BARRIERS TO SUCCESSFUL APPLICATION OF INFORMATION TECHNOLOGY IN BOTSWANA.

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Declaration

This thesis is submitted under the University of Salford regulations for the award of a PhD degree by research. The researcher declares that no portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

Abbreviations

American Customer Satisfaction Index	ACSI
Birth and Death Register System	BDRS
Botswana National Productivity Centre	BNPC
Botswana Power Corporation	BPC
Botswana Technology Centre	BoTeC
Botswana Telecommunications Corporations	BTC
Chartered Institute of Personnel and Development	CIPD
Chief Executive Officers	CEO
Chief Information Officers	CIOs
Civil Service Computerisation Programme	CSCP
Department of Civil and National Registration	DCNR
Department of Public Service Management	DPSM
Department of Road, Transport and Safety	DRTS
Driver and Vehicle Licensing Agency	DVLA
European Computers Drivers Licence	ECDL
Free On-line Dictionary of Computing	FOLDOC
General Practitioner IS	GPIS
Government Data Network	GDN
Gross Domestic Product	GDP
Gross National Income	GNI
Gross National Product	GNP
Information and Communication Technology	ICT
Information Technology	IT
Information Systems	IS
International Computer Drivers Licence	ICDL
Institute of Personnel Development	IPD
Joint Funding Councils of the United Kingdom	JFCUK
Just in Time	JIT
Knowledge Workers	KWs
Livestock Identification System	LIS
Local Government Modernisation Agenda	LGMA
Micro-and-Small Enterprises	MSE's

Millennium Development Goals	MDG
Moment of Truth	MOT
National Health Service	NHS
National Registration System	NRS
National University of Singapore	NUS
Network Readiness Index	NRI
Non-Government Organisations	NGO
One-Stop Business Licensing Portal	OBLS
Oxford English Dictionary	OED
Process Based Maturity Models	ProsBMM
Product Based Maturity Models	ProdBMM
Robson Framework for Research Design	RFRD
Scandinavian Airlines	SAS
Service Quality	SERVQUAL
Society for Information Technology Management	SOCITM
Swedish Customer Satisfaction Barometer	SCSB
Total Quality Management	TQM
Work Improvement Teams	WITS
World Economic Forum	WEFORUM
Year 2000	Y2K

Abstract

This research looked at barriers to successful applications of information and communication technology (ICT) in Botswana. Botswana has high investments in ICT infrastructure development in the public service. However, there is still concern about service delivery not being satisfactory. Many departmental functions are still performed manually despite the availability of computers and people capable of using them

The research question addressed is why there is lack of exploitation of ICT in the Botswana public sector. Two government departments based in the capital city were selected as case studies and investigated using questionnaires and semi structured interviews to determine the status of employee relations and ICT use. Questionnaires were used to solicit satisfaction perception of the general public about public service using a sample of capital city population.

This research revealed a digital divide within Botswana. Within the public sector, computer penetration as well as internet access is very high as there is 1 computer for every 2 employees. For the general public, computer ownership is low as about 28% of the population have computers at home. Despite availability of computers in the public service, members of the public experience delay when they seek service. Motivation and payment are biggest problem regarding employee relations. ICT support is satisfactory though this might be due to low level of ICT use. Fear of change is the main limiting factor to ICT exploitation in Botswana.

It was found that maintenance cost of ICT infrastructure is in the order of 8 times the national average salary. A framework is proposed to help policy makers on how best to exploit existing ICT infrastructure. Botswana has remained at the first level of ICT exploitation for over 10 years. Suggestions are made as to how the next level could be reached and future research is also discussed.

CHAPTER 1: INTRODUCTION

1.1 Background Information

The Republic of Botswana is situated in Sub-Saharan Africa. It is land-locked and shares a border with the following countries, South Africa in the south, Zimbabwe in the east, Zambia in the north, Namibia in the west and a small portion in the north-west with Angola. Figure 1.1 shows the geographic location of the country.

