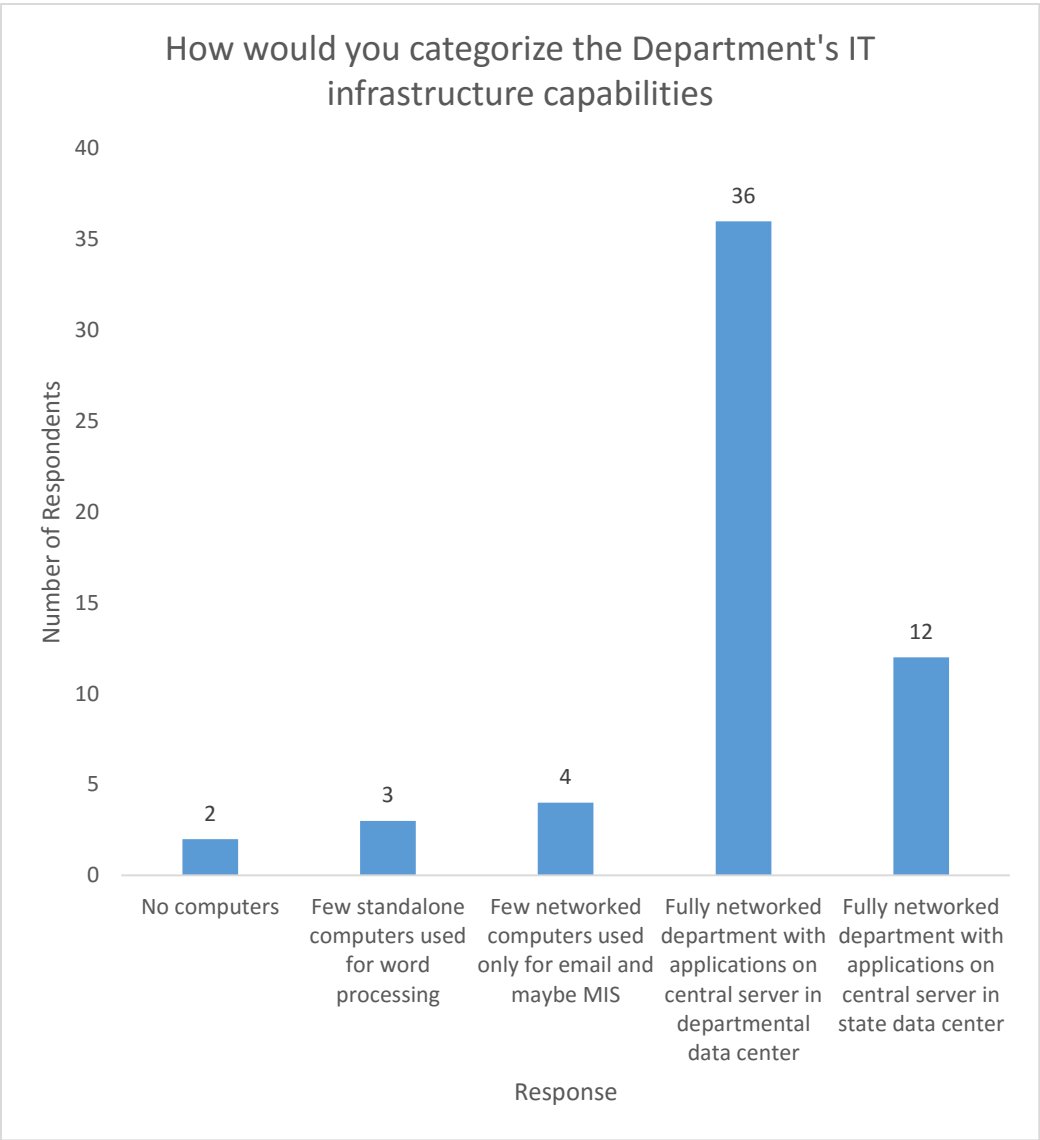
Figure 18: Department's IT Infrastructure

This question examines the current infrastructure of the Department in order to assess what core upgrades and changes are needed in order to provide a feasible platform for further implementation. There is an indication that the majority of responders consider the Department to be fully networked with applications on a central Departmental data centre, however the presence of all of the responses indicates that the environment may not be consistent across the board. It is also possible that the respondents didn't understand the terminology fully.

4.3.14 IT Penetration Ratio
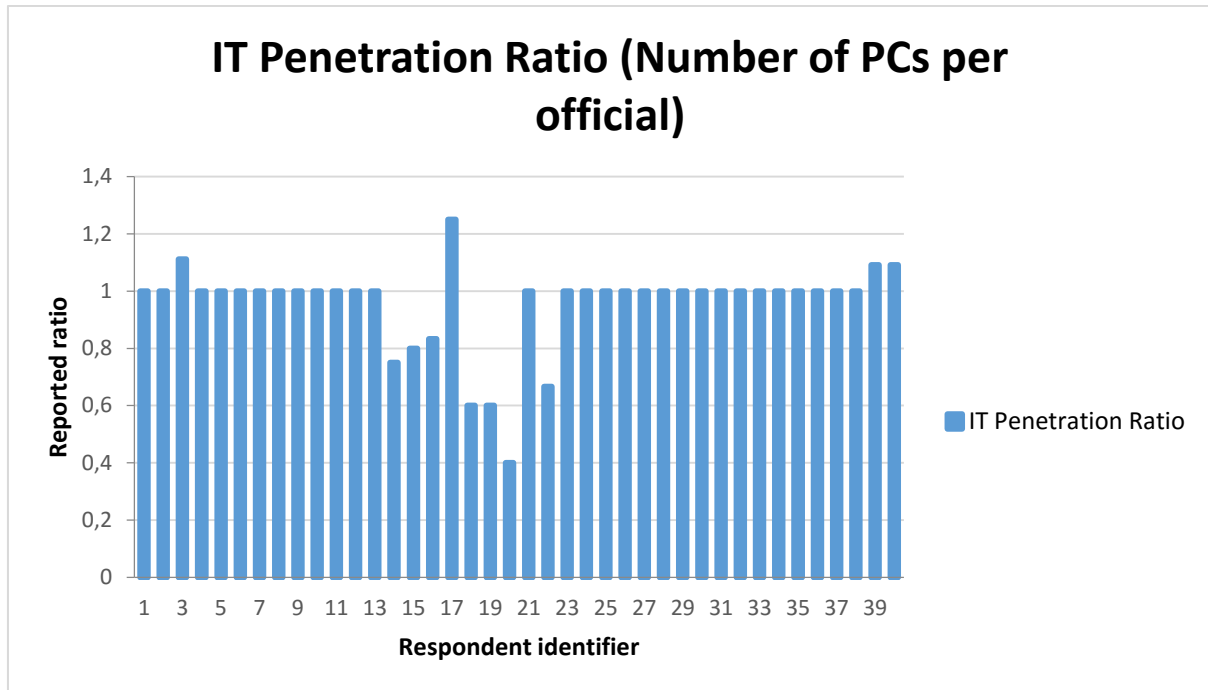
Figure 19: IT Penetration Ratio (number of computers per staff member)

The primary purpose of this analysis was to gain a picture of the KZN Department's current IT landscape at the staff level. The expected result should be a 1 to 1 ratio whereby each staff member has access to a computer. From the data this does not seem to be the case. The mean (see Table 13 below) is 0.9548 computers per staff member, which is a strong indication that the Department needs to procure computers for staff urgently. There also doesn't seem to be a consistency in how computers are allocated across the Department. The spikes shown above seemed illogical and so had to be verified, there are indeed staff who are based in two separate locations with a desktop in each. What is of significant concern for the Department is that there appear to be sections where only roughly half the staff have a computer.

Table 13: Statistical Analysis of the IT Penetration Ratio

IT Penetration Ratio	
Mean	0.954823232
Standard Error	0.024431037
Median	1
Mode	1
Standard Deviation	0.154515444
Sample Variance	0.023875023
Minimum	0.4
Maximum	1.25
Count	40
Confidence Level(95,0%)	0.049416437

4.3.15 Internal Roadblocks

Internal Roadblocks

	Funds/Grants	Infrastructure	Delivery Channels	Demand / Supply mismatch	Public Private Partnership models	Role of PGITOC / GITOC
Severity 1	3	5	2	7	5	12
Severity 2	2	1	10	11	12	7
Severity 3	6	14	10	9	12	12
Severity 4	15	9	11	10	11	5
Severity 5	41	38	35	30	26	24
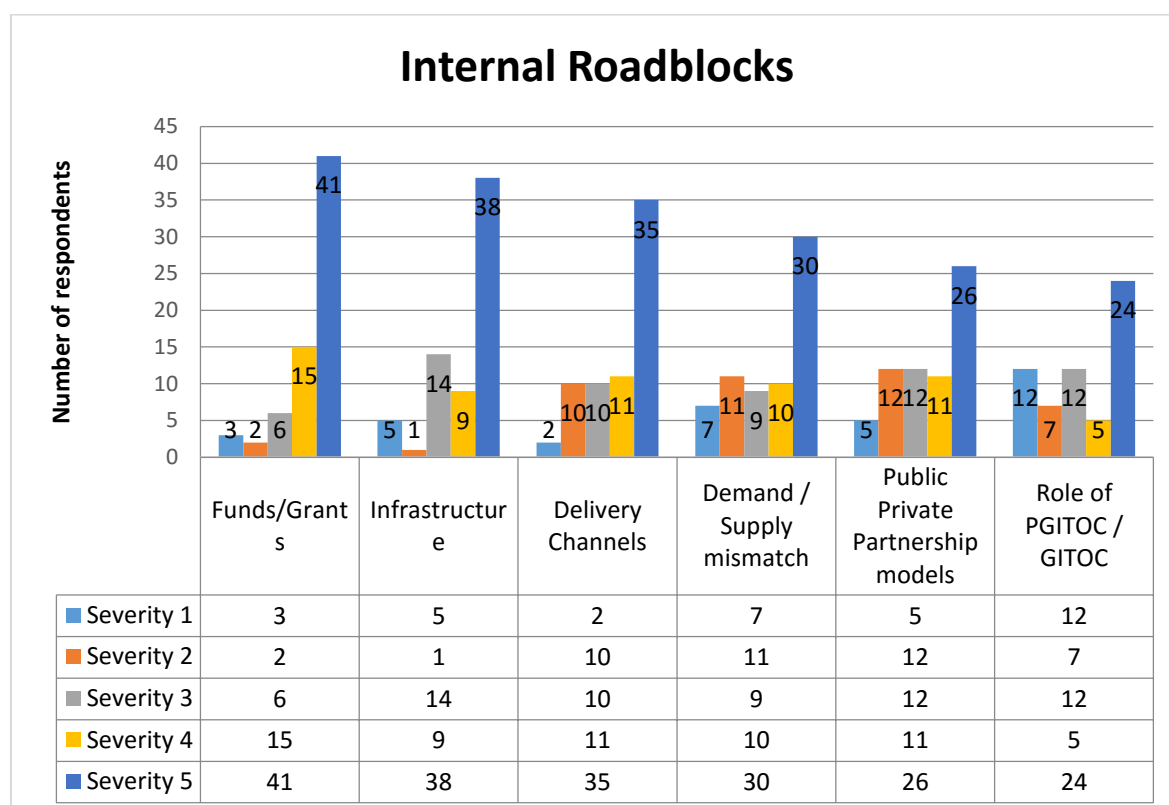
Figure 20: Internal Roadblocks & Severity

This data can be analysed in two different ways. The mode (see Table 14 below) is the most frequently occurring value in each of the data sets, and therefore is a useful indication of the perceived severity of the Internal Roadblock. The mean on the other hand is an average across all the values and therefore is a better indication of the frequency which that type of roadblock impacts on processes. So for example, Corruption with a mode of 5 is the most severe roadblock, whilst Budget Allocation has a higher mean of 3.34 which suggests that the frequency at which the budget impacts negatively on the implementation of ICT initiatives is far greater.

Table 14: Statistical Analysis of Severity Rating of Internal Roadblocks

	Lack of adequate manpower	State Policies/Acts	Inter-departmental dependencies	SCM procedures	Corruption	Accounting	Budget Allocation
Mean	3.03	2.80	2.87	3.03	2.94	2.87	3.34
Mode	3.00	3.00	2.00	2.00	5.00	2.00	2.00
Count	70.00	69.00	69.00	70.00	68.00	68.00	70.00
Confidence Level(95,0%)	0.36	0.27	0.28	0.32	0.36	0.29	0.31

Ranking the Internal Roadblocks results in the following:

- Mean

  1) Budget Allocation

  2) Lack of adequate manpower & SCM procedures

  3) Corruption

  4) Inter-departmental dependencies & Accounting

  5) State Policies/Acts

- Mode

  1) Corruption

  2) Lack of adequate manpower & State Policies/Acts

3) Inter-departmental dependencies & SCM procedures & Accounting & Budget Allocation

Additional roadblocks were also identified by a few respondents, but were not sufficient in number to add into the statistical analysis. They are nevertheless worth mentioning:

- Ineffective systems (BAS, Persal, Management systems)

- ICT equipment (old and insufficient) – this links into the earlier IT Penetration Ratio

- Insufficient network and internet access

- Inadequate skills

- Logistical issues

4.3.16 External Roadblocks
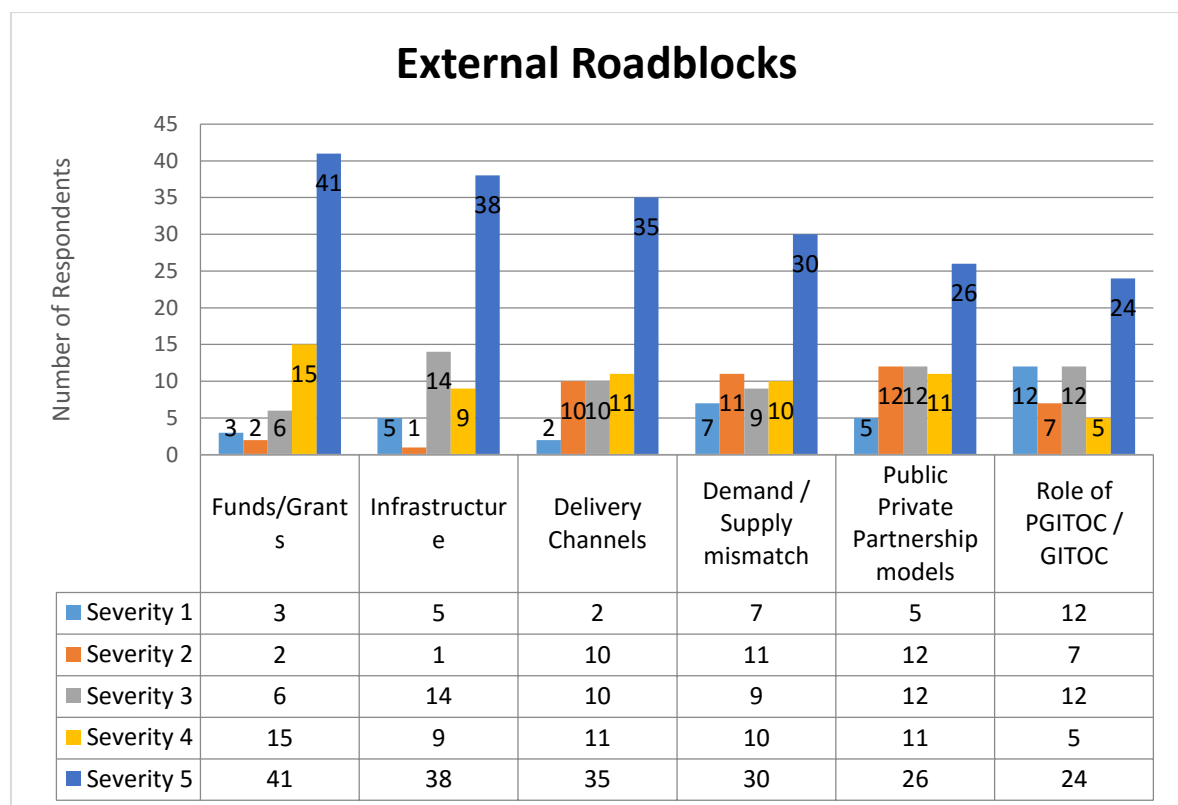
Figure 21: Graph - External Roadblocks

What is clear from this data is that the respondents all feel that External Roadblocks are significantly more severe than Internal Roadblocks. This is demonstrated in Table 15 below

where the mode, once again a measure of most common response, is set to severity rating 5 for all areas. It is also clearly visible in the graph above where the dark blue lines indicate severity rating 5. With all factors being rated predominantly with a 5 severity, the mean is the only item for comparison. Ranking the External Roadblocks on the mean obtains:

- Funds/Grants

- Infrastructure

- Delivery Channels

- Demand/Supply mismatch

- Public Private Partnership models

- Role of PGITOC / GITOC

Table 15: Statistical Analysis of Severity of External Roadblocks

	Funds/Grants	Infrastructure	Delivery Channels	Demand / Supply mismatch	Public Private Partnership models	Role of PGITOC / GITOC
Mean	4.33	4.10	3.99	3.67	3.62	3.37
Mode	5.00	5.00	5.00	5.00	5.00	5.00
Count	67.00	67.00	68.00	67.00	66.00	60.00
Confidence Level(95,0%)	0.26	0.30	0.30	0.35	0.34	0.41

4.4 Summary

The thematic analysis identified 8 primary themes within one secondary theme for noting. They were: SITA, HR, Finance, Management buy-in, Governance, Information flow, Policy, and Infrastructure, with Change Management rounding up as a footnote. Within each of these themes a number of interrelated items were presented and will be discussed further in the following chapter. Eighty respondents participated in the quantitative questionnaire. As a whole the responses were sufficient that at a 95% confidence level, the confidence interval could only relate to one response and so the mean results are deemed to be applicable to the entire population. These findings both support themes identified in the interviews, and highlight a few new challenges which need to be addressed. The following chapter will discuss and integrate these findings to establish meaning from the research.

CHAPTER 5.   DISCUSSION

5.1   Introduction

Existing literature does suggest that while substantial benefits can be gained from IT, the projects themselves are "often fraught with cost overruns and delays" and "once deployed, many systems fail to meet functional requirements or are too complex to be feasible for many organizations" (Kanungo & Jain, 2011, p. 40). Without a proper roadmap for implementation and an in-depth understanding of these obstacles; cost overruns, delays, and system complexities will over-shadow any attempts to revolutionise government. This requires an analysis on many fronts. The research performed has focussed on a number of assessment models in the preceding chapter in order to understand the obstacles which the KZN Department of Education are faced with in terms of implementing ICT.

An adaptation of the Technology Acceptance Model was employed to assess the perceived usefulness of ICT in the environment. This was done with an understanding that it is the staff perceptions which will predict the acceptance and adoption of ICT and can therefore be an indication of the level of resistance to change that will be experienced due to the nature of the change being ICT related. Secondly, an understanding was needed of the Department's Strategy for ICT, this was obtained from interviews with key officials, but also from the Department's adopted IT Strategy, which is an adaption of government's central strategy for ICT and was mandated through the Corporate Government ICT Framework as documented by the Department of Public Service Administration.

Thirdly an analysis of the Department's current environment and challenges was needed in order to understand what is impeding the planned implementations and what needed to be prioritised in order to overcome the challenges. This particular aspect is further analysed by using the IT Readiness Assessment for Government Organisations tool as developed by Yesser for the Saudi e-Government Program. The IT Readiness Assessment Tool was developed "to empower ICT managers and staff in the Saudi Public Sector with a comprehensive resource about IT Readiness with a comprehensive Assessment Methodology to guide agencies self-assessments and scoring" (Yesser, 2007, p. 6). The intentions in developing the document was for a self-assessment, however the research performed provides sufficient information to draw reasonable conclusions about the current e-Readiness state of the Department. From that point, having identified the challenges, recommendations can be made as to how to proceed effectively.

5.2   Staff Resistance to ICT – The Technical Acceptance Model (TAM)

The first twelve questions of the questionnaire came from a modified TAM assessment model as defined by Godoe & Johansen (2012). Davis et al. (1989) showed how TAM postulates that the level of usage of a computer or system is dependent on the strength of a person's intention to do so, this is called BI within the TAM model. The TAM defining characteristics are presented in the figure below:

U – Perceived usefulness – subjective probability that making use of the system will increase job performance

E – Perceived ease of use – degree to which the user expects the system to be free of effort

A – Attitude towards using – dependant on a combination of U and A

BI – Behavioural intention to use – calculated based on person's attitude (A) and the perceived usefulness (U)
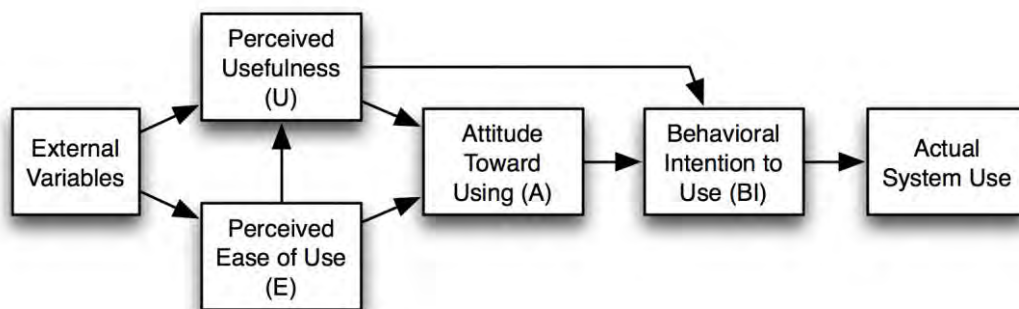
Figure 22: The TAM Assessment Model Diagram

The questions in the questionnaire were therefore categorized into two groups, perceived usefulness and perceived ease of use as is demonstrated in the table below.