Figure 1.1: Map of Botswana

Formerly known as the British Protectorate of Bechuanaland, the country gained independence from Britain in 1966. At the time of independence, it was one of the poorest in the world with per capita income of about US$60 (Somolekae, 1998: 13). Immediately after independence, diamonds were discovered in the country. By 1997 income per capita had risen to US$27,000 (Somolekae, 1998: 13). Through a stable political environment, which still persists to-date, the country has managed to use revenue from

diamonds to develop itself and it is now classified as an upper middle income country (WORLDBANK, 2007a).

The economic success of Botswana raises expectations on other developments such as ICT infrastructure, satisfactory customer satisfaction etc. The small population of the country makes it ideal to achieve these social and infrastructural developments. Also the gradual increase in high education attainment among the general public in particular the public service also favour satisfactory customer satisfaction. Unfortunately service delivery and project implementation has been problematic to achieve in Botswana.

1.2 Introduction

This study looked at the impact of information and communication technology applications in service delivery of selected government departments of Botswana. It is intended to support Botswana's vision of becoming an international information and communication technology hub. It is not always the case that when an organisation adopts and implements information and communication technology, it will achieve the desired goals of productivity gains and better work practices. According to Schrage (1997: 178) the investments in information technology have been based on a "lie" which is so perfect that it is easy to believe. Schrage (1997) was referring to the promise that has been widely published, mainly by the information technology practitioners on use of information technology in organisations.

In Botswana, within the last ten years, the government has invested heavily in providing relevant information and communication technology infrastructure in all government departments. This is especially true in the selected government departments for this study. Since the early 1990's there has been an outcry about lack of productivity in most of government departments. When Thapisa and Jain (2000: 86) looked at perceptions about productivity in academic and public libraries in Botswana, lack of productivity also came out.

The Botswana government has taken a number of initiatives to address a lack of productivity in the civil service such as Work Improvement Teams (WITS), setting up Botswana National Productivity Centre (BNPC), implementing performance-based reward system, developing good

information and communication technology infrastructure in government departments. Some of these intervention measures yielded expected results according to Selepeng (2002: 2), however the problem is still going on today, despite relatively good information and communication technology infrastructure such as email, internet and telephone availability in government departments. According to Little and Bose (2004c), Botswana *"is already an active participant in the global information society" (Little and Bose, 2004c: 14).*

There has not been any detailed study to find out why information and communication technology introduction in government has not had a positive impact on productivity. Generally, the introduction of information and communication technology in Africa has been shown not to have delivered expected results. The main reasons for this are that the introduction was driven from the top of organisations and also supply led (Unwin, 2005: 116). Based on literature as discussed in chapter 2 and in order to reduce the scope of this research, it has been limited to the following: issues of employee relations, user support, ICT infrastructure and state of customer satisfaction in Botswana. How these issues are addressed can determine the success or failure of information and communication technology.

A schematic representation of work undertaken as part of this research is illustrated by Figure 1.2.