Table 16: TAM Evaluation

Technology acceptance model (TAM) items		Scale:	1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree
Perceived usefulness		Mean	
Q1	**ICT enables me to accomplish tasks more quickly**	4.2125	
Q2	**Using ICT improves my job performance**	4.2875	
Q3	**Using ICT increases my productivity**	4.2	
Q4	**Using ICT enhances my effectiveness on the job**	4.0625	
Q5	**Using ICT makes it easier to do my job**	4.225	
Q6	**Overall, I find ICT useful in my job**	4.225	
Perceived ease of use			
Q7	**Learning to operate the computer/system is easy for me**	4.1875	
Q8	**I find it easy to get the computer/system to do what I want it to do**	3.925	
Q9	**Usage of the computer/system is clear and understandable**	4.075	
Q10	**I find it cumbersome to use the computer/system**	2.1875	
Q11	**It is easy for me to remember how to perform tasks using computer/system**	4.2	
Q12	**Overall, I find the computer/system easy to use**	4.2125	

Based on the response mean for each question being of a four or higher, except for the inverted question ten whereby the two is an equivalent of a four, in terms of the TAM, the perceived usefulness and perceived ease of use is sufficiently high to suggest that there is minimal resistance to the adoption and use of ICT within the Department. The System Usability Scale can then be used to interpret the results and lands up with a perceived usefulness score of 80.05 and a perceived ease of use of 76.72, both of which are considered to be reasonably high out of a total score of 100. These two scores then feed into the attitude towards using ICT

variable (A) resulting in a score of 78.385, and perceived usefulness is combined a second time into attitude (A), resulting in the Behavioural intention to use variable, BI, being equal to 79.2175. The data does indicate that the majority of staff would be open to adopting new technology, however there still remains a small element that struggle with using technology, "users are open to the introduction of new systems however training is needed". This could also be as a result of what one interviewee suggested that "unqualified people are being employed into key vacant posts both in Head Office and at District level". Historically budget has not been available for training, but fortunately this year budget has been specifically allocated to training.

5.3 ICT Strategy and Alignment

The interviews revealed two potential conflicting pieces of information which were highlighted in Chapter Four. On the one hand a statement was made during an interview that there is no single consolidated strategy for IT, ICT & MST, EMIS etc. and the strategies of other ICT related business units are not shared. However in another interview the statement was made that there is an IT Strategy policy in place as well as the Corporate Governance of ICT Policy Framework, which is aligned to the DPSA policy framework. The IT Strategy Implementation and Migration Plan was then provided to the researcher and mined for information regarding both the current infrastructure of the Department as well as the strategic plans.

What was discovered when examining this plan is that the IT Strategy which was developed does in fact include project initiatives for:

- e-Learning, the key function of ICT & MST,

- Database Implementation initiatives, a key component of EMIS,

- VPN initiative,

- Infrastructure initiatives,

- Customer Relationship Management initiative, and

- BCP/DRP initiatives

These last four are elements of the function of IT Services according to interviewees. What this means is that there is one central consolidated strategy for ICT in the Department, yet too

many responses indicate that this strategy is either not known or not elevated to the right level. The document was officially adopted by the Department on the 6th of February 2014 when signed off by the Head of Department, and includes wide reaching initiatives, as listed above, in order to align ICT value within the business context.

Interviews identified that there is an ICT Steering Committee; however it is not feeding in at a strategic level within the Department as it has not been elevated to a sufficient level. Currently this Committee is chaired by the General Manager for Strategic Management and Organisational Transformation, but resides primarily within the office of the IT Services Directorate. The Governance and Management of ICT Framework identifies three key structures of governance, the ICT Strategic Committee, chaired by the Head of Department, which has not yet been created; the ICT Steering Committee which exists but is not chaired by a member of Executive Management as recommended; and the ICT Operational Committee whose functions of managing day-to-day ICT service management elements appear to have been included with the current ICT Steering Committee. What is clear therefore is that the necessary governance structures to drive ICT initiatives have not been created, and this immediately impacts on the ability of the ICT components to engage with top management. The figure below illustrates the recommendations from the DPSA Corporate Governance of ICT Policy Framework.
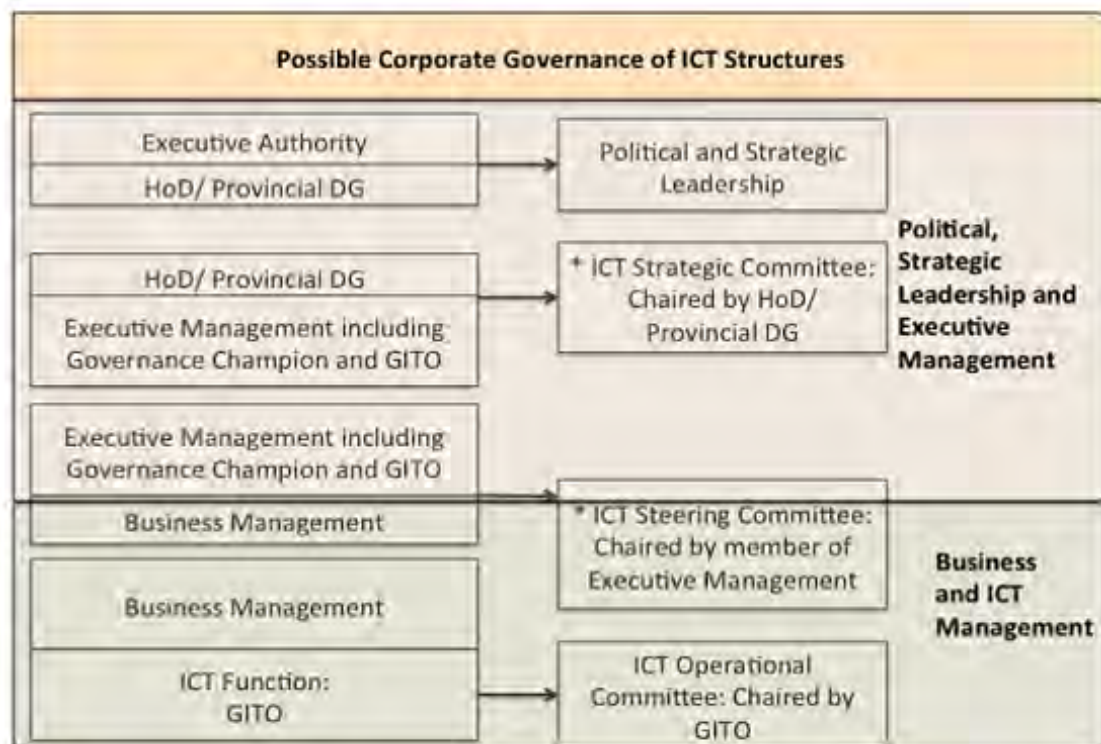
Figure 23: Possible Corporate Governance of ICT Structures – from Corporate Governance of ICT Policy Framework

The IT Strategy itself was developed in light of the current infrastructural needs and prioritised accordingly. It reflects a number of statements captured in the interviews in the way in which the Plan was developed, the key initiatives follow.

5.3.1 ICT Capacitation

ICT Capacitation is defined as a year 1 project. It includes ensuring that ICT has the appropriate skill set and capacity to support the Department, as well as ensuring that business is appropriately skilled and equipped to utilize available solutions and technologies. These needs have been echoed over and over again in the interviews. There is more and more reliance being placed on SITA due to the lack of staff and skills in the Department and it is acknowledged that the issues of staff structure for ICT was overlooked during the recent restructuring exercise. Furthermore the budget constraints have impacted severely on training in the Department thereby ensuring that the skill sets do not grow. Fortunately the need for staff and skills within ICT has been recognised and "at this moment in time there is a process underway to eliminate duplicate and unnecessary posts and to move those posts to areas like ICT". Additionally it has been confirmed that money has been allocated towards training for

this year, and that will help to narrow the gap. What remains concerning is the uncoordinated approach which seems to be taken. There is no ICT representative on the committee which is moving these posts, and it appears that the Governance documents on structure are also not being adhered to. Below is a figure from the IT Strategy document which highlights the functional roles which are required.
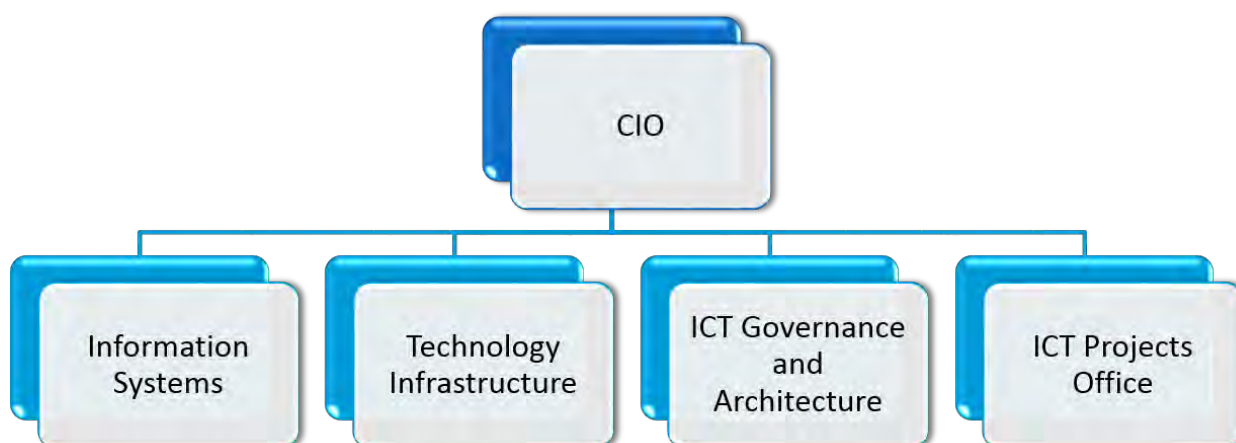
Figure 24: ICT Required Roles

At present these roles are all in theory centralized within the IT Services Directorate, however it is also clear from the interviews and from an examination of the Directorate's structure that there is no staff to fill them. HR is planning to allocate some of the reprioritized posts to IT support technicians at the level of Districts, yet support at District Offices is the responsibility of SITA. So it appears that there is misalignment or miscommunication in this process as well.

An examination of the structures for the various ICT related components may shed some light on this. IT Services resides within the Corporate Management Branch under the Chief Directorate – Strategic Management and Organisational Transformation. They have traditionally handled all the internal Departmental IT systems and infrastructure, management of the SITA SLA and as a result the IT support within the Department. ICT and MST resides within the Curriculum Management and Delivery Branch under the Chief Directorate – Curriculum Development Programs. Their role is to develop curriculum for ICT, as well as Maths, Science Technology. EMIS resides in yet another branch, the Institutional Development Support Branch under the Chief Directorate – Infrastructure Planning and

Delivery. EMIS, as the name suggests, manages the Education Management Information System, that contains the data for all schools, learners and parents.

One of the challenges identified through the interviews is that there is little to no coordination and cooperation between these sections. Due to government bureaucracy this very structure is most likely a significant cause of this challenge. The official communication path, as defined by one interviewee, from IT Services to EMIS for example is:

1. IT services manager, to

2. Chief Director SM & OT, to

3. DDG Corporate Management, to

4. DDG Institutional Development Support, to

5. Chief Director Infrastructure Planning and Delivery, and finally to

6. EMIS.

Without the support and approval of each of these individuals communications may never reach their destination, indeed there are so many steps in this process that significant delays are to be expected, particularly when dealing with technological matters which non-specialists have little to no knowledge of. Indeed this is the very reason why, according to one interviewee, that governance structures like the ICT Steering Committee were created, in order to facilitate this much needed cooperation. Unfortunately, as indicated by the same interviewee, the ICT Steering Committee is not functioning at the level it should, and as the other governance structures don't exist, decisions of this committee invariably have to follow the same path anyway, starting from IT Services and through the Chief Director – SM & OT who chairs the committee.

Finance highlighted that there was an e-Learning strategy and an IT Strategy, but no consolidated approach. These types of issues are at the core caused by the misalignment of ICT within the Department. It's not just a case of a lack of staff or a lack of skills, but also staffing and skills that cannot function together as a unit, as a result of old legacy ways of doing tasks. As was highlighted during one of the interviews, "within the ICT components the functions and roles continue to grow rapidly but the staffing structure of the components is not keeping pace".

5.3.2 Infrastructure

There are a number of infrastructure related initiatives spread out over the three year strategy. Both interviews and questionnaires identified challenges in the ICT infrastructure. What were identified were computers that are old, between 8 and 15 years, and non-functional in that they no longer boot into Windows or are able to perform any functions. Further it was identified that networks are slow and hinder communications, and systems don't function properly due to server problems. These are primarily internal challenges, at school level what was identified was a lack in core telecommunications infrastructure to provide suitable connectivity for e-Learning. e-Learning is a key element of the Department's strategy to deliver quality education to scholars, however without connectivity, collaboration cannot happen and content cannot be delivered to the schools. It was also mentioned that this was not a core competency of the KZN Department of Education and therefore relates to challenges in inter-departmental liaison.

The strategy document provides for five key infrastructure projects in year one. They are as follows:

1. A Wide Area Network (WAN) Optimisation Project – this project is intended to maximize and streamline the use that is made of the bandwidth in the Department. It directly addresses the challenge of slow network connectivity and will allow better information regarding data line speed requirements.

2. Workstation Optimisation Project – this project refers to the rollout of new desktop and laptop computers. It also makes reference to providing appropriate security on all the workstations. This is intended to address the first challenge of old and non-functional computers.

3. Server Optimisation Project – this project is based on the need for an entirely new server infrastructure. It is planned to provide a cost-effective, simplified and standardised server infrastructure, simplifying support and maintenance, as well as to provide for Disaster Recovery. This will also alleviate the challenges relating to system functionality.

4. Application Delivery Infrastructure Project – this project is aimed at ensuring that the applications requiring technology solutions can be executed and delivered optimally. It involves creating a standard "technology stack" for all Departmental applications thereby reducing support costs and optimising use of available resources. It also is

intended to enable optimal application integration. This is the base infrastructure that will address issues of interoperability, and lack of coordination.

5. Database Implementation Project – this project relates to the EMIS core function. It requires the implementation of a data warehouse for housing the entire Department's data in order to optimize the use of resources and reduce costs, whilst providing one platform for the data from the integrated applications mentioned above.

As can be seen, the IT Strategy recommendations around infrastructural projects in year one align very well with many of the immediate challenges that have been identified. Slow network connectivity is to be addressed by the WAN Optimisation Project whilst the continued use of old and non-functional computers is to be addressed by the Workstation Optimisation Project. Issues which were highlighted by staff relating to system functionality are to be addressed in the Server Optimisation Project and where there is a lack of interoperability and coordination, this is covered by the Application Delivery Infrastructure Project. Indications from Finance also suggest that budget has been made available for many of these projects. This coupled with the MEC's support of the use of ICT as a platform does bode well for the first year's projects at least.

5.3.3 Role of SITA

SITA seems to be a bit of a contentious issue for the Department. As one official put it, "SITA's house is not in order". They then went on to elaborate how it doesn't effectively provide the needed skilled services and the pricing is inflated. The difficulties are compounded as the Department is mandated to utilize SITA for some core services, and due to staff and skill shortages, have a reliance on SITA that would otherwise not be necessary. The Department was in the process of renegotiating their Service Level Agreements with SITA and this will impact on all future relations. SITA currently provide the following services to the Department:

1. Local Area Network (LAN) and Desktop Support

2. Wide Area Network (WAN) Access via data lines and related support

3. Hosting services for systems and hardware in their data center

4. Training Services (IT related)

5. Project Management on a time and material basis

6. Procurement services, billed as a percentage mark up

5.3.4 Finance

Finance lies at the root of many of the challenges identified. Available budget in 2008 was used to employ people instead of upgrading the ICT infrastructure, and that salary burden coupled with the public sector budget cuts has meant that there is even less money available now. The budget has far reaching implications, without money additional staff cannot be employed, existing staff can't be trained, infrastructure can't be upgraded and in some cases even repaired, and projects, especially costly ICT projects, cannot commence. Some budget has been made available for these types of things this year and it is hoped that it will have an impact. From the discussions held it does seem that with sufficient motivation and validation that budget can be found in order to implement key critical projects when necessary. This does suggest that the real obstacle to delivering on ICT is a breakdown in communication, possibly due to a lack of effective governance in the Department.

5.4 e-Readiness Assessment

Yesser (2007) has defined IT Readiness as being a combination of an organisation's technical resources, existing IT infrastructure, and ability to change and redesign processes. The readiness of the Department was measured based on four levels, namely "No Readiness", "Low Readiness", "Medium Readiness", and "High Readiness". There are three key dimensions of readiness which Yesser (2007) identified to be taken into account, architecture readiness, infrastructure readiness, and process readiness. The framework is detailed below.
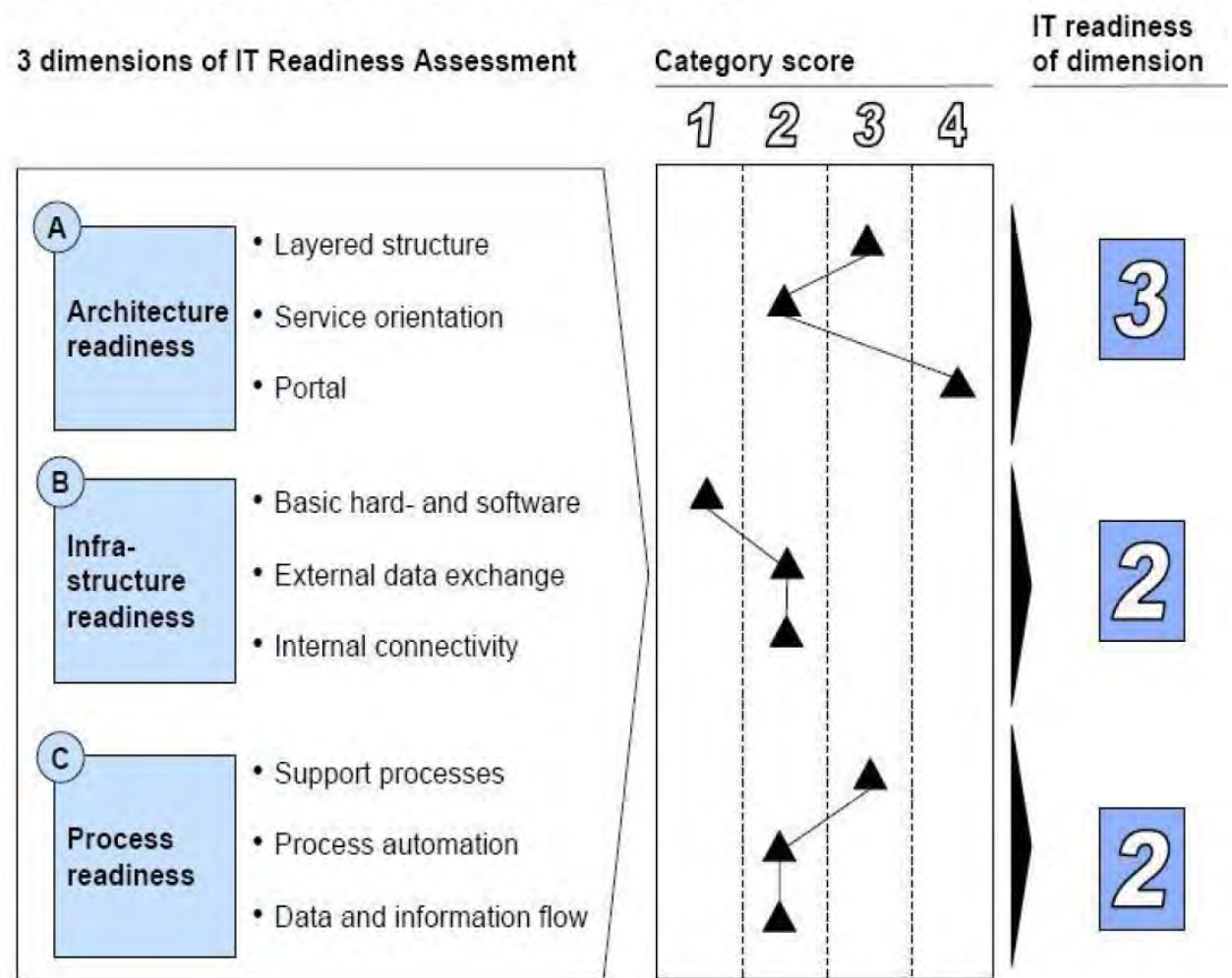
Figure 25: Framework for e-Readiness Assessment (Yesser, 2007)

Each of these dimensions have been decomposed into their component parts and evaluated based on the information available through the research performed. The figure below illustrates the layered decomposition to the level which can be directly assessed. Each element will be assessed individually and the relative scoring combined to arrive at an overall readiness score. The framework in combination with a guide that formed part of the assessment tool book was used to interpret the research results into scorings, the guide can be found in Annexure C. The process, whilst ultimately determining one overall score, is also useful in determining specific weak areas as each organization is unique in its own ICT related capabilities.

METHODOLOGY OF IT READINESS ASSESSMENT – DECOMPOSITION INTO DRIVERS
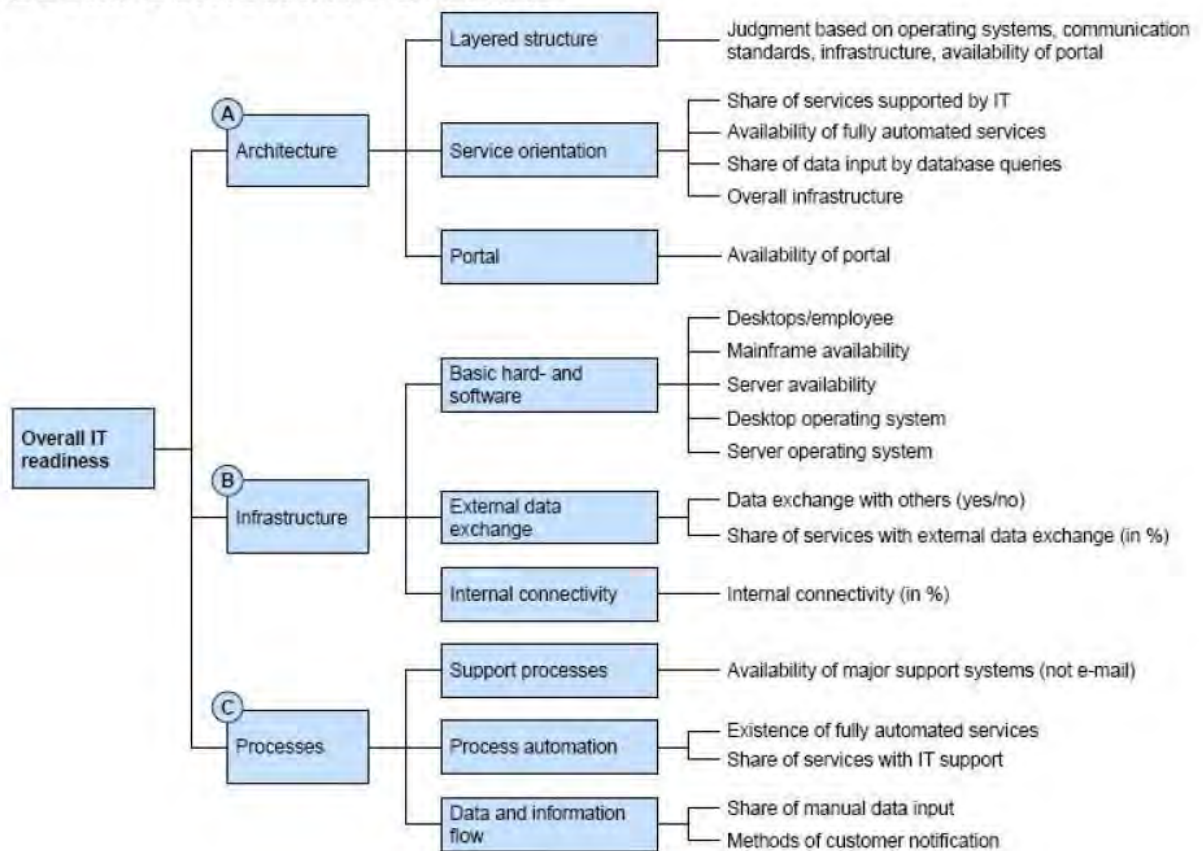
Figure 26: Evaluation Framework Dimensions (Yesser, 2007)

5.4.1 Architecture

Layered structure: This is a judgement call based on operating systems, communication standards, infrastructure, and availability of the portal. The research conducted through the TAM questionnaire showed that the Department is using many old and outdated computers. Communication is hampered by data line challenges, infrastructure is failing particularly at the core, and the website is not a true portal and the management thereof has had to be outsourced to SITA.