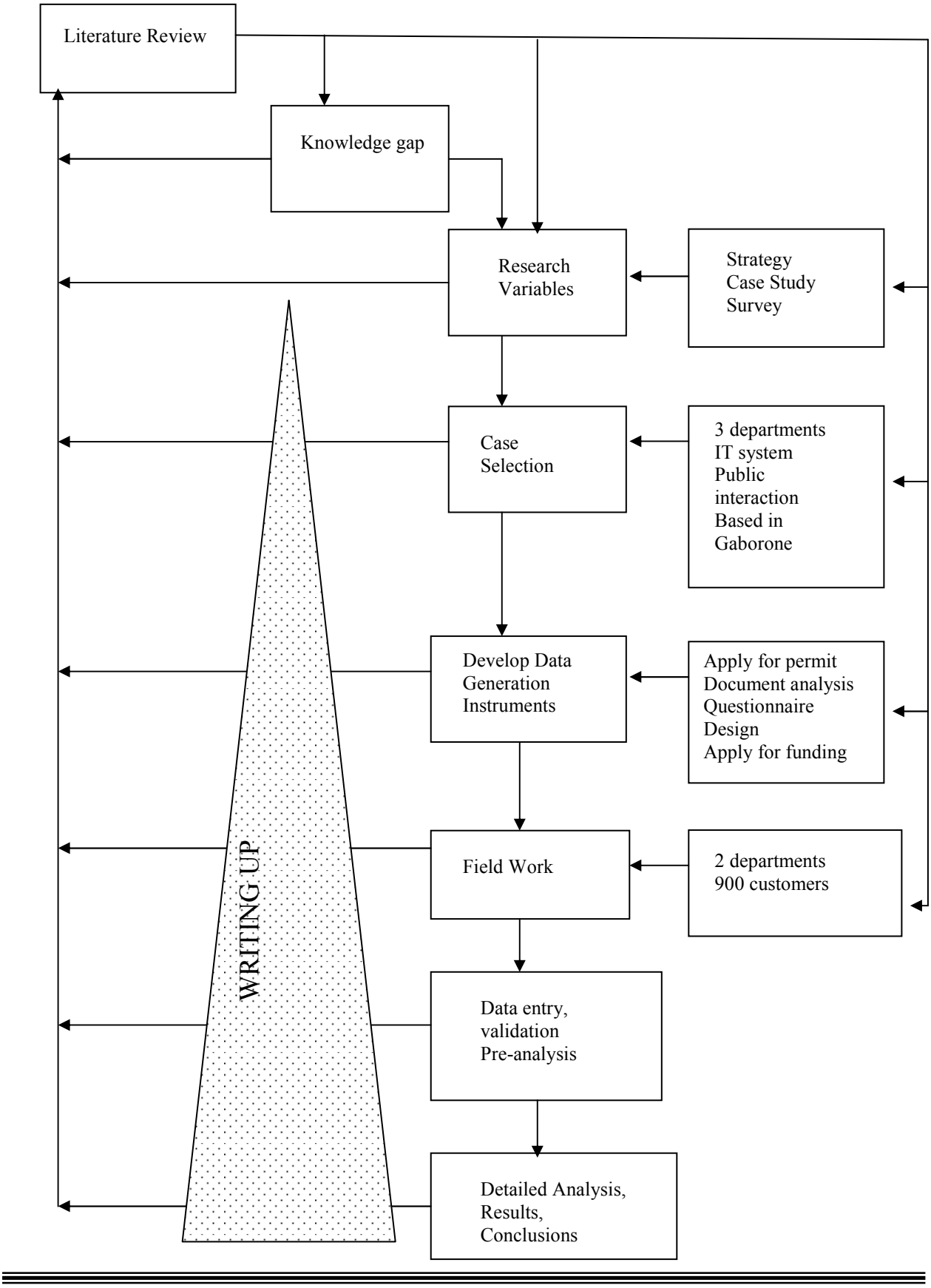


Figure 1.2: Schematic Representation of Work Done

1.3 Research Question

Development of a research question is a process of looking at an issue that might be a problem that is taken for granted and formulating a question about it. The research question emphasises lack or absence of understanding about an issue. It is this gap that the researcher wants to address (Sweet and Grace-Martin, 2003: 4). The main question that this research tries to answer is:

Why information and communication technology applications are not having positive impact in service delivery by government departments of Botswana?

Service delivery is a phrase derived from the phrase service and delivery. According to (OED, 2006) service means

> *"the condition of being a servant; the fact of serving a master or the condition or employment of a public servant (of a sovereign or state)". Delivery is "The action of handing over, or conveying into the hands of another" (OED, 2006)*.

The impact of ICT is investigated both internally in terms of government employees using it and externally on members of the public being served by government employees in Botswana.