Scoring: 1 out of 4

Service orientation: Within the Department IT supports all the services, although SITA is utilized as an outsource partner. The effectiveness of these services due to staff and skill shortages and challenges with SITA however suggest that the rating cannot be high readiness.

Scoring: 3 out of 4

74

Availability of fully automated services. At present the developed systems are not functioning as intended and data has to be manually collected on CDs and reports run manually as well.

Scoring: 1 out of 4

Share of data input by database queries. As mentioned above, the EMIS database relies on physical CD collection and manual queries in order to manage the school-based data. The data, once physically received is uploaded to the central database. Business units throughout the Department make extensive use of the data, but do have to request a manually run report.

Scoring: 2 out of 4

Overall infrastructure of the Department is not conducive to the centralization of data. There is at present no data warehouse and the network links cannot be relied upon for connectivity.

Scoring: 1 out of 4

Portal: Availability of portal. The Department does have an accessible website. The website information is managed and decided upon by the Communications Directorate, however all updates, and indeed the entire webmaster function has had to be outsourced to SITA. The website does contain a number of documents that are outdated, as well as links that lead nowhere. Additionally it cannot function as a proper portal.

Scoring: 1 out of 4

Architecture scoring = (Layered Structure + Service orientation + Portal) / 3

= $\{1 + (3+1+2+1)/4 + 1\} / 3$

= 3.75 / 3

= 1.25

5.4.2 Infrastructure

Basic Hardware and Software: IT Penetration Ratio internally to the Department is 0.954 computers per 1 staff member. This indicates a shortage of computers. Additionally it has been identified that the computers are very old and using software which is outdated and no longer fully supported by Microsoft.

Scoring: 2 out of 4

Server availability. Some challenges have been experienced regarding servers. It has impacted on some of the systems which were developed. The support of the server infrastructure is outsourced to SITA and a WAN optimization project is planned for this year.

Scoring: 2 out of 4

Desktop operating system. Due to the age of many of the computers in the Department, operating systems have not been able to be upgraded very often. Additionally it appears that some of the Finance systems can't function on the latest operating systems.

Scoring: 1 out of 4

External data exchange: Data exchange with others. The Department does exchange data with other government departments, the Auditor General and the like. It is done primarily via email. Information that is required from EMIS has to be requested via email and will then be provided via email as well.

Scoring: 2 out of 4

Share of services with external data exchange. The only access point for services externally is the website, and it does not contain any specific services. The Department invariably has to be engaged in person.

Scoring: 1 out of 4

Internal connectivity: Internal connectivity in %. All Departmental buildings are fully networked, cabled, and connected, however the speed of that connection is not always sufficient to support the operations that are required. Therefore the percentage would be 100% but the scoring needs to reflect the issues in speed.

76

Scoring: 3 out of 4

Infrastructure scoring =   (Basic Hardware and Software + External data exchange + Internal connectivity) / 3

         =   {(2+2+1)/3 + (2+1)/2 + 3} / 3

         =   2.056

5.4.3   Processes

Support Processes: Availability of major support systems (not email). The Department uses transversal systems to handle salary payments and for payment of invoices. These systems are accessed via biometrics security.

         Scoring: 3 out of 4

Process Automation: Existence of fully automated systems. There are no fully automated systems in the Department, however every business process is performed with the use of IT.

         Scoring: 3 out of 4

         Share of services with IT support. With the challenges identified in system implementation and functionality due to server issues and connectivity issues, a large portion of the services of the Department have only minimal automation. Where possible staff do make use of IT equipment however.

         Scoring: 2 out of 4

Data and information flow: Share of manual data input. The data for SASAMS which comes through to EMIS is captured manually at schools, however once it has been captured there, it is uploaded directly into the database.

         Scoring: 3 out of 4

         Methods of customer notification. Communication to the schools remains a challenge as only about 33% of schools have connectivity. Correspondence can be sent via email, however many school principals then have to go to their nearest Education Centre or District Office to get connected and receive the email.

         Scoring: 2 out of 4

Process scoring   =   (Support processes + Process Automation + Data and Information flow) / 3

=   (3 + (3+2)/2 + (3+2)/2) / 3

= 2.667

Through the aggregation of scores, the overall IT readiness in the KZN Department of Education is:

(1.25 + 2.056 + 2.667) / 3 = 1.991

This means that the Department is currently falling just short of low readiness.

5.5   Summary

The e-Readiness of the Department has been looked at from the aspects of Architecture, Infrastructure, and Processes and has been found to have a rating score of 1.991 which falls just short of a low readiness rating of 2. Low readiness is characterised, according to Yesser (2007), by rudimentary architecture principles, poor connectivity, insufficient hardware and software, and various processes supported by IT. The Department's weakest score came from the Architecture component, which is probably fairly accurate when taking into account the issues in governance which were also discussed. An additional element of ICT adoption levels by staff, based upon the TAM model for perceived usefulness and perceived ease of use, suggests, with a score 79.2175 that the use of ICT and technology would be fairly high, however it must be noted that within these sections there remained staff that would both resist new technology, and struggle to be able to use it effectively. Finally a discussion around the IT Strategy and the alignment of that strategy to some of the key challenges was undertaken. The Strategy itself seems to be well aligned, however challenges exist in the governance arena as well as the staffing arena. Finance appears to have a core role to play, however moving forward it appears that budget alone may no longer be a sufficient reason for lack of implementation. In light of this, the final Chapter will discuss the conclusions that have been made as a result of the data, as well as the recommendations for the Department to enhance its e-Readiness.

CHAPTER 6.   RECOMMENDATIONS AND CONCLUSIONS

6.1   Introduction

Weerakkody et al. (2011) have stated that ICT has an important role to play in the public sector to make public services more efficient, transparent and accessible to citizens however there remain concerns around the number of failed ICT implementations and the general poor adoption of technology within the environment. It is for this reason that e-Readiness assessments were developed in the first place.

Le Dantec and Edwards (2010) highlight the cost of changing the way in which things are done as one area which has been traditionally unplanned for. It is the lack of understanding around this that limits the perceived return on investment value and creates uncertainty around the value of future ICT related projects. These elements are what contribute to the cost overruns, delays, and general failure of developed systems that Kanungo and Jain (2011) make reference to. It is critical therefore to ensure that a proper strategy for implementation is developed, together with an in-depth understanding of the obstacles. The KZN Department of Education already has such a document, and it was in an attempt to clarify the obstacles and recommend solutions that this dissertation was written.

6.2   Summary of findings

The objective of this study, as described in Chapter One, was to evaluate the current role of ICT within the KwaZulu-Natal Department of Education, the alignment to the mandated strategy, and to identify the limiting factors, prioritise and recommend solutions in order to assist the Department in the adoption of ICT and ultimately e-services.

The first specific objective was to evaluate the alignment of the Department with the mandated ICT Strategy document. What soon became clear was that the Governance areas were not aligned. The Department has an ICT Steering Committee, but that committee is formed at too low a level to make an impact and is taking on the roles of a more operations-based committee, according to respondent 5. Additionally the other governance bodies have not been created by the Department, namely the ICT Strategic Committee - chaired by the Head of Department, and the ICT Operations Committee. The IT Strategy document was adopted in February of 2014, yet to date no implementation appears to have happened. From an in-depth examination of the document, it has been crafted well to fit the Department's overall strategy and encompasses priority areas such as e-Learning at schools, the creation of data warehousing for

EMIS and other systems, and all this on top of a highly technical IT framework. Furthermore, all the priority systems which have been identified by key officials in the Department have a place in the IT Strategy.

The second objective was to evaluate the fit of the IT Strategy. The approached that was used in developing the IT Strategy was to start by analysing the Master System Plan, which had already been developed for the Department. Thereafter the strategic imperatives of the Department were analysed and a consolidated gap analysis performed. From there the initiatives were prioritised based on their service delivery ranking and on their interdependencies and grouped logically. The strategy focuses primarily on infrastructural projects during the first year. This is not only a good place to start, but is a critical requirement when looking at any ICT implementation. Dwivedi et al. (2011) defined this priority as being transformational government, including radical change in terms of the existing structures, operations and culture of government. The roadmap that has been developed is for the most part fairly clear, however it was noted that some of the projects have been left in a very generic format, which makes setting specific deliverables difficult. An example of this is the Application Delivery Infrastructure Program, which suggests that the exact technology stack which is needed to be adopted has yet to be defined.

The final objective was to identify the obstacles to implementing the IT Strategy and recommend solutions to these obstacles. A number of obstacles or challenges were identified as a result of the research, captured in Chapter Three and discussed in Chapter Four, with varying levels of complexity and impact. They were:

- HR obstacles in terms of staffing and training

- Finance obstacles to being able to provide sufficient budget for ICT implementations

- Issues around management buy-in and therefore challenges in getting traction

- Governance obstacles

- Obstacles relating to information flow

- Policy obstacles

- Shortcomings around the available infrastructure, and finally,

- The issues surrounding change management

6.3   Implications of this Research

This study contributes to the body of knowledge on third world public sector ICT implementations and e-Readiness. It may have implications primarily for the KZN Department of Education which was the subject of the study. With a clearer approach to ICT related issues, the feasibility of successfully implementing the IT Strategy and beginning the Department's journey towards e-Governance and e-Learning is drastically improved. The results may have highlighted specific initiatives and structures which need to be in place prior to commencing with large scale ICT implementations, as well as a significant gap in communication which also needs to be addressed.

6.4   Recommendations for Overcoming Obstacles

6.4.1   Governance

The first and most important aspect which needs to be rectified is the Governance structure for ICT. A number of respondents identified a weakness in terms of a lack of structure and the existing structure, such as the ICT Steering Committee not being elevated to a suitable level. Thus the existing structure has no real decision making power and is unable to engage directly with the Head of Department in order to strategically support the Department and enable ICT. Chongthammakun and Pal, (2012) have shown that there is little to no hope that ICT can change the flows and structures of power in bureaucracies in the developing world, however they go on to demonstrate how the structure of the organisation needs to be aligned in terms of reward systems, policies, work practices, culture, and norms to the underlying technology. In order for IT to be highly effective in the public sector environment it is critical that IT managers are given more powers in taking decisions. Top management motivates the IT personnel, however undue interference by top management in IT related projects should be avoided (Kanungo & Jain, 2011). The governance structures of the ICT Strategic Committee and Steering Committee would be key to achieve this.

Another aspect of governance is the structure which exists in government as a whole. Two overarching governance frameworks were illustrated, namely the Centralised and the Federated IT Governance Framework, and each framework has its own strengths and weaknesses depending on the model which is implemented. What is concerning is that the interviews, as discussed in Chapter Four, suggest that it doesn't appear that South Africa has adopted either orientation fully, opting for a more decentralised structure which is creating fragmentation, duplication of systems and a lack of integration. SITA was created to be the centralised IT

governance partner for government, and almost all the ICT resources were reallocated from Departments to SITA. Similarly, a second centralised body called the Provincial Government Information Technology Officer Council (PGITOC) has also been constituted in order to standardise and centralise ICT in the province. Decisions taken at National are channelled through to the PGITOC, particularly items relating to legislation and systems which have been mandated for adoption. Meanwhile, each of the Departments has their own IT section, headed by at least a Senior Manager, who then has almost carte blanche to choose the Department's technology stack as they see fit.

This type of model is definitely more of a Decentralised Approach, and it is thus clear that South Africa, at this point in time has either chosen to adopt a kind of hybrid governance structure, or has not managed to fully implement the intentions when creating SITA. Once the issues of governance are sorted out internally, sufficient traction and communication channels should be available to reach top management and garner their buy-in. From this platform the issues of staffing structure, skills and staff shortages can be better addressed.

6.4.2   HR

The first prize would be for the core IT related functions to all be centralised into one IT component thus creating the needed improved synergy, which interviews indicate the Department wants. ICT & MST could remain where currently placed but specifically handle any curriculum related tasks and issues without the technological burdens, whilst strategies around e-Learning infrastructure, connectivity to schools, and the rollout of ICT equipment should be relocated, together with staff, to fall under this new structure. EMIS, in the opinion of responder 1 would also benefit from this restructuring, and therefore as a whole also needs to move. Originally the alignment of EMIS within the Infrastructure Planning and Delivery Chief Directorate made sense because of the role which the data took. However with the advancements in databases and the intended implementation of a data warehouse, the user of this data becomes far broader than ever before and it is far more important to strategically align the Management Information System within the broader ICT context.

It is suggested by the researcher that the new structure be implemented with a Chief Information Officer (CIO) at the level of at least a General Manager, under the Corporate Management Branch. This recommendation is actually directly in line with the recommendations stemming from the IT Strategy. CIOs have a key function in the management of IT resources as well as in ICT planning. This includes elements such as policy

and practice development, planning, budgeting, resourcing and training. Below the level of CIO should be sections for:

- Information Systems, a large portion of which would come from the existing EMIS section

- Technology & Infrastructure, mostly formed by the current IT Services Directorate

- ICT Governance and Architecture, these roles currently do not exist within the Department and so would need to be filled, and the

- ICT Projects Office, also containing new roles

This would be the most ideal situation as it would serve to both elevate ICT matters, as well as provide direction and specialised control of the various aspects of ICT. However, understanding that the Department, as highlighted in one interview, is currently only looking at relocating existing duplicate posts, it seems a foregone conclusion that these posts that a number of respondents suggest are desperately needed, won't be created as the required level is much higher than that of the posts being reallocated. The need for these posts is not just stemming from a management level however. The initiatives that need to be implemented as per the IT Strategy involve firstly significant funding, and secondly are highly complex, which means without the necessary staffing resources, the cost overruns, delays, and failings that Kanungo and Jain (2011) mention are inevitable.

6.4.3 Finance

Budgetary limitations, whilst referred to as the primary challenge by almost all interviewed seems more to be the excuse used when management don't believe that the initiative is important enough. The budget is indeed limited, but that just means that communicating with top management becomes substantially more important in order to, as respondent 2 suggests, prioritise initiatives that can have the most impact. With ICT initiatives, very often operating costs are reduced following a successful rollout. This in turn can create a roll-on effect whereby monies saved due to ICT in one area can then be used to finance the next ICT initiative, and so on.

6.4.4 Information flow

The way in which information and data currently flows in the Department is not conducive for decision making processes. The interviews highlighted that ICT driven processes are planned

to convert many manual processes over the next five years, however the platform to provide that ability does not yet exist. Business intelligence specifically, has been identified by respondent 2 as being a key enabler for the Department providing up-to-date information at the fingertips of decision makers, facilitating better and faster processes. Workflow and Enterprise Content Management will further enhance the processing time issue which was one the key flow findings by automating document processes and centralising the storage. This will also improve accountability but the core infrastructure must be present first.

6.5   Recommendations for Future Studies

This study looked at a specific case study of the KZN Department of Education, within the South African context, in order to evaluate the use of ICT and ultimately the e-Readiness of the Department. As a case study the same methodology could be applied to other institutions both in the public and private sector. Many of the existing e-Readiness assessments for public sector focus on the architecture, infrastructure, and process areas of ICT, however they do not include issues relating to staff acceptance of using ICT within the workplace. Further study could be done to develop a more integrated model with which to approach issues of ICT adoption. Additionally this study could be furthered by incorporating studies of other provincial departments with the aim to eventually redefine government's approach to e-Governance. Another key aspect which could form part of further study is the adoption within South Africa of a hybrid governance framework, whether intentionally or not, with the goal of defining its feasibility and making recommendations for the best fit within the South African context.

6.6   Limitations of the Study

The sampling technique which was used was convenience sampling which in itself does not provide necessarily a truly random sample of the population, in addition it was decided to select the sample from the key system users in the Department as their exposure to the challenges in the system is far greater than other staff. Additionally interviews were limited to ICT decision makers and senior managers from Human Resources and Finance. Interviewing all of top management would have provided a better indication of strategic alignment between the IT Strategy and the vision of top management, however the availability of these officials was extremely limited and the scope of the study was already expanding beyond initial intentions.

6.7   Summary

The KZN Department of Education's state of readiness falls just short of low readiness in terms of the assessment tool. The role of ICT in the Department is extensive, with ICT related business units segregated between the various branches. These units are divided functionally into internal IT support and systems (IT Services), School based ICT and curriculum (ICT & MST), and school management information systems (EMIS). Strategically the data indicates that there is a desire for existing processes to be moved into an ICT based platform for improved functioning. Additionally there is a strong desire to begin implementing e-Learning initiatives at schools, and to develop a centralised data warehouse to consolidate and easily access relevant information. There are many challenges which have been identified through the research. The IT Strategy document is correctly aligned in terms of functional requirements and priorities for contributing towards the Department's overall strategy, but what is lacking is sufficient emphasis on the structural governance and the staffing shortages. These form the two key challenges which need to be prioritised before system implementation should begin. Infrastructural challenges should be addressed immediately as budget has been allocated this year for it, but complex system development should be put on hold until the correct governance structures have been created and are functional, and until the necessary skilled staff are employed in order to ensure the success of the system initiatives without substantial cost overruns. Financial constraints are often cited as the primary constraint for ICT initiatives due to the high implementation costs, yet the data indicates that this is more a case of insufficient priority for ICT initiatives within an ever decreasing budget allocation. The budget for the Department does exist; it has just been prioritised elsewhere.

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ANNEXURE

A

Researcher	Thank you for doing this. I'd like to start off looking at the element of the IT Infrastructure of the Department. Is it currently outsourced to a 3rd party or is it handled internally?	
Respondent	I think it's handled both by the 3rd party, take SITA as a 3rd party, but also internally to the Department	**SITA is the outsourced partner**
Researcher	Are you aware what the roles and functions are that have been outsourced?	
Respondent	What is outsourced is mainly the server administration. I think other things relating to software, desktop, problems and things, usually they are done internally to the Department.	
Researcher	OK. The structure of your section… you're working for EMIS, that stands for Education Management Information Systems?	
Respondent	Mm	
Researcher	What is the structure within EMIS at the moment for in terms of your data capturers, your processors, your administrators, and that sort of thing?	
Respondent	We no longer have data capturers. Of course we have the Director or Senior Manager, with his PA of course, and we are supposed to be having 2 Deputy Managers, 4 Assistant Managers, and 4 people who are at Admin Officer level. Here at Head Office that's it, which is different from the Districts. At District level you'll have your DCES, who heads EMIS with 2 Senior Education Specialists under him/her, and depending on the size of the District you'll have Technical Assistants, 2 or 3.	
Researcher	OK, and do they all filter up into Head Office?	
Respondent	Ya, we work together hand-in-hand, because whatever they do, information has to end up here.	

Researcher	OK. And are all those positions filled?		
Respondent	No.		
Researcher	Not? What positions are currently filled?		**There are unfilled posts in EMIS Head Office**
Respondent	Of course we have the Manager, we don't have Deputy Managers, the Assistant Managers only 2 are filled. OK the Admin Officers all of them are filled.		
Researcher	OK. So it's looking like in terms of the structure that EMIS was planned to have, that you are short 4 Deputy Managers and 2 Assistant Managers at present.		
Respondent	Yeah. 2 Deputy Managers short and 2 Assistant Managers.		
Researcher	Ah 2 Deputies.		
Respondent	Yes.		
Researcher	OK. So you're handling the EMIS system. What application and database platforms is it running on?		
Respondent	We are using Access, but we have changed the way we are working. Initially we were using, we were collecting data from school aggregated data, the number of learners, the number of teachers. But now we have moved to a unit record system, where we collect the names of learners, the names of parents, the names of teachers, their qualifications. The information that we collect is a lot and detailed, and we now have SQL. So now our database is in SQL cause Access, obviously, cannot handle it.		
Researcher	Have you fully migrated across to SQL or is it still in the migration phase?		
Respondent	I would say we have fully migrated to SQL. We are running our queries, although because we have not been using it for some time, we are still in the learning process having to teach the other guys what it's all about. Maybe saying fully is not quite correct, because some of the things that are in SQL, we need to run queries in Access because we still have historical data in Access.	Historical data is in Access still but main database is in SQL	**Staff is having to learn on the job how to use SQL instead of Access**
Researcher	OK, so you've almost got a bit of a hybrid at the moment?		
Respondent	Hybrid, yes, it's a hybrid.		
Researcher	What information is contained in the MIS system?		

Respondent	It's mainly school information, learner information, educator information. By school information the addresses, phone numbers, telephone numbers, the infrastructure, how many classrooms, laboratories, toilets they have and so on. We try to capture almost everything.	
Researcher	How frequently is it updated?	
Respondent	Let me say what is supposed to happen. For now because policy is not in place, we are just expected to submit this once, but if the policy is approved this year, then we are supposed to update every quarter.	**No update policy for EMIS is in place to enforce school capturing and uploading**
Researcher	Every quarter?	
Respondent	Yeah	
Researcher	That's the full database	
Respondent	The full database, everything from schools	
Researcher	How often is information and data sent up into the system, and the people that are capturing, are they capturing from schools into the system, or is it sent to somebody else to capture on their behalf?	
Respondent	It's captured at school. Maybe schools may ask other people to do it for them, but it's supposed to be captured at school.	
Researcher	And that data when it comes through is it reflected immediately on the system?	
Respondent	No, we are not connected. We use CDs to collect information. The database in schools, maybe that's why I'm saying it's a hybrid, the database at schools is Access based. So we collect all those Access databases from schools on CD and upload them to our data warehouse that is SQL based.	**Data is captured on CDs and physically collected.** Database at schools is Access, database at Head Office is SQL
Researcher	And when you say your plan is for that to be done quarterly?	
Respondent	Yah. We are doing it quarterly, but I know if schools could know this they would say "No, there's no policy". But the policy has not yet been approved but we are trying to do it quarterly.	**Policy for EMIS has not yet been approved. The policy is needed to enforce school capturing activity**
Researcher	Oh OK. And the data that's contained therein, how accurate is that data?	

		Lack of ID numbers of some students brings data into question.	Potential of deliberate misrepresentation of school learner numbers

Respondent | That's a good question. I wouldn't say how accurate it is. I'll just tell you my suspicions. My suspicions are it is not quite accurate. 1 because the learners, all of them, have to have an ID number. And at the moment we have quite a number of learners without ID numbers, which should not be the case. My suspicion is: all those learners without ID numbers may not exist at all. So the accuracy of the information would be that I'll be saying we have so many learners in the system when in actual fact we have less.

Researcher | OK

Respondent | The other parts as I have looked at the database, will be misunderstanding of what they're supposed to capture in the system. Questions like how many multi-grade classes that you have, and a person gives you the number of classes instead of looking at the "multi-grade" classes.

Lack of understanding of EMIS capturing requirements and fields

Researcher | Ah lack of understanding

Respondent | Lack of understanding of what is required. And of course it's something that our technical assistants have to check if the questions were, before they take the databases, if the questions were understood, did they answer the question correctly, things like that. But we are working on that, if you find a school for instance, with over 800 learners in the multi-grade classes, then you know, it's not quite correct. Then you have to go back to the school and explain to them about the questions.

Researcher | How widely is the EMIS system utilised within the Department for information?

Respondent | People who use it mainly use it for Finance. I know Resource Planning, Budgetting – how much they're going to give, Norms & Standards – how much they're going to give to schools, Nutrition – they want to know how many learners they have to budget for, and HR for staff on location, and Infrastructure, LTSM – for the number of books. It's widely used by quite a number of Directorates.

Researcher | How do the people needing the information access it?

Respondent

That's the problem. That they request it, through email, and we email it back to them.So we run queries and email it to them. It will be better if they could do it themselves through the website because sometimes they don't ask the same question and if the question is not exactly the same, then we have to rerun the query to include the fields that they require, that the other person didn't require.

EMIS information is requested and reports are manually run and then emailed

Researcher

Are you aware of any e-Governance initiatives in the Department?

EMIS is not being involved in e-Governance initiatives

Management does not appear to be including SASAMS in the strategic plans

Respondent

I am aware that ICT have e-Education… e-Governance – I would say that we are supposed to be part of that as EMIS because the presence of SASAMS at schools towards e-Governance that schools should manage their systems electronically rather than using paper. The only thing is we are still in that transition phase.

Researcher

Are you aware of any specific plan in the Department to begin leveraging e-Governance initiatives?

Budget constraints are inhibiting the creation of an effective Business Intelligence Tool

Respondent

I'm aware that because we have it in our strategy, we need to make sure that schools are connected. We need to make sure that we have a business intelligence tool that will allow most stakeholders to access the information easily. The plans are there, but the problem is the finance is not.

Researcher

That leads me into the next question, which is: the challenges, the specific challenges you are experiencing here in EMIS in terms of being able to deliver on what you are supposed to be delivering, and what should be done. What challenges are you experiencing and if you have suggestions on how to overcome them?

Respondent	The challenge that I suspect is the understanding of what we are supposed to be doing. I personally do not believe that there's no money to do what we need to do because some of the things that we want to do don't cost much. I have a 3G card, 2 GB, I pay R99 per month, and if we were to give schools that, it wouldn't cost much. Now I was just making my own calculations that if from the EMIS budget we could finance each school for a year, we'd pay about R7.2 million, which could be covered in that budget. I don't think the problem is money. The problem is understanding what we are supposed to be doing. I don't think that management has adopted the strategy and they appreciate where we want to go and how it is going to save them money. So the challenge is the understanding of the concept of the management information system. I know many people look at us as statistics, and that's it. We are supposed to be providing the numbers, but the fact that we have to look at the systems, working together with IT developing systems, I don't think there is that understanding in my opinion. Because if there was an understanding, an understanding even from our immediate superiors they'd be able to communicate what needs to be done well. Maybe another challenge is that even our supervisors do not have an understanding of systems and what needs to be done, and they are not confident enough to articulate that to senior management or top management.
Researcher	It kind of looks to me like governance structures.
Respondent	Yeah.
Researcher	And that ICT, EMIS, IT issues aren't elevated at a sufficient level to be strategic.

Unqualified people are being employed into key positions

Respondent	Yeah, they're not. For instance, Chris, the Department would never make a mistake of hiring someone with no finance background in the finance section. Must have a BCom. But you come to EMIS and IT, anyone can come in to manage that section, and really you end up having to teach the person who's supposed to lead. And the strategy has to come from… you know? You end up not having a strategic leader.

Researcher: It's almost commitment, there's no commitment from the top to the sections. You also mentioned challenges that was around connectivity to schools. Any other glaring issues in the environment?

Respondent: Yeah. The issue of making sure that we equip schools with computers and all. The lifespan of a computer is 3 years, but some of those schools they've had those computers for over 5 years, 6 years. It's something that the budget that we have, we could handle that. When it's 3 years we know that the we have about 6000 schools, first year we'd resource 2000 schools, the second year 2000 schools, the third year 2000 schools, then we'd go back to the first lot. There are ideas of how we could do this but – no money, and I don't think there's no money. Maybe it's true that there's no money but my main thing is understanding because we don't have activity, don't have computers, the data can be corrupted, viruses – schools don't have any anti-virus software, and we have to see how we do things using our own resources.

> **No money to buy all schools a computer**

> **Ideas are being generated at lower levels however there seems to be a lack of communication with management**

> **Ideas not reaching management and management decisions not reaching staff**

Researcher: Who does the support for schools?

Respondent: Support for schools is the Technical Assistants, who are also thin on the ground.

> **Insufficient support for schools**

Researcher: How many Technical Assistants would you say you have?
Respondent: Less than 20.
Researcher: Less than 20 for how many schools?
Respondent: For 6211 schools.

Researcher: And, you mentioned earlier one of the challenges in terms of the data quality was a lack of understanding of what is being asked for. What would you say is the cause of that?

> **Lack of commitment by principals to attend training**

> **Lack of prioritisation and understanding of significance of EMIS system**

Respondent: I think mainly the cause is that, when principals are called for workshops, they don't come. They send their admin staff, who may not understand the system of education properly. And they say something to them, they may not understand what you are talking about, and the person who's supposed to be accountable is not there.

Researcher: So there is training that's happening for the schools.

Respondent: There's training that's happening for the schools, but the people are supposed to be there, the managers of the schools, some of them never attend.

Lack of commitment by principals to attend training

Lack of prioritisation and understanding of significance of EMIS system

Researcher: That's pretty much all the specific questions I have. Knowing what I'm trying to do is there anything else you'd like to comment on before we finish up?

Respondent: I think you have covered everything I've said. One other thing of course is the issue of staffing. The structure that we have, I know you started with the structure, the structure that we have was good enough when we had, when you're connecting aggregated data from schools, but now the data is very detailed and we're still maintaining the same structure.

Function and role has grown but structure has not

Researcher: So an increase in data, increase in schools, increase in complexity.

Respondent: There's an increase in complexity, we have to train people to work with big data, because it is big data the way I look at it, and it's going to keep on growing and it's still the same number of people. And my fear is even when people are appointed, people are not going to check the qualifications of the people who are supposed to be appointed. Anyone may be taken and that's the problem that we have even at district level where people who have no idea of even working with numbers, working with spreadsheets are appointed to EMIS, and that ends up piling a lot of work on us having to do work for the districts.

Unqualified appointments are being made of unskilled people

Insufficient training. Need to train people on big data

Researcher: Thank you very much for your time.

Researcher

Firstly thank you very much for agreeing to this interview. I really appreciate your valuable time. As explained, the interview is around a paper which I'm doing on ICT on the Department in KZN, looking specifically at the admin side of things, and incorporating its impact on schools. I'd like to look first at the role of SITA within the Department's IT operations and what the expectations are from your side as a senior official in the Department of SITA.

Respondent

In terms of SITA, the main aim of government was in order to elevate the high cost that is incurred by mostly skilled labour in terms of IT etc. Government introduced SITA, and have expected SITA to provide the service in terms of skills etc. and all the IT related services to the government, but my experiences with SITA is that it hasn't got its house in order in terms of providing skilled services in terms of coming in at the correct prices etc. Therefore you'll find that in certain instances because of the Act, Departments are forced to use SITA. Other than that if Departments can find a way not to use the services of SITA, they will do so. But unfortunately, I think in terms of good governance, in terms of protecting the public sector etc. we hope that SITA will get its house in order and provide services that is required by government.

SITA's house is not in order. It doesn't effectively provide the needed skilled services and their pricing is inflated

Researcher

I wanted to ask around e-Governance, are you aware of any e-Governance initiatives in the Department at present?

Respondent

Well there's, in terms of e-Governance, or only our e-Learning?

Researcher

Specifically e-Governance although e-Learning as a Department of Education would fall under e-Governance.

Respondent

Yah. The only thing that we most probably have some sort of e-Governance is on the Department of Public Services where all SMS members are required to complete their confidentiality, through their portal. That's the only e-Governance thing because it's a requirement. That's the only thing, otherwise there's nothing else I've seen.

Researcher

Nothing to interact, say, with citizens?

Respondent

With citizens? Nothing, in terms of governance, I haven't seen anything.

There are no e-Governance intiatives in the Department currently

Researcher

Are you aware of a specific plan for ICT within the Department?

Respondent

Well there have been many plans that have been submitted. ICT/MST Strategies etc. We have a directorate called ICT/MST and they have provided strategic document in detail, and so has the IT Department has also worked together with them, I think, and provided some sort of strategic documentation. So there is a strategy in place but I think the implementation of the strategy is not taking off due to budgetary constraints most probably. And due to, I think, in terms of skilled people within the Department to drive this process forward. Cause if you have that kind of drive then you'll be almost as fast as Gauteng in terms of taking off the ICT Strategy, but its been in place but in pockets, its not a consolidated approach its fragmented, and its not showing any outcomes in terms of something real that the Department can be proud of saying: we've now started working towards, what can I call it, the cyber technology in terms of getting everything electronic, and I think the most important thing is the gathering of information. You know, we don't have a data warehouse as yet, we don't have that in place, so for me first thing is that we've asked the IT Department to create the foundation so that any other, what would I say, electronic device or project, can sit on it and have the full backing of that infrastructure. So the most important thing is that our bandwidth is weak, we haven't increased the bandwidth in all our buildings. We find that even if you have a good product where it can give you the necessary information, the bandwidth is weak and then those projects fall because the information trickles in, you know you can't really put in a work based system, so most of the time we go, what would they say… thin client, which is not beneficial for the Department.

Budgetary constraints are limiting the implementation of the ICT strategies

There is no single consolidated strategy for IT, ICT&MST, EMIS etc.

The strategies have not been effectively communicated to management

Insufficient bandwidth and need a data warehouse to be created

Researcher

So the challenge with the information flow is because of the connectivity.

Respondent

Because of the connectivity. The second thing is because of the personnel and the skilled personnel, they need to be skilled to understand the importance of capturing this data. A good example is SAMS, you're capturing the data in most of the schools. The schools will say: yes, we have implemented SAMS. But this data is not consolidated for the use of decision making and it's all lying around there. So I believe there's a project that's been initiated from National where they have come and tried to build a data warehouse, but I haven't seen any improvements as yet. I haven't seen any move towards this so far.

Personnel need to be skilled to understand the importance of capturing the data

Need a data warehouse to consolidate the information

Data is not consolidated.

Researcher

You made mention of budgetary constraints and its something that's come up in a number of different interviews I've had so far. How severely constrained is the budget when it comes to allocating funds towards ICT initiatives? Are they prioritised at all?

Respondent

I think the most important thing is that we need to balance the basket of money that's given to us. In terms of budgetary constraints, you know that at this moment in time we are suffering a major debt that we owe the IMF and due to that they have cut budget in all of the public sectors, and we also have suffered the consequences of the household statistics.

Budget has been cut in all public sectors

Researcher

Looking at the total number of learners in the province?

Respondent

Yah. You find that the household statistics, the number of people in the province has decreased, and we've lost people who moved away to Gauteng etc. Now the equitable share of the budget is based on the number people, number of learners etc. and that's the formula that is created at National. And we in the province over the MTEF period have lost about 6 billion rands. So naturally every Department gets a cut, so we as Education have also got a cut, so we have to, in order to balance the books, you have to also cut in every programme. And so for there forth. As far as possible we wouldn't like to cut in IT, but you know that basically meeting the expenditures of the Department is more important. I mean the first cut is to pay the salaries, and we have taken away almost, we couldn't make the salary bill with the normal budget, so we had no money forthcoming from Provincial Treasury and National Treasury so therefore we had to take away almost a billion rand from infrastructure. So infrastructure is suffering at this moment in time at the expense of compensation for employees. And therefore now in order to give any more money towards progressively moving ICT has diminished. But nevertheless, I think in the last year we have tried to take money from other places and give it to ICT so that the foundation gets ready, and we have tried in most cases, tried to provide money for infrastructure for IT, getting your servers ready etc. but I don't know in terms of bandwidth whose function is it, is it part of SITA where SITA can eventually build us? Or we need to change the strategy instead of going web-based we need to go through the cloud, I don't know if that's more effective.

Meeting the basic expenditures of the Department have to take priority, for example paying salaries.

Researcher

What is the primary motivators now? I hear you saying there's budget constraints. When it comes to e-Governance research has shown that within the public sector implementation of ICT very often has a result in terms of better strategic planning and better interaction with the citizenry, however within specific organisations if there's severe budget constraints then often the motivator is related to cost savings around the implementation of the system to do something that was inefficient beforehand. Where is the Department sitting now in terms of motivations around adopting these types of projects?

Respondent

Sorry just come again?

Researcher

The question I was asking is: the primary motivators for the Department to develop or implement ICT projects, is it still looking at improving service delivery at school levels or efficiencies within the Department itself, or is cost saving a bigger motivator in the current environment?

Respondent

I think we all are looking at trying to move towards e-Governance kind of a thing. But at this moment in time there is EMIS which has a substantial budget which we have allowed them to try to build up the e-Governance collection of data in terms of the schools, and well there's SAMS etc. there is a conditional grant which we have given it to them, but once again, what is happening is there's not sufficient skills out there to project manage and drive this thing. In terms of connectivity, we have taken advantage of government's initiative to say that most schools must be given connectivity, so that's going ahead, but once again I think that the whole budget move/priorities is, and I think one of the 9 or 10 or 11 pillars now, is to get the Department more ICT geared. So the priority is there and also maybe in terms of the initiatives that we're going to ask to Treasury, they give you 2 or 3 initiatives where after your budget you ask for more money, and ICT is one of them. So there is also the huge move towards getting e-Learning on board, there's a lot of initiatives around, but I think Kwazulu-Natal, the terrain, and the number of schools is just too large to implement at one go, and no-one is really motivating that we most probably, I don't know: do it District by District or find out which schools we can implement and move towards it. Just top slice and go ahead with it. But I think these are the things that are part of the MST ICT strategy, they're looking more and Science and Mathematics, trying to get content for them etc. it's really difficult. But then on the other hand, which I would really like is that, would like to have a data warehouse in terms of information, management information, and I think that for me is the most important thing that is lacking in this Department because as far as I know, and have come to this Department, every time we want information it's always an excel spreadsheet and that information has to be verified, needs to be checked. You know there's no consolidation of it, but there are information lying all over, so a data warehouse in terms of management information system, basically for decision making is very very critical, and that is one of the things that we need to work towards and put a business requirement together so that we can tap into information that's lying in different databases. Then have one business intelligence portal so that we can click in and get any information that we want, for example, the basic information is the number of teachers, the number of learners. These are the drivers for expenditure, and this is the information that we as finance need every other day. The other issue is the results, which also need to be checked in terms of information gathering, and once again if you look at the results from grade 1 or maybe from grade 8, 9 and 10, if you consolidated you actually can determine as an early warning signal how the schools are doing right from grade 8 so that by the time they come to grade 10 or 12, you've already got plans of action in terms of your strategy that we're talking about, bounce back etc. because it can give you a consolidated view of what subjects are taking, you know all those kinds of things. SO there's a tremendous thing that needs to be done and for me those are the things that I would try to motivate for budget, try to move money to those areas. If someone comes up with those plans and is really determined to move forward, so that we can over a 3 year or a 5 year period make sure we've got our own portal of information.

(margin annotations)

EMIS is building up the e-Governance collection of data in terms of the schools

Insufficient project management skills to drive e-Governance

ICT is being prioritised now as a result of government's intiative to get most schools connected

ICT is one of the initiatives Treasury is being approached for additional budget for. Budget can be made available for key initiatives

No central information system to consolidate data. Need a Business Intelligence portal for accessing the data.

Researcher

So in terms of overcoming the challenges that you've seen in implementing ICT, you've mentioned now the need for a data warehouse, for management information systems, dash-boarding, business intelligence and all this for decision making. Any other ideas or thoughts around how we can overcome challenges?

Respondent

There's lots of businesses and lots of companies, for example Intel. Intel is not a seller of a product, they're not a supplier. They are manufacturers but they're not interested in coming around to sell you a product. They're interested in coming to support you at the end of the day, and I think many of them are interested in Education and want to come and support, and I think somehow we need to get them inside our system, or get them into our Department and see how they can assist, without promising anything in return. And I'm sure there are many many companies out there that want to get involved and we need to find a way, without contradicting the normal prescripts of the Department. There are a lot of initiatives around, but they are all in pockets, I haven't seen a consolidated initiative as yet. We've made money available for the MEC's projects, we've made money available for ICT MST, we've also given extra 20 million rand to Dr Nzama to look at the resource centres etc. we also gave money to improve Dokkies, but at the end of the day, unless someone else takes initiative, and I think most important thing is initiative. The security is so weak that these equipment get stolen, like we started a conferencing thing in Dokkies and I hear the other day they broke in and they stole everything from there. So I think that its with security etc. etc.

(margin annotations)

Lack of a concolidated approach to projects and initiatives

Security is weak at schools resulting in theft

Researcher

Well thank you very much, is there anything else you'd like to add?

Respondent

Well, all I can say is I'm also passionate about the ICT cyber-technology etc. I've been involved before at National level developing a data warehouse called Vulindlela. I know the value of it I know the value that it's adding now and I wish together with the other stakeholders we can drive these things forward.

Researcher

Ok. Thank you very much, thank you for your time.

SITA
HR
Finance
Change Management
Policy
Information Flow
Governance
Management buy-in
Infrastructure

Researcher

Well thank you very much for agreeing to meet with me, I really appreciate your time, and I will try get this finished within the next 10 minutes or so. As I mentioned your role in the Department is primarily HR related and so I want to try and drill down into issues around HR which may be impacting on ICT. From my discussions I've had with other officials in the Department one of the challenges that has come to light has been that of lack of resources, and in particular there was a lot of talk around HR resources in terms of the number of personnel, but also in terms of the skills within the Department. And I wanted to get your opinion on the matter. Where is the Department going when it comes to HR resourcing for IT, ICT and filling of posts, the potential creation of new structures. I know the Department went through a restructuring recently. What is your take on the situation?

Respondent

I think we're not where we should be because of a number of challenges. I think one problem within the Department is that when it comes to ICT we lack the basics or the basics that we have are not adequate. For instance, just desktops, just laptops, are not adequate in terms of numbers but also in terms of… we don't have enough in terms of numbers but also in terms of quality. We're using very old computers. That's the first part before you even think of how to introduce new things, as technology advances, how to take advantage of those because most of the time the new advances go along with upgrading of what you already have and that's where, that's the problem that we have. Our own computers are quite old, but nevertheless in spite of that I think we are trying to get into the 21st century so to speak. But the progress is quite slow.

When it comes to ICT we lack the basics, or the basics that we have are not adequate. Old obsolete computers.

Researcher

Why is it that the computers within the Department are so old?

Respondent

I think it's financial constraints and not prioritising ICT equipment which maybe could be one of the reasons. I think in the past when the Department was not facing such… we did not prioritise ICT. I remember 6 years ago, and most of our computers are 12 years and older, I mean they were like 2002, mine is a 2003, which means it's quite an old thing, it's 13 years now, 14 years this year. Around 2008 we didn't have that kind of financial problems that we have now, but we then increased the number of posts for educators, and maybe around that time, that's when we should have injected ICT into the system, but we went the route of appointing more teachers. Which is why for example, when in Gauteng they talk about being top province ICT-wise, you can trace it back to decisions they made at a particular point in time, not now, decisions they made maybe 10 years ago. They have not been increasing the numbers of teachers for example, rather investing their money in ICT when we are investing our money in employing more teachers. That's fundamentally the difference between us and a province like Gauteng. But we have now realised that that might not have been the correct decision, but at the time with the pressures that were there, it looked right. Now we are no longer creating more teacher posts, and with the budget, may possibly allow us, although it may take time, but it will possibly allow us to buy a few new computers which I think we are doing now, and we introduce new systems, for example in HR we want to do systems for leave management, recruitment and appointment systems, where people don't necessarily have to always bring hard copy application forms, where people can apply online, things like that are things that we have thought about.