1.4 Aim and objectives

The aim of this research was to develop a framework for information and communication technology exploitation in aid of improving service delivery in Botswana public service. The aim was achieved through investigating the following objectives:

- determine status of ICT developments in Botswana in comparison with global trends
- determine maturity level of information and communications technology in selected Botswana government departments.
- determine the limiting factors to full utilisation of information and communication technology by Botswana government departments.
- determine customer satisfaction levels on services offered by Botswana government departments
- determine user level of satisfaction with information and communication technology use and support in selected Botswana government departments.
- develop a framework to help Botswana government departments increase use of information and communication technology applications.
- determine state of psychological contract among civil servants of selected Botswana government departments.

The objectives were researched in the selected government departments. For customer satisfaction, a sample of the population in Gaborone was used. This was to minimise travelling time and costs. Gaborone as the capital city has the best information and communications technology facilities in the country.

1.5 Background to the problem

There is a need to conduct comprehensive research as to why information and communications technology has not improved service level provision in government departments. The impact of information and communications technology on productivity was summarised as

> "*It can help you with your problems, but those problems won't disappear just because you have a computer" (Gates, 1999b: 16)*.

Gates (1999b) was emphasising that information and communication technology alone cannot lead to productivity gains.

Earlier research into determining the relationship between information and communication technology investments, productivity gains and work practices was inconclusive. This was because it was not possible to isolate information and communication technology input; there are other inputs that contribute to productivity in organisation as observed by Brynjolfsson (1993: 67). It will not be fair to put all the blame for lack of productivity gains on information technology alone.

The problem of technology in information management has been researched and can be deduced from the following questions:

> *"But why is it that most of us, deep down, feel frustrated by information technology? Why do most workers –even CEOs-find it so hard to adjust to new systems and the information skills they require? Why isn't this revolution all it's cracked up to be?" (Davenport, 1997: 3)*

The experience of the year 2000 (Y2K) scare has resulted in boards of organisation being suspicious of information technology. This has also been made worse by the fact that members of boards may not be knowledgeable on IT spending and strategy (Nolan and McFarlan, 2005: 96), (Raghupathi, 2007: 95). This situation is further complicated by lack of development of standards for IT governance. Just like organisations have auditing and accounting there is also a need to have IT governance standards. Lack of such standards have often resulted with IT governance being not a matter for the board, but given to

IT specialists like chief information officers (CIOs) (Nolan and McFarlan, 2005: 98).

Botswana government departments lack appropriate methodologies and suitable instruments of analyses to ensure that information and communication technology and work practices are leading to productivity gains. The research is in line with Botswana Government priority in the National Development Plan 9 (NDP 9), which is "*focused on high quality service delivery and improving organisational performance*"

1.6 Contribution to knowledge

Research into finding ways to exploit the power of a computer has been extensively done in developed countries especially USA. The USA has been the producer of both hardware and software through companies like IBM and Microsoft respectively. Microsoft has been the biggest driver to USA success in information and communication technology. The founder and former chairman of Microsoft, Bill Gates is regarded as one of the technological entrepreneurs of the time. Under Gates' leadership Microsoft managed to capture the market in software production through its 'Windows' operating system and Microsoft Office suite.

There has been a significant increase in the budget allocated for ICT in many organisations. This has led to continued concern regarding the effect of such investments as observed by Mahmood et al. (2001), who stated the following:

> *"With an estimated investment of over 1 trillion dollars to date on information technology (IT) products and applications, one would hope that there exists a corresponding improvement in organizational performance and productivity. The level of IT usage has widely been accepted as an important indicator of IT success within organizations" (Mahmood et al., 2001: 107)*.

The call for understanding the impact of ICT in Africa has been summed up by Adeya(2001) who stated the following:

> *"Yet, with all the 'noise' surrounding the potential of ICTs to speed African developments, is there evidence for it? Are ICTs actually changing the 'shape of Africa?"(Adeya, 2001: 4)*.

The potential of ICT to contribute to the development of Africa has been acknowledged. What is required now is to show that where ICTs have been

introduced in Africa, for example in South Africa, Botswana etc, this technology is actually bringing the desired benefits.