When the funds were available back in 2008 the Department chose to prioritise employment of teachers. This also created the current salary burden that is hindering budget availability

Systems for leave management as well as recruitment & selection are needed

Researcher	I came across a document put together by the Head of the Department, Dr Sishi, talking about the education landscape, and the challenges, general challenges, and specific challenges that are existing at a district/school level and that sort of thing, so I'm seeing from what he's saying there, in terms of just the availability of education to the children, the distances travelled and that sort of thing, and although you're saying that it was a decision in 2008 to employ, perhaps we'll find that it's not really the wrong decision, because obviously back then with less teachers it would have been even more difficult. What is your opinion as to where the Department's going now in terms of the Strategy around this lacking of resources now? Are you seeing a push towards the ICT side of things or is it still going in the traditional way, trying to alleviate the poverty at district levels?	
Respondent	I think with this year's budget, there is some money which has been set aside for improving ICT's strategy, I mean ICT capability within the Department. Something which has not happened in years. I think it's a welcome development.	**There appears to be budget set aside for this year for improving the ICT capability within the Department**
Researcher	One of the difficulties with introducing new systems into organisations is the resistance the staff members that would have to use it. Do you think that there's a significant amount of resistance from staff members to start using new technology, or are they quite open to new systems coming in?	
Respondent	I think they are, but they will need training of course. They are keen to but they will need training and re-orientation in terms of systems that may come in.	**Users are open to the introduction of new systems however training is needed**
Researcher	In terms of training, how much training is the Department undertaking annually?	
Respondent	I think the financial constraints have resulted in us not even undertaking training the way we would have wanted to. But this year we have put aside 109 million for that, for training, and we are hoping that a lot of training will be taking place.	**Financial constrains have also impacted on training. Budget has been set aside this year for training.**
Researcher	How much of that training would be utilised for basic computer skills.	
Respondent	A lot of it. I think you can access our work place skills plan, either from the website, or ask Mr Msweli directorate, HRD. Check our work place skills plan, you can see there how much the extent which we are catering for ICT related training.	
Researcher	Part of what I've been looking at is this concept of e-Governance. E-Governance in a nutshell is creating a platform for the public to engage directly with the Department on whatever level is needed, via electronic platforms. So via online, for example parents applying for kids to go to certain schools, these administrative processes. Are there any e-Governance initiatives planned for the next 2 or 3 years that you're aware of?	
Respondent	No. I know that the ICT companies are involved particular in supplying our schools with that, but that is only as far as my knowledge.	**Management are not unilaterally aware of the ICT strategy and the initiatives**
Researcher	Alright. I think that pretty much covers all my direct questions. Knowing what I'm doing, so it's around overcoming challenges in delivering on ICT, is there anything else you'd like to add? Anything you could think of?	
Respondent	I think from the HR side, we want to eliminate the old styles of paper, running of the HR function like your leave forms, your application forms. We do want to convert to ICT driven kind of processes, and we are hoping that in the next 5 years or so, we'll have taken huge steps towards that direction.	**HR wants to convert to ICT driven kind of processes over the next 5 years**
Researcher	One last question, in line with that. What do you think needs to happen in order for the Department to get there? You're saying 5 years hopefully.	

Respondent — I think we need to start investing in improving for instance our servers and stuff like that. Just give an example: 3 years ago we developed, about 5 years ago we developed a recruitment capturing tool for capturing of applications all over, but it's always not functioning well because our servers don't work quite the way they should be working. In other words there are ideas about how to improve things but sometimes they come short because of those things.

Systems developed don't function well because the servers aren't functioning the way they should

Researcher — I'm wondering what obstacles there might be in understanding "OK this is where the Department wants to go with these systems" so we list what might be required – are there obstacles from say National DOE that restrict your ability to…

Respondent — Yes, they say they are coming up with a universal HR system that's going to cover the whole country, and you wait for that and it never comes. And in the meantime they say "Provinces don't do your own thing because we don't want a proliferation of various systems and processes", but other provinces end up doing things, like Western Cape they ended up doing it, Northern Cape they ended up doing it, in spite of the National directive that was saying "let's stop all attempts at the procuring process of systems"

National are developing systems for adoption by all provinces, however extensive delays in delivering on these systems frustrate the process and cause some provinces to go their own way, whilst others like Education are forced to continue relying on paper based systems.

Researcher — So National is trying to centralise systems, but they're not delivering?
Respondent — They're not moving fast enough.
Researcher — And in terms of creating structure within ICT, within the Department, in order to support the systems going forward?
Respondent — I think we are far behind there, I think there we are actually lacking.
Researcher — Is there anything in particular that obstructs that process?

Respondent — I think that in the creation of posts now, when we devised the new organogram maybe we omitted to move in that direction, but the organogram is being reviewed now and I think it's something we'll have to consider.

The organogram which was devised did not cater for ICT, however it is being reviewed now

Researcher — Is it something that can be changed easily or is it something that has to go through quite lengthy processes?

Respondent — It may go through quite lengthy processes, but I think that the idea is to provide district ICT support rather than the situation where the centralised kind of support now. And the idea is also to ensure we use our own IT specialist to the full rather than rely on SITA and so on. I believe that maybe we are not utilising our own people to the full, because there are possible systems that they could develop themselves without necessarily involving procuring of things outside, or with minimal procuring of things from outside. I think that's the area that we have not pursued vigorously, but which if we can have even more staff in the unit concerned, we could then consider doing / expanding.

There is an intention to provide IT support technicians at District level

There is a desire to use internal IT specialist to the full, particularly in system development

It is understood that additional staffing is needed to achieve this however

Researcher — The relooking at the organogram as you were talking about. Is that something that is finalised and implemented within the Department itself, or does it have to go for National approval.

Respondent — It has to go for National approval, but what we are doing now it won't result in significant changes. It's a question of doing away with some posts in order to activate others within the organogram. So, it's something that wouldn't meet any resistance at National level because we'll be showing them that we're creating these posts because we have de-established these. Or we have dealt with the duplication that was here in order to open up space for…

There is a process underway to eliminate duplicate and unnecessary posts and to move those posts to areas like ICT.

Researcher — That conversation around posts that sort of become duplicated when functions change within the Department, as well as possibly the use of ICT changing the functions required and maybe reducing a need here and increasing a need elsewhere. Is that kind of conversation happening in the Department fairly regularly?

Respondent	Yah, that's exactly what we've been talking about, the implications. That's exactly what we're discussing at the level of top management.	Discussions around reallocation of posts is happening at Top Management, however there is no ICT related champion in that forum.

Researcher   Well thank you very much for your time, I really appreciate you agreeing to this interview, and I wish you a good day.

Respondent   Thank you.

Researcher	Thank you. I've just got a few questions to start us off with. Mostly revolving around the IT infrastructure and that side of things within the Department. Management of the IT infrastructure of the Department, is it outsourced to a third party?			
Respondent	Well, yeah, technically it is outsourced to a third party because we use the State Information Technology Agency. Even though they are part of government, but technically I'd say they are a third party because they are not part of the Department.	**SITA is the outsourced partner, however are part of government**		
Researcher	What are the roles and functions that SITA undertake?			
Respondent	My understanding is that they provide us with desktop support, they provide us with technical support, they are involved in the procurement process of our ICT resources. That's basically it, they do have a training component to them which in my own view is that it's not been very pronounced. I'm not too sure whether they also have invested that much in that, because even with that they would go to a third party to source a training programme on behalf of the Department.	**SITA tend to outsource to third parties**	**Training has not been pronounced**	
Researcher	When you say they are involved in the desktop side of things, support and that, does that include the support of schools or is it just within the Department.			
Respondent	No, it only involves the administrative side of the Department. The schools side… no they're not involved with that.	**No support for schools. Is not part of the SITA services**		
Researcher	What would you say is the penetration ratio for IT and computers within the schools?			
Respondent	It is… we separate it into two – for computers, we have computers that will be used purely for administrative purposes, and then we have computers and allied equipment that could be used / infrastructure that could be used to support teaching and learning. With computers for administration, the penetration is 100%. The use of computers for teaching and learning also varies, because you will find a school with a computer laboratory (so-called) with perhaps 10 – 15 computers, then the next thing would be a school with a laboratory with up to 30, and you find a school with more than 1 computer laboratory. So it's quite a mixed bag and there is no standard that one could put to it. What we rely on is to say, one school, depending on its size may be using a laptop, a data projector, to support teaching and learning and move that from one classroom to another. Another school the latest would be to buy laptops or tablets in a trolley that charges them, which can then be wheeled from one classroom to another. So it's quite a varied bunch, but the penetration… if we're to say schools that sometimes use computers for teaching and learning, there would be less than a third of the 6000 odd schools that we have.	**Penetration of computers within the administration is 100%**	**Penetration of computers within schools is less than 33%**	**There is no standard for ICT within schools**
Researcher	Ok. Thank you. I'm wondering, in terms of: you mentioned a standard – that there isn't a standard that goes, is there an intention to develop a standard?			

Respondent

As a Department we have developed a standard, but it's also a moving target, because we're moving away from the laboratory concept, I mean, if you will remember, when computers started in Western Europe and the United States, the laboratory was the standard, and then there was a move towards moving technology to a classroom, where you'll have an interactive whiteboard, a projector and a computer, so you'd be able to kit more than one classroom. Now the move is towards mobility and also a multi-device type of environment, where you're not just looking at the desktop, or the laptop, or the netbook, but you're saying whatever device a person has, must be able to be floated on that platform. So as a Department, what we've adopted is to say: let a school have a very good server that will then have a router, in the server you will have all your content for all the subjects, and then you'd have a very robust wireless network in the school which will be able to provide access to that content wherever you are in the school, we're far from that but that's the standard we're aspiring towards, so whatever device you bring in whether it's your own device or it's the school's device, you're able to access the content on the server.

The Department has developed a standard but it is constantly in need of updating due to changing environments and changing best practices

Researcher

And, in terms of the strategy of the Department, is the Department's strategy aligned with the strategy for delivering to schools at this point?

Respondent

Now it is because it was only ratified, the Department's strategy after a long time was only ratified at the recently held Education Summit, so it is, and it's also aligned with the white paper 7. So yes it is.

Policy was only recently ratified

Researcher

OK. In terms of other organisations or groups that get involved, does the PGITOC, GITOC and National DOE have any impact on the delivering of ICT into schools?

Respondent

GITOC and PGITOC I wouldn't be too sure, we've tried as a Department to engage those structures, particularly in terms of… there was the issue of government second-hand computers from government departments being directed towards the Department of Education. We're very uncomfortable with that, we had engaged PGITOC, not GITOC, because I think GITOC would be National, and we said to PGITOC: look in as much as it might look very attractive, we might be burdening schools, because second-hand electronic equipment is very hard to maintain, and therefore we also engage our own IT section to say that they should come up with a policy, which should be distributed to schools to say: you don't just receive, whether it's a donation, or whatever form, second-hand equipment that will end up eating into your financial resources for you to maintain.

Government replaced computers were being directed to schools, however the maintenance of these generally extremely old machines is a significant cost burden for the schools.

Policy on donation of computers to schools is needed

Researcher

What have you experienced to be the challenges in delivering on both ICT at schools, and ICT internally in the Department? I'm look at from both infrastructure and systems side.

Respondent

Within the Department, I think maybe it's our own financial policies that are not very much in line, because I'm not too sure why we continue to buy computers for our own use as a Department when the total cost of ownership is very high. If you lease, it might look very expensive at the beginning, but you leave the risk with another person, if something happens, the person you're leasing from comes and takes, swaps, replaces, you don't own the equipment, and when it comes to the end of its lifespan, the person you're leasing from takes it away. I really don't understand why we haven't gone that route of purchasing a service, like you do with cell-phone companies, you don't buy handsets because it would be unaffordable, handsets sell for over 8 to 10 thousand rands, so you won't fork out that much money, you buy a contract, which carries with it the handset, and I thought we could have gone that route, and also if we have people in the Department who have the expertise to run that such, maybe rely on them to say: this is the most cost effective way that the Department should be doing things. Instead of these things being top-down and most of our decisions are supposedly financial, like all government departments, but we tend to be penny-wise and pound-foolish in most things.

The financial policies within the Department may not be aligned with current best practice and may not be the most cost-effective solution

Changes to the way in which the Department procures computers needs to be discussed with Management

Without appropriate governance, discussions around how to procure ICT equipment may not be effective in arriving at robust decisions

Researcher

Are there any e-Governance initiatives that are currently being planned in the Department, that you're aware of?

Respondent

No, except that the MEC is very eager for us to use ICT as a platform. What we're working on now with the EMIS section is to get a dashboard, which was developed by the Dell foundation which has got data for most of the schools, schools that use the South African… student management system called SASAMS. Using that dashboard you can at the touch of a button look at the provincial data, data in a district, data in a school, and even drill down to a learner. So we're moving towards adopting that, and the first district that will be piloted is Uthukela, where we will get all the data on every learner, every school, every circuit office, every district office, so that whoever sits anywhere is able to just go there and say what's happening.

> **MEC supports the use of ICT as a platform.**

> **A dashboard is planned for development with EMIS for school and learner information**

Researcher

OK. On the e-Learning side of things, what is the current state of e-Learning in the province?

Respondent

It's also very chequered, depending on… then also there's no shared definition on what e-Learning is. For some people, e-Learning is learning and teaching content in a digital format, which is not necessarily e-Learning. So in as much as we are still to have a shared definition means, in terms of materials that we use, the platforms that we use, but as things are, a person that perhaps uses a DVD will say they are using e-Learning. So, no, it's not only in this province, I think the whole country has not kind of embraced it. We have made several representations to National Department to say: like we did with textbooks, let's now have the same kind of regimen with e-Content. So that if a teacher or a school wants to purchase something, they know exactly what it is, like it is with the textbooks. So we have material that has been evaluated and signed off by the Department and is put in a category to say: in this suite of materials this is what you can choose.

> **There is no shared definition on what e-Learning is**

> **A policy was ratified that is aligned with white paper 7 however the content has not been communicated effectively enough to ensure a common definition**

> **Without the proper governance structures, the high level conversations around e-governance and e-Learning are not happening**

Researcher

OK. We've spoken about some challenges so far, and the primary one that you highlighted is around the financial systems in the Department, are there any other challenges that you're aware of?

Respondent

The biggest challenge is that ICT is dependant on the type of telecommunications infrastructure that you have, and unfortunately that's not the competency of the Department of Education, it lies outside, it's the competency of the Department of Telecommunications. Now in as much as you don't need connectivity constantly in respect of e-Learning, but connectivity is critical for you to be sure that you update your virus definitions, you also update your material, you communicate with other people when the need arises. If for example a learner was to, or a parent wants to communicate with the school, you need connectivity. Now the issue then becomes the telecommunications infrastructure in the province is almost non-existent to be able to support e-Education. We now have to come up with hybrid models that will work offline and then you can come back online at some stage. The other issue is the technical support infrastructure, because schools need to be supported, if they have gadgets, those gadgets need to be supported, technically. That also is not there, and that, in terms of the policy, Departments like your Trade and Industry, are supposed to setup incubation centres where people who have just graduated, either from your Universities of Technology or your FET Colleges, or TFET Colleges as they are called now can be housed and work in the local environment. That is also not happening. So those are the issues that are really… and finally it's the social scourge of crime, where you put resources into schools, and schools are broken into. The issue of refreshing technology, you can put a state of the art laboratory in a school, 3-4 years down the line, that technology's outdated. Those are all the issues that we haven't managed to…

> **Telecommunications infrastructure is not sufficient to support e-Learning**

> **Computer refresh rate at schools is not sufficient to maintain the ICT functionality at schools**

> **Inter-governmental functionality is lacking particularly around the creation of incubation centers which will offer support to schools**

> **Insufficient support for schools**

Researcher

What would you like to see happening moving forward for the Department, both internally and within the schools?

Respondent	I think it would be for the Department to embrace the new trends, because we can't be working as if we were in the last century. We should be able to move with the times, as a Department of Education, we are custodians, we are supposed to be setting the pace, the cadre of people that we produce are supposed to be the leaders of tomorrow, now if we are in the stone age, the people we produce will not be able to embrace what they come up to meet in their environment in the future.
Researcher	You made mention about core competencies and it raises a question that I've come across in my reading, which looks at the governance of ICT within both, mostly in public sector, and the difference between a centralised type of governance whereby ICT is external to government organisations, an organisation on its own, with its own staffing and everything and budget, that then takes care of all the other Departments, or a decentralised / federated governance where each Department has their own section. What would you classify the Department's governance structure in terms of that, and is it working?
Respondent	It is centralised, because all government departments are supposed to be using the State Information Technology Agency. There were good intentions, because the thinking was that you would then increase the buying power of the agency, and its muscle to be able to negotiate cheaper prices with government, but I think where we lost the plot was: the needs of different Departments are totally different and there isn't that much of a saving that you can do, because the industry, the IT industry is really quite closely knit and it would take much more than government's muscle to unbundle and things like collusion and fraud. I also thought when in the early 2000s there was a move towards a centralised service agency like SITA that also you'd be having your resources in terms of human would also be maximised and be shared by Departments, I really don't think it was a good idea, because perhaps with this you need an in-house support structure that will provide support that is peculiar to that Department. What happens in Health is totally different from what happens in Transport, what happens in Education, so the IT needs for the Department of Health is not the same as that of the Department of Transport, or the Department of Education.
Researcher	OK. Well thank you very much, is there anything else you'd like to comment on before we close the interview.
Respondent	No, thank you and good luck.

The overall governance is centralised

There is a need for an in-house support structure as each Department's needs and functions are completely different

Researcher	Good morning. As I was saying, thank you very much for agreeing to this interview. With your role as it is, within IT Services, most of the questions are going to be looking into challenges you're experiencing within IT, as well as getting an idea of the environment of IT within the Department currently. The first thing I wanted to look at is the management of the IT infrastructure. Has that been outsourced to a third party?
Respondent	No.
Researcher	What roles or functions within IT has been outsourced?
Respondent	We basically rely heavily on SITA currently to do quite a few of the projects that we are doing in terms of IT. We rely on SITA to do project management for projects that we embark on. We also rely on SITA to do procurement whether it be of hardware, or any other IT Services that we require. Because of our staff shortages, we don't have the required skills currently that we can utilise in terms of ensuring that we avert going to SITA or to 3rd parties. So we are kind of forced to rely on SITA.

SITA is relied upon to do procurement and project management   **Staff shortages force more reliance on SITA**   **Lack of skills internally force more reliance on SITA**

Researcher	Do you have any existing Service Level Agreements with SITA?
Respondent	Yes we do have a Service Level Agreement, it is in existence however we are in the process of reviewing that to ensure that SITA is able to deliver and in cases where they are not able to deliver, we are able to take some action against SITA. But basically we are trying to use some of the areas to have some sort of recourse, and to try and strengthen what we expect SITA to give us. So the Service Level Agreements, they are in existence with SITA, but sometimes you find that due to the nature of how we work, we end up dropping the ball in terms of reviewing them regularly. You only tend to have an issue if you run into something, you remember you have a Service Level Agreement and you refer to that. Although we do have monthly SLA meetings with SITA, but they're more into LAN & Desktop support than really looking into other aspects of the SLAs. So the focus mostly becomes under WAN & LAN and Desktop support.

SLA with SITA is being reviewed   **More regular reviews of the SLA is needed**   **Monthly SLA report meetings are held**

Researcher	You were mentioning SLA meetings which WAN, Desktop and LAN, is that the content of your Service Level Agreement?
Respondent	It is, however we would like it to be more detailed. We do get information in terms of call, types of calls that were logged, when they were resolved. However type of information though the way that it is reported on, we are hoping that we can review that and perhaps be able to get more information as the client or as the end-user from SITA, because you do find that you have calls that are pending for quite some time, but when the report comes out you will find that it will meet the Mean Time to Report time frame that you'd have which is 8 hours. So you do find that the reports that you received are not a true reflection of what's happening on the ground, and hence you do get a lot of disgruntled users at the end of the day, who would say I logged a call and it has not been resolved, however SITA would be giving you a different report. So we're hoping that through this SLA that we're currently doing, we're going to be able to actually tighten up those loose ends.

SLA reports need to be more detailed

Researcher	OK. Are there any other outsource partners?	
Respondent	Partners? What do you mean by partners?	
Researcher	Any other organisation which the Department has an agreement with?	
Respondent	That would be your Enterprise Agreement, that would be Microsoft. And then through that you have a Large Account Reseller, so we do have such.	**Microsoft Enterprise Agreement is in place**
Researcher	Why were the roles and functions outsourced to SITA in the first place?	
Respondent	You know that SITA, it's an Act, we are obliged by legislation to source certain services from SITA, so there are mandatory services, and there are those that we can obviously outsource, or use our internal supply chain processes and procedures to procure. So basically we have to abide by legislation, so it is an Act and we have to follow.	**Outsourcing to SITA was mandatory as a result of the SITA Act**
Researcher	OK. So we've discussed sort of the role that SITA's playing in the Department's operations, but what are the expectations from SITA in order to improve on the delivery of IT Services?	
Respondent	A lot. 1, the issue of resources in terms of IT support itself, we have a very huge challenge with regards to that cause there are times where you have shared resources, where you have to share resources with 4 or 3 other Departments, that does compromise a lot in terms of service, especially Districts, where you have users who are there, who have to share a resource with quite a few Departments. And then also, I would like to see SITA play a more of an advisory unit or part of the Department, rather than SITA being viewed as an extension where if you need a service done, or if you need to procure something you go to SITA. So at the moment SITA is more like, you go to SITA if you need to procure a service, I would prefer SITA to be more of a strategic partner with the Department, I would expect SITA to be at a point where they are able to engage with business units within the Department, be able to get information from business units for what it is they would like to see happen, or how they would like to see IT or ICT to be used to enhance their different responsibilities or duties that they are performing, how IT can enhance the performance of their business units and what challenges they are experiencing, because you would find that with SITA you have business units like your HR, which is stationed within Department, you have MST & ICT and other directorates that would at some point have to utilise sort of IT system or something of that nature. So I would say that it's important that there is that dialogue or that communication between business units and SITA, obviously that will need to be co-ordinated by the IT directorate. So SITA comes up being more of a strategic partner than just us going to SITA because we want 1, 2, 3, 4, 5.	**Service is compromised when SITA human resources are shared between too many Departments** / **Need SITA to perform more of an advisory role as a strategic partner that can engage with business units, coordinated by IT Services, to enhance performance and overcome challenges**
Researcher	Mm that makes sense. In terms of the internal structures within the Department, what structures exist for IT related functions?	

Respondent

We have a very big Department, and I would say, with Education, IT is featured in almost every business unit. But you do have business units where IT is of quite prominent importance, for example you have your ICT & MST unit, you have your EMIS unit, Exams… there are quite a few, however what tends to happen is that you find those business units coming to IT just to have a system, for example, procured, or if they need to have a particular software procured, or if they need a particular hardware or equipment. There isn't much interaction between IT directorate and those business units, so in a way you find that there isn't much co-ordination, but even if there are things that IT can do to enhance how those business units function, you'd find that there's still that screen where IT is just viewed as: OK I just go to IT because I need a system and that's it. There isn't much communication, co-ordination in terms of strategizing how IT can be utilised in the Department as an enabler, and how IT can be used strategically. There are units that work with IT, or that require support from IT, but I believe that the relationship between those units and the IT directorate and top management can be further enhanced to ensure that things are managed at a strategic level rather than just operational and what IT needs to do as and when they are required to do.

There are a number of ICT related business units however there seems to not be sufficient consolidation Business units are not involving IT in the development and procurement of systems at a strategic level. Proper governance will help to correct that. Management need to ensure that all IT related projects are channeled through the correct structures

Researcher

You made mention of a few sections, ICT MST, EMIS, Exams. What are the functions of those different sections?

Respondent

MST & ICT is more towards providing ICT in schools, it's more schools, education centres. So your issues of connectivity do come under ICT & MST Technology. So they focus more on schools rather than the administration side where we are based. But they have to liaise strongly with us, particularly when it comes to connectivity issues. But another issue with MST & ICT is that they focus more on the Dinaledi schools, which is about 88 – 90 schools in the province, and the rest you find that they are accommodated as and when you have ad hoc projects that come through either from the MEC or whether it's a CSI project, so that's when we would be roped in as IT, when we have to make sure that we're able to provide the necessary IT support just for those projects. And then you have Exams, Exams go deal… obviously you'd have your Exam mainframe system, so it would be data capturing, so they deal with those types of systems and data. And then you'd have your EMIS, EMIS is quite important for localisation because they house all your data , your information, which is necessary for planning ahead and so forth, they are in a way linked up with IT Services.

Researcher

What challenges exist that impede functioning around those sections and IT?

Respondent

One biggest challenge which I have observed is that every time these business units come to IT, they only come to IT as I alluded to this earlier on, only when they require something, there isn't… they don't come to IT to say: this is where we would like to be, or share their plans with the unit (IT Directorate), so in a way we are not able to advise them properly in terms of saying "for you to get to that point, this is how IT can assist you in terms of workflow for example, or how you can enhance your systems that you've currently got, or whether the systems that you have you really need them or not". So if there could be that synergy, or that open communication with those units, then we'd get a better understanding of what they are about, or what it is that they want to do in the future, what it is that they want to achieve. So they must really see us as people who are there to help as their partners instead of them just seeing us as just people that they can come to only if and when they need something which they would think would benefit them.

The strategies of other ICT related business units are not shared. There is thus no system integration or alignment IT needs to be seen as strategic partners of the various business units.

Researcher	That makes me wonder – the EMIS system, was that developed with IT or is it something completely separate?	
Respondent	The EMIS system is a National system. It was developed Nationally, so I would not have background into how it was developed, but I would assume that IT would have been involved at some point, but at the provinces it was basically cascaded down to us and we had to implement it.	**The EMIS system was developed Nationally and cascaded to provinces, but without the involvement of the provincial IT sections**
Researcher	How much information around the backbone of EMIS is there available to IT? I'm thinking in terms of the platform it's running on, the information it contains, it's updates, how accurate the data is, and that sort of thing. Has that integration happened at all post the implementation, or is it being kept as a separate type of system without actively involving IT?	
Respondent	IT has not been actively involved. In terms of the accuracy of the data, I find it questionable myself at times, because if you still have schools somewhere out there that have no connectivity whatsoever, you do run a risk of information that is distorted somehow, and of not being able to collate all the necessary data properly. The Department sometime would have to resort to actually going out there to the schools to do the physical inspection, a physical count, go there to gather the information, so it might be a bit distorted as it doesn't really link up or sync up with all the other systems that we have, so where we can compare apples with apples, cause currently you might find that you have another system which would somehow collate similar information, for example your SASAMS or LURITS or what-not. They might have information which is not the same, whereas they're looking for something which is identical. So there is some sort of distortion in terms of the quality of information, and the accuracy thereof.	**EMIS data is questionable due to the connectivity challenges and because it doesn't really link up with any of the existing systems** **Physical inspections at schools are often needed to collect and verify data**
Researcher	OK, and I'm assuming that EMIS stands for… Education Management Information Systems. How widely is it used for information purposes within the Department?	
Respondent	I'd say it's mostly used by Districts, Top Management, business units that deal mostly with planning, curriculum section for LTSM purposes, your NSNP (school nutrition). So I would say for planning purposes, finance would definitely use EMIS for allocation of norms and standards and so forth, so I'd say it would be used vastly by those units.	
Researcher	The units that access it, do they have direct access into the system to get the information, or do they have to get that information from somebody else?	
Respondent	They have to get the information from the EMIS unit and make that request.	**The information from EMIS has to be requested from the EMIS unit**

Researcher	So now we've spoken about the role of SITA within the Department, but my investigations have shown that there's also a Provincial Government ITO Council and as well National Department that may have a role to play. What roles do the PGITOC and National DOE have within IT in the Deaprtment?	
Respondent	Well, PGITOC, which is a provincial structure, is basically there to provide a platform, or an arena for government CIOs or head of IT units in various government departments, and its core function really is to make sure there is standardisation, uniformity, and that issues of policy, legislation are being able to be discussed, thrashed out, and to ensure that there is compliance in that regard. Obviously you'd be looking at policies or legislation that come up from National, could be DPSA, could be DBE. SO all those that are discussed at National, they have to cascade down to provinces, so to ensure there's synergy and there's standardisation and uniformity, PGITOC provides a platform for such to happen in the province.	**The PGITOC provides a platform for standardisation and synergy within the province**
Researcher	OK. Is the PGITOC delivering on its expectations.	
Respondent	I have attended one PGITOC. To me it created a platform where CIOs could share experiences, share challenges, and advise each other where they seek advice. To me it more or less provided a platform where ITOs or CIOs can just discuss or deliberate on current policy issues or on current projects perhaps that are being driven from either National or from the Provincial point of view. But besides that I didn't see much value.	
Researcher	Is there any part that is looking at driving specific technologies through the entire province? Maybe developing one system for government to utilise?	
Respondent	Not until recently where we have received communication where they want to have, or develop a leave system. But I'm not finding them being proactive towards having integrated systems, or one service provider for a particular service. They are not very much proactive, for example the issue of telephony, there was talk of how best we can handle that, cut costs, and have one contract, a leave system I've alluded to. No there isn't much of an effort from their side that I have seen, except where it really just becomes a place where everybody raises their frustrations around SITA.	**There is a lack of integrated systems despite the intentions of the PGITOC**
Researcher	The Department's website. How frequently is it updated? Are you aware?	
Respondent	I'd say daily. If by update you mean posting a photo and an odd media statement, one pager, yes.	
Researcher	Who's responsible for doing that?	
Respondent	It would be the Communications Directorate, but I understand that they do it through SITA.	**The website is being updated by the Communications Directorate** **SITA is the webmaster** **Insufficient staffing to handle website updates internally**
Researcher	I'd like now to just have a quick look at e-Governance initiatives. Are there any e-Governance intiatives that are being planned?	

Respondent	There are that are being planned. There is an e-Learning strategy that currently exists within the Department, so yes there are plans to implement.	**There is an e-Learning strategy within the Department**
Researcher	Is there a specific plan for ICT implementation over the next, say 5 years?	
Respondent	Yes. We do have an IT Strategy in place and we also have developed the Corporate Governance of ICT Policy Framework, which is aligned to the DPSA policy framework. So we do have plans in place.	**There is an IT Strategy in place as wall as the Corporate Governance of ICT Policy Framework, which is aligned to the DPSA policy framework**
Researcher	Would it be possible for me to get a copy of those?	
Respondent	Yes.	
Researcher	Thank you. The initiatives in that plan how were they identified?	
Respondent	It was basically, we had to look at where the current state of our Department when it comes to ICT, so having done that then we had to prioritise projects based on that. Obviously you cannot start looking at issues such as implementing a full Enterprise Content Management project without having proper infrastructure in place. Whether you have proper hardware in place, so all of those we had to take into consideration before we could start putting the building blocks towards achieving that optimum standard in terms of IT delivery.	**The IT Strategy was developed in light of the current infrastructural needs and prioritised accordingly** **Proper governance is needed to communicate the IT strategy**
Researcher	OK. What's the approval process for any of these projects?	

Respondent

Ok, just to give you a breakdown on how it works. You'd have the IT unit, within the IT unit you would conceptualise or put together a proposal which is what we call a submission, where you'd have costed what you want to do. Then you'd also have to look at the budget, so before you actually embark on a project you must make sure firstly that it's budgeted for, that there's funding for it, you have to do a procurement plan that's done well before the financial year begins. So once the funds have been allocated and you know that you've got funding for that particular project, then you'd have to put together a submission. Although in your procurement plan it does state that you have particular project that you want to do at a certain time. So you have to do that submission. The submission originates from the Directorate IT, if for example it has to do with infrastructure (cabling or networking) obviously you'd have a particular person within the unit that handles that, so that person would put together that submission, it would have to come through to the office of the Manager: IT Services, from there on it would move to the office of the General Manager, from the office of the General Manager it would go to the office of the Deputy Director General, from the office of the Deputy Director General it will now has to go through to the office of the Chief Director: Financial Services who will have to confirm, before the CFO signs or makes recommendations, that there is really funds available for that project, and then it will go to the HoD, obviously depending if it's something which is more than half a million you've got delegations for different people, then it has to go up to the HoD. SO it's quite a cumbersome exercise.

> **Lengthy project approval process hinders ICT initiative implementation**

> **Management support of the IT Strategy is needed in order to streamline the process**

Researcher

And that's just getting approval for the project?

Respondent

That's just getting approval. You have to do the same thing when you have to request payment to be processed on the same project.

Researcher

What challenges have you noticed that are impeding the implementation of projects?

Respondent

Staffing is a huge huge problem. Obviously the delays in terms of how long it takes for approval, that is a serious problem. Also the fact that we are heavily reliant on SITA is another issue cause with SITA it takes just as long to have the project scoped, finalised, goes out to RFQ, it takes a long time. So the issue of not having capacity within the Directorate or the Department is a huge huge huge stumbling block for us. And obviously funding, that is another challenge that we've got. But I do believe that if we could have more staff I'm sure we would be in a much much better position than where we are currently.

> **Insufficient staff to implement projects**

> **SITA procurement processes introduce significant delays**

> **Funding is a challenge**

Researcher

How can these challenges be overcome? Or what do you need in order to be delivering?

Respondent

I believe it is important to have support, especially from top management, for them to get an understanding or begin to appreciate how important IT is in enhancing service delivery. I think it's high time that top management does realise that IT is here and it's big and we need IT as a Department of this size, to actually mitigate some of the problems there are, I mean take for example the leave qualification that we got from the Auditor General over how we capture or keep records of leave that is taken by employees. That can be averted only if IT could be involved and top management can make sure that IT does participate or is represented at the various strategic meetings that they've got. So they have strategic meetings, however whatever things that get discussed do not cascade down to IT. So we do not know how best we can assist the Department going forward. So I think if we can have that buy in from top management it would assist immensely. We were actually able to move now forward and actually have some budget allocated to us this year, because I believe it was the pressure that top management was getting from AG in terms of how the Department is fairing in implementing ICT Governance, otherwise I don't think that we would have received any funding at all.

> **Management support is crucial for them to get an understanding of, or begin to appreciate how IT can enhance service delivery**

> **There is no IT representation at strategic meetings**

> **Information is not cascaded down to IT so alignment and support of strategic initiatives is impossible**

Researcher

In terms of the Governance structure, what structures currently exist within the Department?

| Respondent | We do have an ICT Steering Committee but it is not meeting as regularly… it did meet regularly for some time, but then like I said also again, if business units do not start seeing ICT or IT as a strategic partner, they only just see us as: if my computer is not working or whatever. So we do have that structure. We are still trying to have a proper structure which is at a strategic level which can be headed for ecample by DDG, or someone at that level. So currently we do have an IT Steercom which is basically situated within the office of the Director IT. | An ICT Steering Committee exists in the Department, but is not meeting regularly. A proper governance structure has not as of yet been created. | ICT Steering Committee is not feeding in at a strategic level as it is not chaired at a high enough level |

Researcher	So it's chaired by?
Respondent	It's chaired by a Chief Director for Organisation Transformation and Strategic Management.
Researcher	I think that's everything. Is there any other comment, understanding what I'm looking for, anything you'd like to add?
Respondent	No.
Researcher	Thank you very much for your time.

ANNEXURE

B

															IT Penetration Ratio			Internal Roadblocks							Other Internal Roadblocks					External Roadblocks						Other External Roadblocks				
	Question	1	2	3	4	5	6	7	8	9	10	11	12	IT Infrastructure Capability	Total number o computers	Total number o staff	Ratio	Lack of adequate manpower	State Policies/ Acts	Inter-departmental dependencies	SCM procedures	Corruption	Accounting	Budget Allocation	Ineffective systems(bas , persal, management systems)	ICT equipment (old and insuffient)	Insufficient network and internet access	Inadequate skills	Logistical issues	Funds/Grants	Infrastructure	Delivery Channels	Demand / Supply mismatch	Public Private Partnership models	Role of PGITOC / GITOC					
Official	1	5	5	5	5	5	5	5	5	5	1	5	5	5	1	1	1	1	1	1	1	3	1	3						3	3	1	1	1	1					
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	8	4	4	4	4	3	4	4	5	5	1	5	5	4	10	9	1.1111111	1	3	3	3	3	3	3						3	3	3	3	3	3					
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	35	3	4	4	4	4	4	4	3	3	3	4	4	3	300	500	0.6	2	3	3	5	5	5	5						4	4	3	5	3						
	36	4	4	5	5	5	5	5	2	5	4	5	5	5	1	1	1	1	3	5	5	5	5	5		5	5	5		2	4	4	5	5						
	37	2	2	2	2	2	2	2	2	2	2	2	2	0	1	1	1																							
	38	5	5	2	2	2	5	4	2	2	4	2	3	4	1	1	1	5	5	5	5	5	5	5						5	5	5	5	5	1					
	39	5	5	5	5	5	1	4	1	1	1	1	1	0	1	1	1	5	3	3	3	5	5	5						5	5	5	5	5	5					
	40	2	2	2	2	2	2	2	2	2	2	2	2	0	1	1	1	5	5	5	5	5	5	5						5	5	5	5	5	5					
	41	4	4	4	4	4	4	4	2	4	4	4	2	2	4	10	0.4	5	5	1	5	1	1	5						5	5	5	5	5	5					
	42	5	5	5	5	5	5	5	5	5	1	5	5	4	3	3	1	5	3	3	5	3	3	3						5	3	2	2	2	2					
	43	5	5	5	5	5	5	5	4	5	1	5	5	4	2	3	0.6666666	4	3	3	4	3	3	3						4	3	2	2	2	2					
	44	5	5	5	5	5	5	5	4	5	1	5	5	4	1	1	1	4	1	2	2	2	1	5						4	3	2	3	2						
	45	5	5	5	5	4	4	3	3	3	3	4	4	4	1	1	1	2	3	3	1	1	2	1						1	1	1	1	1	1					
	46	5	5	5	5	5	5	5	5	5	5	5	5	5	1	1	1	5	3	5	5	3	4	5						5	5	4	4	4	3					
	47	5	5	5	5	5	5	5	5	5	1	5	5	0	1	1	1	5	3	5	5	3	4	4						5	5	4	4	4	3					
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	62	4	4	4	3	4	4	4	4	4	2	4	4	0	30	30	1	3	2	2	2	1	2	2						5	5	5	5	5	5					
	63	4	4	4	3	4	4	4	4	4	2	4	4	0	30	30	1	3	2	2	2	1	2	2						5	5	5	5	5	5					
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	69	4	4	4	4	5	4	4	4	4	4	5	4	4	1	1	1																							
	70	4	5	5	5	5	5	5	5	5	0	5	5	4	1	1	1		5		5		5	5								5								
	71	5	5	5	5	5	5	5	5	5	5	5	5	0	1	1	1																							
	72	5	5	5	5	5	5	5	5	5	3	5	5	4	1	1	1	1	1	5	5				5	5	5		5											
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	75	3	3	3	3	3	3	3	3	3	3	3	3	4	30	30	1	2	2	2	2	2	2	2						5	5	5	5	5	5					
	76	4	4	4	4	4	4	4	4	4	2	4	4	4	30	30	1	2	2	2	2	2	2	2						5	5	5	5	5	5					
	77	4	4	4	4	4	4	4	4	4	2	4	4	4	30	30	1	3	2	2	2	3	2	2						5	5	5	4	4						
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	79	4	4	4	4	4	4	5	4	4	1	5	4	4	24	22	1.0909090	3	4	3	5	4	4	5						4	3	5	5	4	3					
	80	4	4	4	4	5	4	4	4	4	1	4	5	4	24	22	1.0909090	1	3	3	3	3	2	5						3	3	2	3	4	3					

ICT enables me to accomplish tasks more quickly

Response	Number of Respondents
Strongly Disagree	0
Disagree	3
Neutral	7
Agree	40
Strongly Agree	30

	Question 1	Comment
Mean	4.2125	
Standard Error	0.084744123	
Median	4	
Mode	4	The most frequesntly occuring value
Standard Deviation	0.757974483	
Sample Variance	0.574525316	
Kurtosis	0.963763539	Positive Kurtosis indicates a relatively peaked distribution
Skewness	-0.915321907	Negative skewness indicates a distribution with an asymmetric tail extending toward more negative values
Range	3	
Minimum	2	
Maximum	5	
Sum	337	
Count	80	
Confidence Level(95,0%)	0.168678958	

ICT enables me to accomplish tasks more quickly

Using ICT improves my job performance

Response	Number of Respondents
Strongly Disagree	0
Disagree	2
Neutral	7
Agree	37
Strongly Agree	34

	Question 2	Comment
Mean	4.2875	
Standard Error	0.081895561	
Median	4	
Mode	4	
Standard Deviation	0.732496166	
Sample Variance	0.536550633	
Kurtosis	0.820638917	
Skewness	-0.907105293	
Range	3	
Minimum	2	
Maximum	5	
Sum	343	
Count	80	
Confidence Level(95,0%	0.163009037	

Using ICT improves my job performance
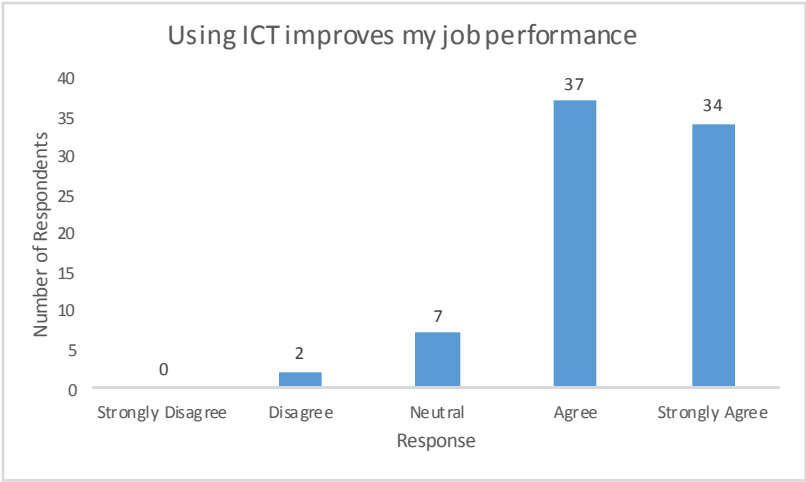
Using ICT increases my productivity

Response	Number of Respondents
Strongly Disagree	0
Disagree	4
Neutral	6
Agree	40
Strongly Agree	30

	Question 3	Comment
Mean	4.2	
Standard Error	0.087872174	
Median	4	
Mode	4	
Standard Deviation	0.785952619	
Sample Variance	0.617721519	
Kurtosis	1.123739872	
Skewness	-1.014022346	
Range	3	
Minimum	2	
Maximum	5	
Sum	336	
Count	80	
Confidence Level(95,0%	0.174905187	

Using ICT increases my productivity
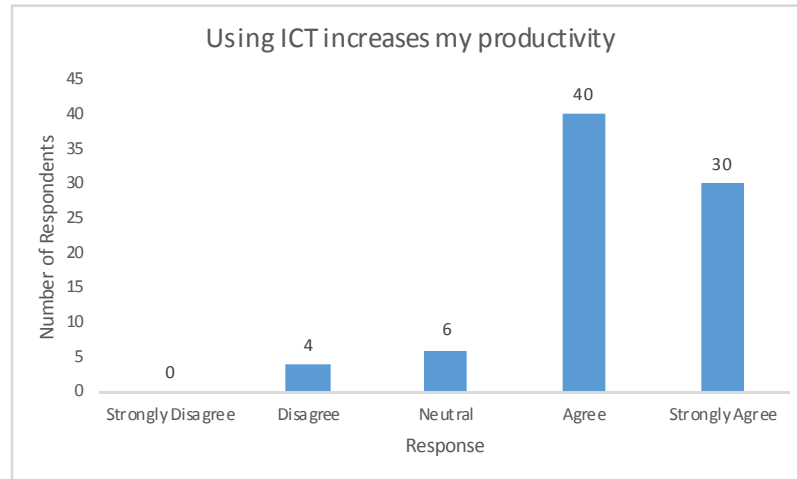
Using ICT enhances my effectiveness on the job

Response	Number of Respondents
Strongly Disagree	0
Disagree	3
Neutral	20
Agree	26
Strongly Agree	31

	Question 4	Comment
Mean	4.0625	
Standard Error	0.099593716	
Median	4	
Mode	5	
Standard Deviation	0.890793275	
Sample Variance	0.793512658	
Kurtosis	-0.867657169	
Skewness	-0.455012971	
Range	3	
Minimum	2	
Maximum	5	
Sum	325	
Count	80	
Confidence Level(95,0%	0.198236333	
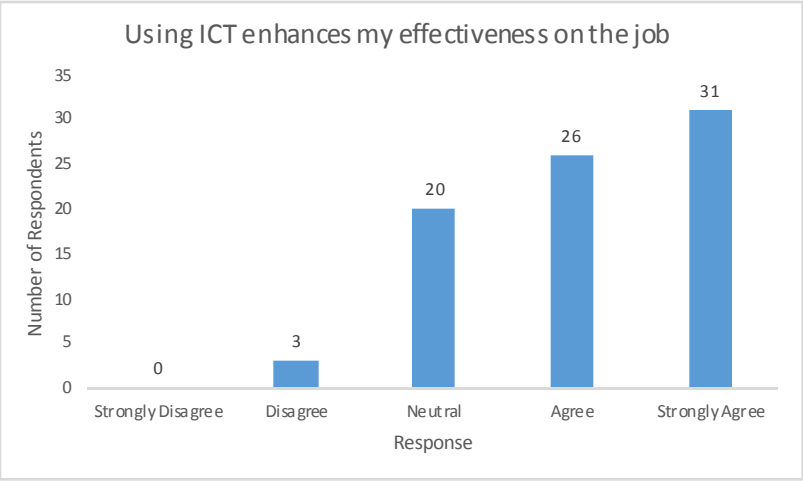
Using ICT makes it easier to do my job

Response	Number of Respondents
Strongly Disagree	0
Disagree	3
Neutral	10
Agree	33
Strongly Agree	34

	Question 5	Comment
Mean	4.225	
Standard Error	0.090663867	
Median	4	
Mode	5	
Standard Deviation	0.810922275	
Sample Variance	0.657594937	
Kurtosis	0.305992893	
Skewness	-0.875914234	
Range	3	
Minimum	2	
Maximum	5	
Sum	338	
Count	80	
Confidence Level(95,0%	0.180461912	

Using ICT makes it easier to do my job
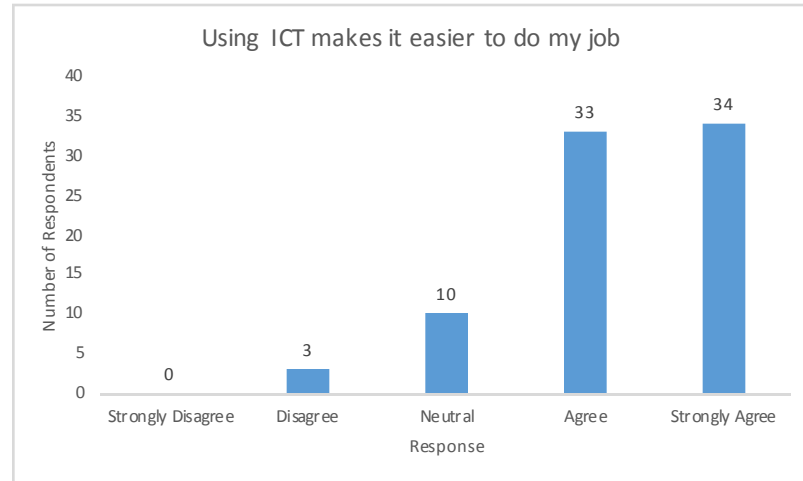
Overall, I find ICT useful in my job

Response	Number of Respondents
Strongly Disagree	1
Disagree	3
Neutral	5
Agree	39
Strongly Agree	32

	Question 6	*Comment*
Mean	4.225	
Standard Error	0.092392599	
Median	4	
Mode	4	
Standard Deviation	0.826384531	
Sample Variance	0.682911392	
Kurtosis	2.874242162	
Skewness	-1.410837574	
Range	4	
Minimum	1	
Maximum	5	
Sum	338	
Count	80	
Confidence Level(95,0%	0.183902869	

Overall, I find ICT useful in my job — bar chart of Number of Respondents by Response: Strongly Disagree 1, Disagree 3, Neutral 5, Agree 39, Strongly Agree 32.
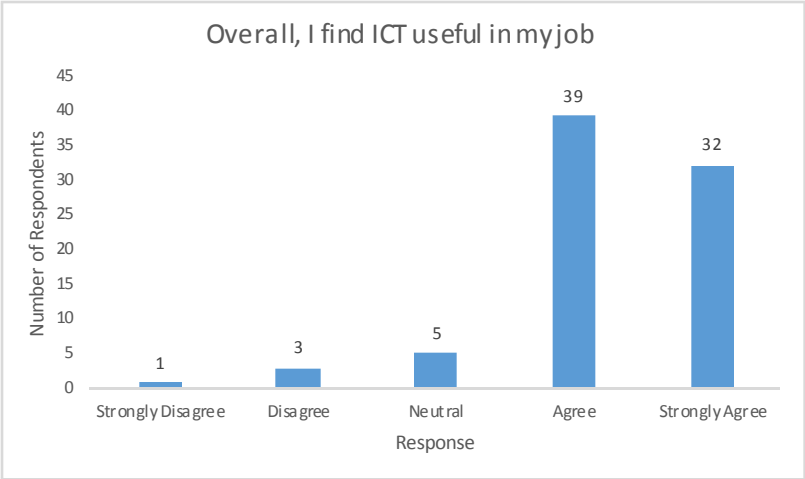
Learning to operate the computer/system is easy for me

Response	Number of Respondents
Strongly Disagree	0
Disagree	2
Neutral	10
Agree	39
Strongly Agree	29

	Question 7	Comments
Mean	4.1875	
Standard Error	0.083616344	
Median	4	
Mode	4	
Standard Deviation	0.74788732	
Sample Variance	0.559335443	
Kurtosis	0.3036209	
Skewness	-0.694663436	
Range	3	
Minimum	2	
Maximum	5	
Sum	335	
Count	80	
Confidence Level(95,0%	0.16643417	

Learning to operate the computer/system is easy for me
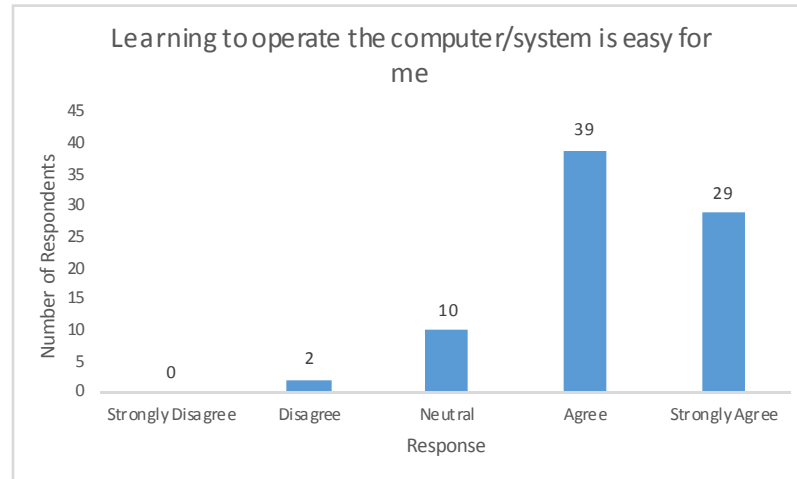
I find it easy to get the computer/system to do what I want it to do

Response	Number of Respondents
Strongly Disagree	1
Disagree	8
Neutral	8
Agree	42
Strongly Agree	21

	Question 8	Comments
Mean	3.925	
Standard Error	0.104903512	
Median	4	
Mode	4	
Standard Deviation	0.938285536	
Sample Variance	0.880379747	
Kurtosis	0.70550892	
Skewness	-0.979429658	
Range	4	
Minimum	1	
Maximum	5	
Sum	314	
Count	80	
Confidence Level(95,0%	0.208805218	

I find it easy to get the computer/system to do what I want it to do
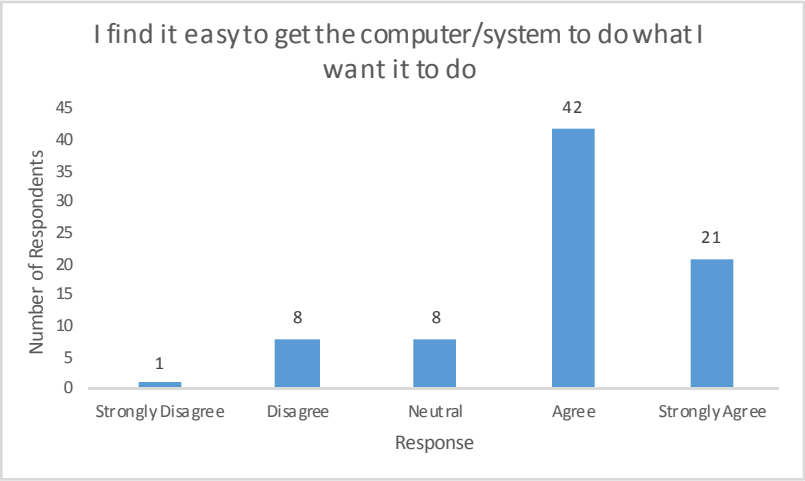
Usage of the computer/system is clear and understandable

Response	Number of Respondents
Strongly Disagree	1
Disagree	4
Neutral	8
Agree	42
Strongly Agree	25

	Question 9	Comments
Mean	4.075	
Standard Error	0.09542543	
Median	4	
Mode	4	
Standard Deviation	0.853510992	
Sample Variance	0.728481013	
Kurtosis	1.837911364	
Skewness	-1.148062208	
Range	4	
Minimum	1	
Maximum	5	
Sum	326	
Count	80	
Confidence Level(95,0%	0.189939567	

Usage of the computer/system is clear and understandable

Bar chart of Number of Respondents by Response: Strongly Disagree = 1, Disagree = 4, Neutral = 8, Agree = 42, Strongly Agree = 25.
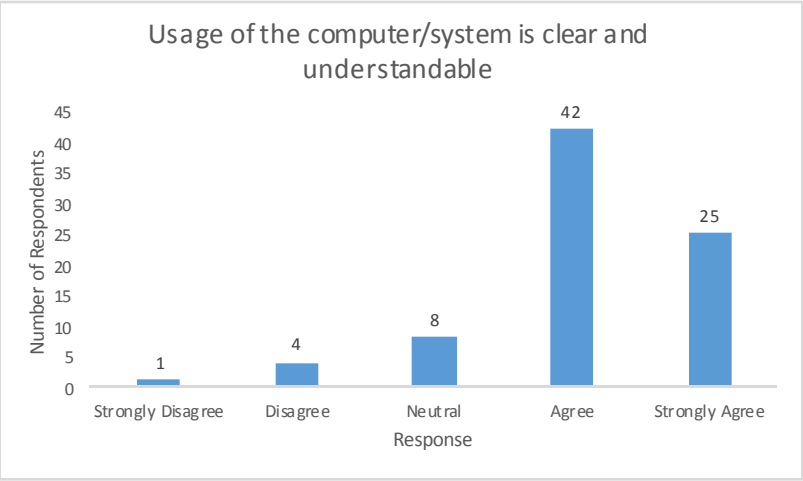
I find it cumbersome to use the computer/system

Response	Number of Respondents
Strongly Disagree	25
Disagree	27
Neutral	14
Agree	11
Strongly Agree	2

	Question 10	Comments
Mean	2.1875	
Standard Error	0.127157022	
Median	2	
Mode	2	
Standard Deviation	1.137326979	
Sample Variance	1.293512658	
Kurtosis	-0.484157337	
Skewness	0.573552825	
Range	5	
Minimum	0	
Maximum	5	
Sum	175	
Count	80	
Confidence Level(95,0%	0.253099721	

I find it cumbersome to use the computer/system
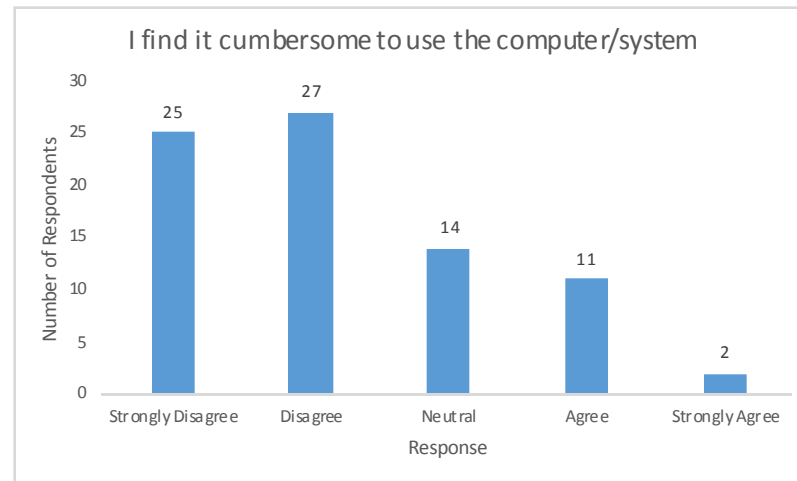
It is easy for me to remember how to perform tasks using computer/system

Response	Number of Respondents
Strongly Disagree	1
Disagree	5
Neutral	5
Agree	35
Strongly Agree	34

	Question 11	*Comments*
Mean	4.2	
Standard Error	0.101257911	
Median	4	
Mode	4	
Standard Deviation	0.90567829	
Sample Variance	0.820253165	
Kurtosis	1.88290105	
Skewness	-1.354753199	
Range	4	
Minimum	1	
Maximum	5	
Sum	336	
Count	80	
Confidence Level(95,0%	0.20154883	

It is easy for me to remember how to perform tasks using computer/system
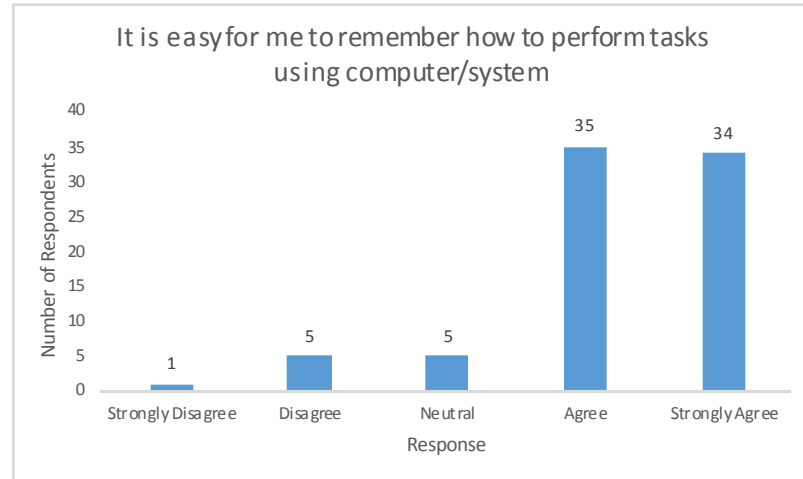
Overall, I find the computer/system easy to use

Response	Number of Respondents
Strongly Disagree	1
Disagree	3
Neutral	7
Agree	36
Strongly Agree	33

	Question 12	*Comments*
Mean	4.2125	
Standard Error	0.095290611	
Median	4	
Mode	4	
Standard Deviation	0.852305139	
Sample Variance	0.726424051	
Kurtosis	2.22156569	
Skewness	-1.30747883	
Range	4	
Minimum	1	
Maximum	5	
Sum	337	
Count	80	
Confidence Level(95,0%	0.189671218	
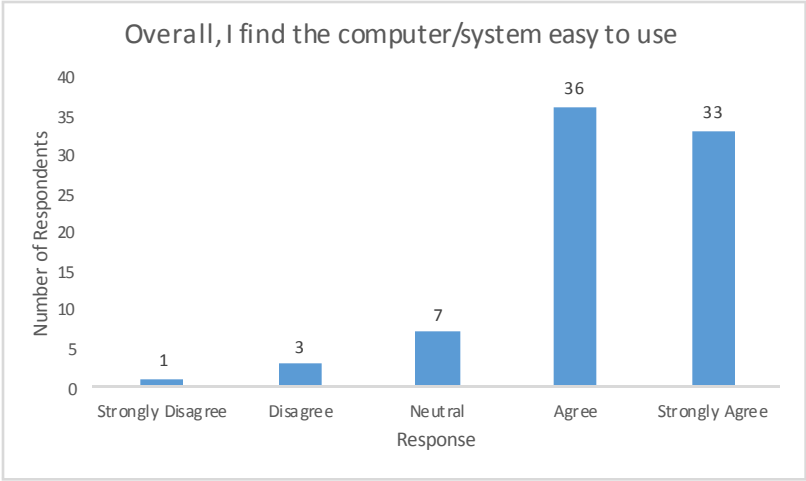
How would you categorize the Departments' IT infrastructure capabilities

Response	Number of Respondents
No computers	2
Few standalone computers used for word processing	3
Few networked computers used only for email and maybe MIS	4
Fully networked department with applications on central server in departmental data center	36
Fully networked department with applications on central server in state data center	12

How would you categorize the Departments' IT infrastructure capabilities

Number of Respondents

40

35   36

30

25

20

15   12

10

5
        2   3   4
0
   No computers Few standalone Few networked Fully networked Fully networked
                 computers used for computers used only department with department with
                 word processing for email and maybe applications on applications on
                                   MIS   central server in central server in
                                                departmental data state data center
                                                center

Response

Average ratio from responses   **0.977411616**

Note: Where no response
was received, both fields
were set to 1 and must
therefore be excluded from
this calculation. Corrected
table below

IT Penetration Ratio		
Total number of computers	Total number of staff	Ratio
7	7	1
16	16	1
10	9	1.111111111
16	16	1
13	13	1
13	13	1
13	13	1
13	13	1
13	13	1
13	13	1
13	13	1
13	13	1
250	250	1
150	200	0.75
200	250	0.8
100	120	0.833333333
100	80	1.25
300	500	0.6
300	500	0.6
4	10	0.4
3	3	1
2	3	0.666666667
30	30	1
30	30	1
30	30	1
30	30	1
30	30	1
30	30	1
30	30	1
30	30	1
30	30	1
30	30	1
30	30	1
30	30	1
30	30	1
30	30	1
30	30	1
30	30	1
24	22	1.090909091
24	22	1.090909091

IT Penetration Ratio

IT Penetration Ratio	Comments
Mean	0.954823232
Standard Error	0.024431037
Median	1
Mode	1
Standard Deviation	0.154515444
Sample Variance	0.023875023
Kurtosis	4.357546071
Skewness	-1.908904321
Range	0.85
Minimum	0.4
Maximum	1.25
Sum	38.19292929
Count	40
Confidence Level(95,0%)	0.049416437

Internal Roadblocks

	Severity 1	Severity 2	Severity 3	Severity 4	Severity 5
			Number of Respondents		
Lack of adequate manpower	17	8	20	6	19
State Policies/Acts	7	23	24	7	8
Inter-departmental dependencies	5	25	23	6	10
SCM procedures	4	30	14	4	18
Corruption	15	15	14	7	17
Accounting	6	25	19	8	10
Budget Allocation	2	24	13	10	21

Additional roadblocks identified by participants:	Ineffective systems(bas, persal, management systems)	ICT equipment (old and insuffient)	Insufficient network and internet access	Inadequate skills	Logistical issues

Severity rating: 1 to 5
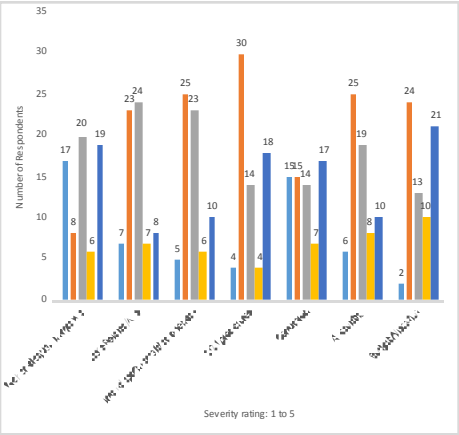
	Lack of adequate manpower	State Policies/Acts	Inter-departmental dependencies	SCM procedures	Corruption	Accounting	Budget Allocation
Mean	3.03	2.80	2.87	3.03	2.94	2.87	3.34
Standard Error	0.18	0.14	0.14	0.16	0.18	0.15	0.16
Median	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Mode	3.00	3.00	2.00	2.00	5.00	2.00	2.00
Standard Deviation	1.51	1.13	1.15	1.33	1.50	1.20	1.31
Sample Variance	2.29	1.28	1.32	1.77	2.24	1.43	1.71
Kurtosis	-1.36	-0.35	-0.46	-1.23	-1.38	-0.69	-1.51
Skewness	0.00	0.48	0.56	0.48	0.16	0.48	0.09
Range	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Minimum	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Sum	212.00	193.00	198.00	212.00	200.00	195.00	234.00
Count	70.00	69.00	69.00	70.00	68.00	68.00	70.00
Confidence Level(95,0%)	0.36	0.27	0.28	0.32	0.36	0.29	0.31

External Roadblocks

	Number of Respondents				
	Severity 1	Severity 2	Severity 3	Severity 4	Severity 5
Funds/Grants	3	2	6	15	41
Infrastructure	5	1	14	9	38
Delivery Channels	2	10	10	11	35
Demand / Supply mismatch	7	11	9	10	30
Public Private Partnership models	5	12	12	11	26
Role of PGITOC / GITOC	12	7	12	5	24

There were no additional external roadblocks identified by the participants
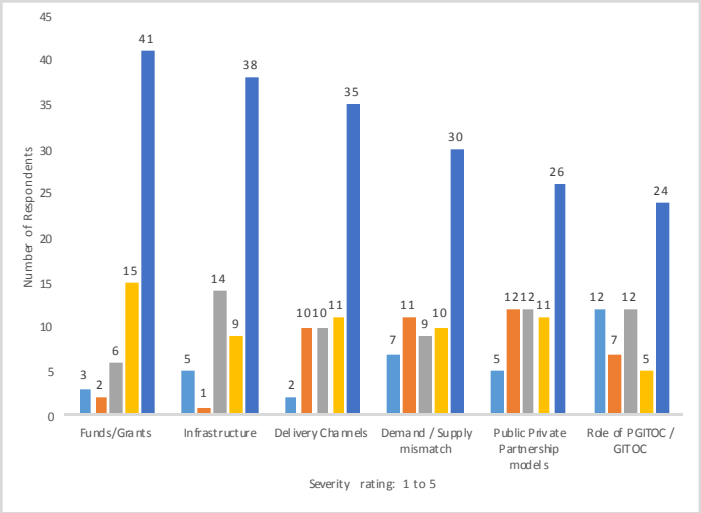
	Funds/Grants	Infrastructure	Delivery Channels	Demand / Supply mismatch	Public Private Partnership models	Role of PGITOC / GITOC
Mean	4.33	4.10	3.99	3.67	3.62	3.37
Standard Error	0.13	0.15	0.15	0.18	0.17	0.20
Median	5.00	5.00	5.00	4.00	4.00	3.00
Mode	5.00	5.00	5.00	5.00	5.00	5.00
Standard Deviation	1.06	1.23	1.24	1.45	1.37	1.58
Sample Variance	1.13	1.52	1.54	2.10	1.87	2.51
Kurtosis	2.73	0.66	-0.65	-1.12	-1.14	-1.45
Skewness	-1.79	-1.26	-0.84	-0.60	-0.47	-0.32
Range	4.00	4.00	4.00	4.00	4.00	4.00
Minimum	1.00	1.00	1.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00
Sum	290.00	275.00	271.00	246.00	239.00	202.00
Count	67.00	67.00	68.00	67.00	66.00	60.00
Confidence Level(95,0%)	0.26	0.30	0.30	0.35	0.34	0.41

ANNEXURE

C

Figure 4 maps the three selected dimensions in the Evaluation Framework, their categories and measurement characteristics.
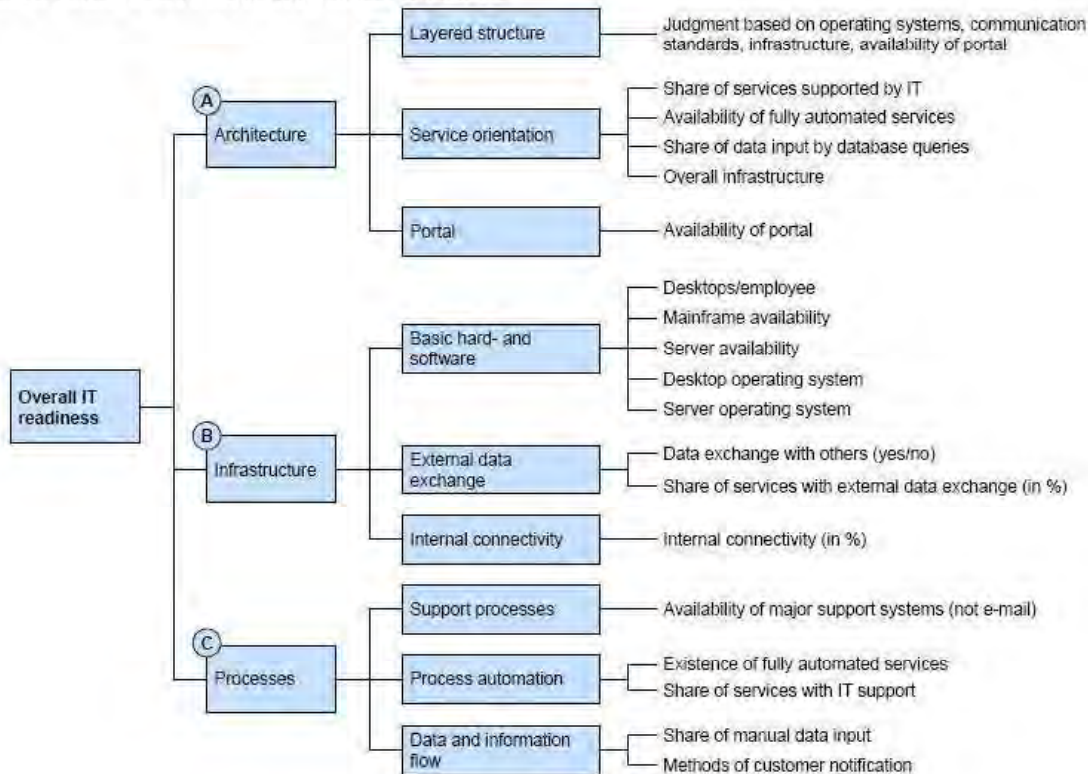
Figure 4 Evaluation Framework Dimensions

5.3.1 Architecture Readiness

Technical architecture is an important technical indicator that refers to the technical structure and orientation. To implement e-enablement projects, several technical structure requirements are demanded; for Software development, hardware structure and standards, services orientation and design.

There are several factors to judge the technical architecture readiness, from which:

- Layered structure

    Judgment is based on operating systems and communication standards used, infrastructure accessibility, and availability of portal

---

Technical Architecture

Term used to describe the structure of a hardware system, and the process and discipline for effectively implementing the design. The architecture of a system always defines its broad outlines, and may define precise mechanisms as well.

- Service orientation

  Reflects Services design and point of reference, which can be judged through the:
  o Share of services supported by IT
  o Availability of fully automated services
  o Share of data input by database queries
  o Overall infrastructure Service

- Portal

  Portal Availability is an essential aspect for e-government services. Its existence effects readiness perception.

Figure 5: Architecture dimension factors and criteria

Figure 5, illustrates in details, the Architecture dimension factors and their scoring criteria and characteristics. Measurement criteria are mapped against the four scoring results groups in a clear matrix.

5.3.2 Infrastructure Readiness

The infrastructure readiness factors are::

- Basic hardware and software

  o Desktops/employee
  o Mainframe availability
  o Server availability
  o Desktop operating system
  o Server operating system

- External Data Exchange
    - Data exchange with others (yes/no)
    - Share of services with external data exchange (in %)
- Internal connectivity
    - Percentage of Internal connectivity between departments and agencies different locations (i.e. intranet connectivity (in %):

Figure 6: Infrastructure dimension factors and criteria

Figure 6, illustrates in details, the Infrastructure dimension factors and their scoring criteria and characteristics. Measurement criteria are mapped against the four scoring results groups in a clear matrix.

5.3.3 Process Readiness

e-Government projects are not only about using ICT to enable transformation to an information society. It's also concerned with redesigning and restructuring the agency business related functional processes workflow and components to increase effectiveness, efficiency and performance.

Process readiness reflects the existing support for processes and procedures to empower and enable technology, it can be judged through the following factors:

- Support processes
  - Availability of major support systems (not e-mail)
- Process automation
  - Existence of fully automated services
  - Share of services with IT support
- Data and information flow
  - Share of manual data input
  - Methods of customer notification

Figure 7: Processes Dimension factors and criteria

Figure 7, illustrates in details, the processes dimension factors and their scoring criteria and characteristics. Measurement criteria are mapped against the four scoring results groups in a clear matrix.

5.4 Evaluation Framework Scoring

In the discussed Evaluation Framework, each dimension discussed in the pervious section, scoring criteria was designed and assigned to each factor mentioned for each dimension. Judging and scoring the dimension depends on a range of values assigned to each factor in the dimension.

To calculate the score for Architecture Readiness, each factor in the dimension was mapped against four scoring levels, each score level reflected a solid description for the factor. For example: the layered structure aspect is assigned the following scores for four defined states:

- **1:** No separation of domain layers**.**
- **2:** Some separation of domain layers.
- **3:** Clear distinction of domain.
- **4:** Principles of layered structure containing client, presentation, middle, and back-office layers**.**

The agency layered structure status is mapped, judged and assigned one of the four scores as it suits it. This should be done to every factor in the dimension producing three (a score for each aspect in a dimension) scores for each aspect in the dimension.

The three obtained scores get enrolled into a predefined mathematic equation (median) to conduct one score result to the dimension status in the agency. Figure 8 below describes in detail each factor for the architecture dimension scoring characteristics, with explaining example that shows generating the architecture readiness score based on calculating its factors scores.
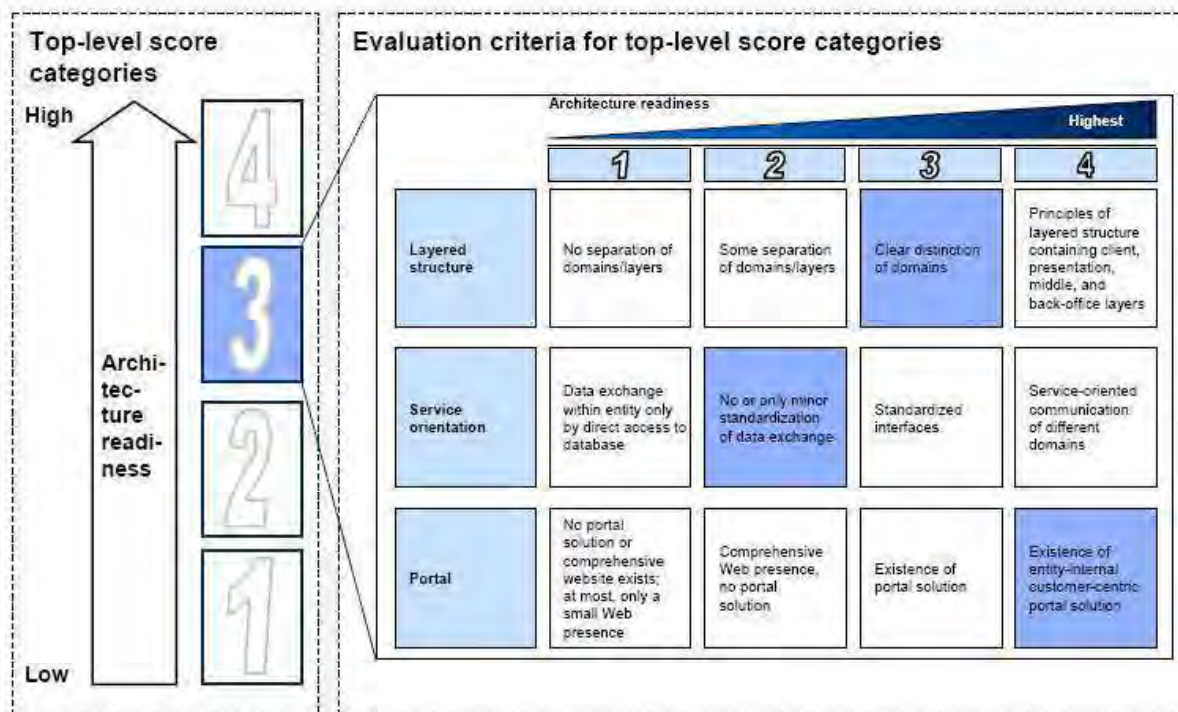

Figure 8: Scoring Architecture Readiness

The same operation and procedure gets applied on all selected dimensions for evaluation and their measurement factors. Figure 9, shows the scoring in each dimension and its three scores outcome.
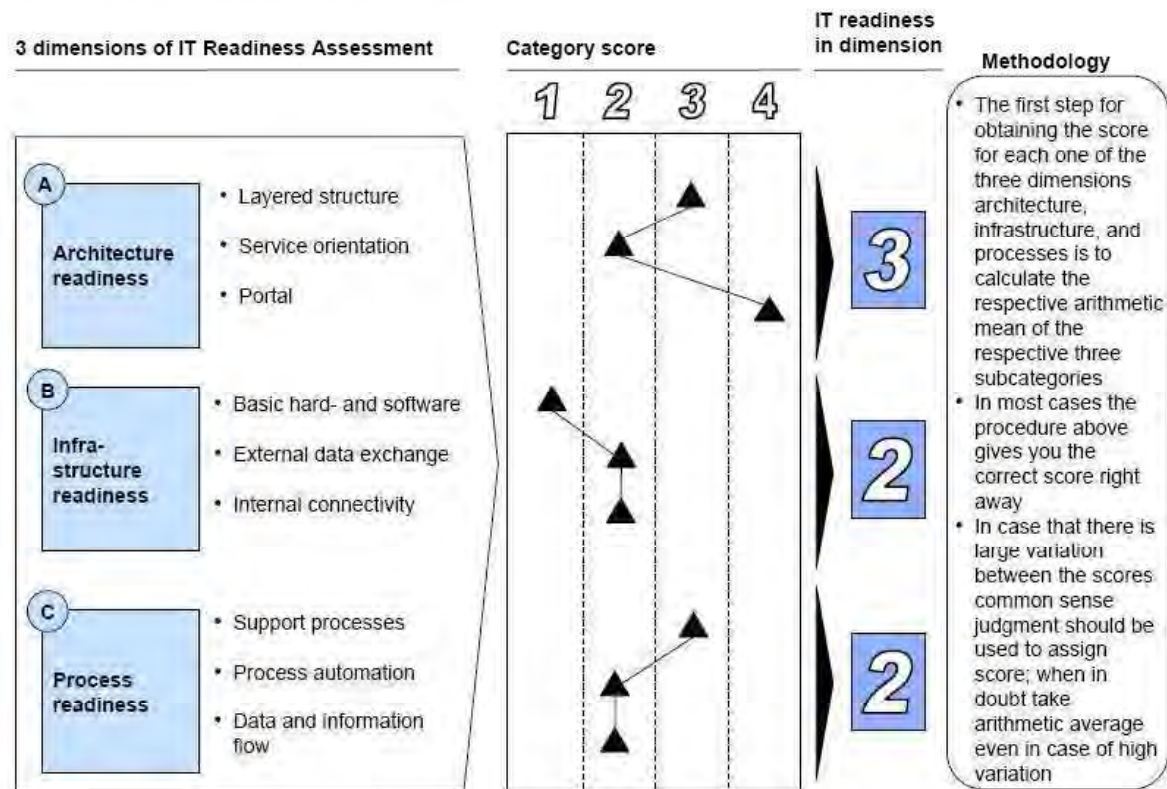
Figure 9: Scores at Each Dimension

5.4.1 Aggregation of Scores

The outcome from the calculation and measurement mechanism conducted on each dimension and its aspects produce three scores, each of them reflect an IT readiness dimension.

Scoring the agency IT readiness needs to be done collectively by aggregating the scores for each dimension.

Aggregation of scores is done through calculating the respective arithmetic mean of the respective three dimensions scores. In the case of large variation between the scores common sense judgment should be used to assign scores; when in doubt, take arithmetic average even in case of high variation. Figure 10 below maps the aggregation process using an explanatory sample.

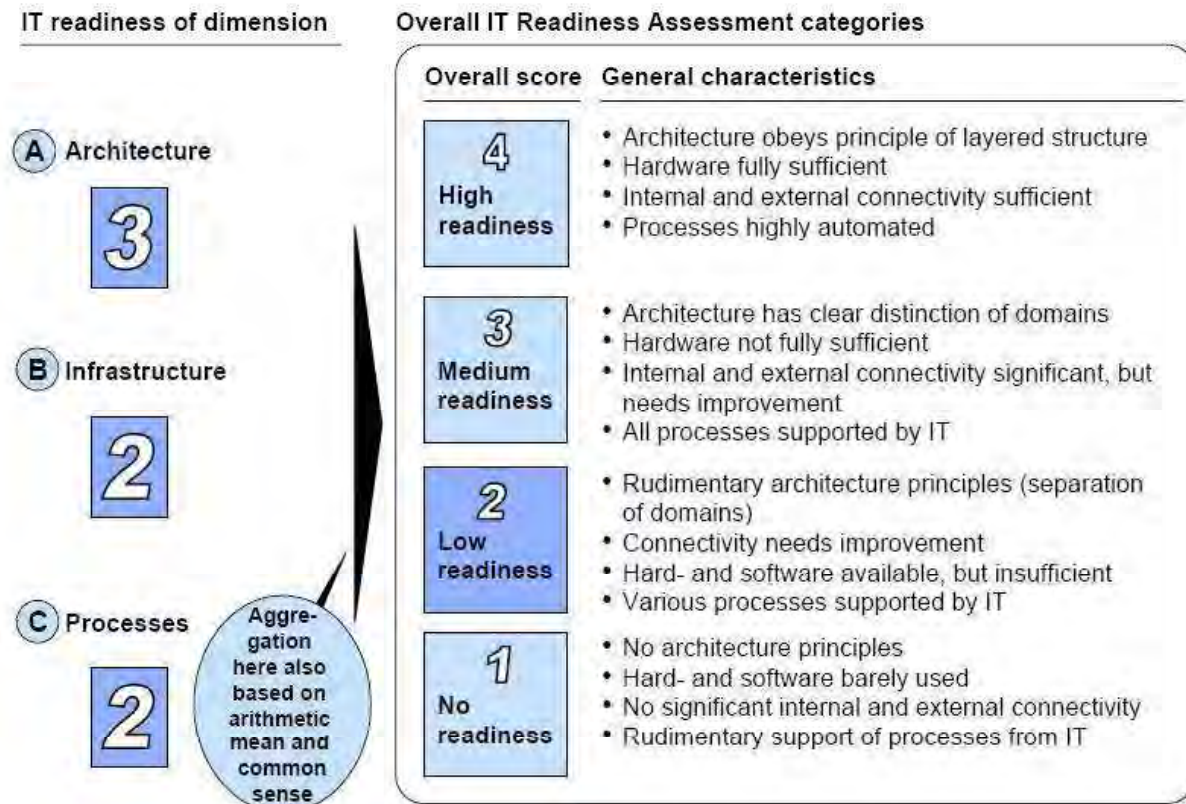## OUTLINE OF OVERALL SCORECARD FOR SELF-ASSESSMENT

Figure 10: Overall Scores Aggregation

Through aggregation of scores, the overall IT readiness in the agency result is obtained and defined as a clear systematic result for later use in analysis.

ANNEXURE

D

Interview guidelines – IT specialists and Top Management

Objective - The objective of the interview is to gather a more in depth view of the functioning of ICT within the Department, the internal and external role players and the processes being followed.

Distribution list – To be completed via interview with the key decision makers in the Department and the IT/ICT Management of the Department or equivalent

Note –

- ❖ *Please be as specific as possible in your answers.*

- ❖ *In case of any further clarifications kindly contact–*

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> **I.** **Discuss the current state of Information technology (IT) Infrastructure/ Organization of the Department.**

1 **Is the management of the IT infrastructure of the Department outsourced to a third party?**
   a. **What roles or functions have been outsourced?**
   b. **Who is the outsource provider?**
   c. **Why were these roles and functions outsourced?**

2 **What internal structures exist for IT related functions**
   a. **What are their functions?**
   b. **What challenges exist that impedes functioning?**
   c. **How could these challenges be overcome?**

3 **Does the Department have its own electronic Management Information System (MIS)?**
   a. **What application and database platform is it running on?**
   b. **What information does it contain?**
   c. **How frequently is it updated?**
   d. **How accurate is the data contained therein?**
   e. **How widely is it utilised within the Department for information purposes?**

4 **What role does SITA, PGITOC, and National DOE play in the Department's IT operations?**
   a. **What are the expectations from SITA and PGITOC to improve delivery of IT services?**
   b. **Are these structures delivering on expectations?**
   c. **What challenges have you noticed in the smooth interaction of these structures?**
   d. **How can these challenges be overcome?**

5 **What is the department's website update policy?**
   a. **How often are the websites of the departments being updated?**
   b. **What are the existing bottlenecks in ensuring timely updating of the website?**
   c. **Who is responsible for updating the website?**

6 **Are there any E-Governance initiatives that are currently being planned?**
   a. **What are the initiatives?**
   b. **Is there a specific plan for implementation?**
   c. **How were these initiatives identified?**
   d. **What is the approval process for e-Governance initiatives in the Department?**
   e. **What challenges exist that impede the implementation of e-Governance initiatives?**
   f. **How can these challenges be overcome?**

E-Readiness Questionnaire

Thank you for agreeing to take part in this important survey to assess the current state of the Department's IT infrastructure, e-Governance status, and the challenges faced by staff in utilising ICT and in implementation of e-Governance initiatives. The purpose of this is to ensure that ICT in the Department is best aligned to provide for the individual's needs as well as for the overall strategy of the Department.

The survey should only take 5 minutes to complete and all responses will be kept strictly confidential.

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Distribution list – To be filled by key officials in the Department – Finance, HR, ICT, and Curriculum

Note –

- ❖ *Please be as specific as possible in your answers.*
- ❖ *Please tick the box/circle wherever applicable.*
- ❖ *In case of any further clarifications kindly contact–*

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Or

Prof. Manoj Maharaj

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The following 12 questions relate to your perception of technology in your work environment. ICT refers to Information & Communication Technology and includes the use of computers, communication devices and automated electronic systems.

	Strongly Disagree	Disagree	Neutral response	Agree	Strongly Agree
ICT enables me to accomplish tasks more quickly					
Using ICT improves my job performance					
Using ICT increases my productivity					
Using ICT enhances my effectiveness on the job					
Using ICT makes it easier to do my job					
Overall, I find ICT useful in my job					
Learning to operate the computer/system is easy for me					
I find it easy to get the computer/system to do what I want it to do					
Usage of the computer/system is clear and understandable					
I find it cumbersome to use the computer/system					
It is easy for me to remember how to perform tasks using computer/system					
Overall, I find the computer/system easy to use					

1 **How would you categorize the Departments' IT infrastructure capabilities** *(Please tick the applicable circle)?*

- ○ No computers
- ○ Few standalone computers used for word processing
- ○ Few networked computers used only for email and maybe MIS
- ○ Fully networked department with applications on central server in departmental data center
- ○ Fully networked department with applications on central server in state data center

2 What is the IT penetration Ratio of the Department?

Total No. of Computers	
Total No. of Employees (Clerks and Above)	

3 WHAT are existing roadblocks in implementing IT/ E-Governance initiatives? Rate the severity of each of these from 1 (not severe) to 5 (very severe)

Internal Roadblocks	*Severity (1 - 5)*
Lack of adequate manpower	
State Policies/Acts	
Inter-departmental dependencies	
Supply Chain Management procedures	
Corruption	
Accounting	
Budget Allocation	
Other: (list here)	

- **External to the department –**

External Roadblocks	*Severity (1 - 5)*
Funds/Grants	
Infrastructure	
Delivery Channels	
Demand/Supply mismatch	
Public Private Partnership models	
Role of PGITOC / GITOC	
Other: (list here)	

UNIVERSITY OF KWAZULU-NATAL

INYUVESI
YAKWAZULU-NATALI

29 May 2015

Mr Christopher Carl Wigens (991236900)
Graduate School of Business & Leadership
Westville Campus

Dear Mr Wigens,

Protocol reference number: HSS/0536/015M
Project title: Readiness assessment of the KZN Department of Education to deliver on the mandated ICT Strategy

Full Approval – Expedited Application

With regards to your application received on 21 May 2015. The documents submitted have been accepted by the Humanities & Social Sciences Research Ethics Committee and **FULL APPROVAL** for the protocol has been granted.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

Please note: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

....
Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Professor Manoj Maharaj
Cc Academic Leader Research: Dr Muhammad Hoque
Cc School Administrator: Ms Zarina Bullyraj