NEWSbits (2006: 8) estimated that in 2005 worldwide expenditure on information technology was about 1 trillion US dollars. Basden (2008) has questioned whether the world was gaining benefits worth that amount of money. Basden (2008) goes further and ask if it is not better for the world to spend that money on *"health, overcoming poverty reduction, or reducing climate change and environmental damage" (Basden, 2008: 1)*. But these other options for spending money are not big issues to the developed world except climate change, which one of the developed countries, namely US, has not yet agreed to tackle.

It is worth noting that the high expenditure in information technology is mainly in developed countries and developing countries, especially those in Sub-Saharan Africa, contribute little to this. Their contribution is mainly as consumers of the technology. Publication on computer based information systems in Africa has been observed to be very rare (Walsham, 2001: 194).

Basden (2008: 1) has proposed the following five questions that can be used in trying to find an answer regarding gaining value from information technology. They are

- *Perhaps it is because our technologies are not yet good enough?*
- *Perhaps it is because we do not use IT in the right way or for the right things?*
- *Perhaps it is because information systems (IS) development is inefficient?*
- *Perhaps we too readily accept the way IT controls our lives, and the assumption that IT is the solution to everything?*
- *Perhaps our very assumptions about the nature of computers and what they can do for us are mistaken?*

All of the above questions illustrate the current lack of consensus as to what can explain the problem. Hence each of the five questions is worth pursuing as a field of study to contribute knowledge to the understanding of impact of information technology. This research explores the second question further.

Information and communication technology has managed to penetrate all countries, even developing ones. It was in 1998, according to Perrazzini and Kibati (1999: 31) that the remaining countries were finally connected to the internet. Unfortunately very few developing countries have managed to exploit the power of information and communication technology. This is particularly true

for majority of Sub-Saharan countries where, according to Chinn and Fairlie (2004: 7), computer penetration is 1 computer to 100 people. On the other hand some of the developing countries especially those in the Asian pacific region like India have managed to take advantage of information and communication technology and according to Singh (2002: 21) are exploiting this to their advantage. Some other Asian countries which are also doing well in this area are Malaysia and Singapore. According to WEFORUM (2006: xv) information and communication technology infrastructure ratings for India, Malaysia and Singapore were 40, 24 and 2 respectively out of a total of 115 countries that were covered. Singapore was second to USA. These rankings are based on the network readiness index methodology discussed in section 3.5.

The majority of reports from African countries concentrate more on the number of ICT artefacts being made available. While this is important, the most important information will be to know the profile of people using them and what they use them for (Adeya, 2001: 18). This research contributes to this call to determine the digital divide that exists within Botswana (see Section 5.2.25.1).

Literature review has revealed that in developing countries, especially those in Sub-Saharan Africa, their knowledge base in information and communications technology application is limited. According to Oshikoya and Hussain (1998: 10) South Africa accounted for a lot of information and communication technology distribution in Sub-Saharan Africa. Despite being in Sub-Saharan Africa, Botswana has a fairly developed information and communications technology infrastructure and it comes third behind Tunisia and South Africa, with rating of 56, according to WEFORUM (2006) networked readiness index rankings 2005.

Botswana's information and communications technology infrastructure development is not reflected in productivity ratings. Understanding of factors that hinder proper exploitation of information and communications technology in Botswana will benefit the information system community as well as government of Botswana. This research aims to contribute knowledge to understanding barriers to exploitation of information and communication technology in Botswana.

According to Oates (2006), previous research concentrated in developing computer based products, for example data processing systems, robotics etc. This shows that a lot of research has concentrated on the technical side of

information technology. The impact of information technology in society is under-researched especially in context of developing countries (Walsham, 2001: 251), (Walsham and Sahay, 2006: 8), (Halewood and Kenny, 2008: 172). This research adds to this knowledge gap.

There has been so much interest in technology and what it can do that in the process the role of information has been forgotten, which is to inform people (Davenport, 1997: 3). The effect of computer products on people as they use them is an area that is under-researched. The importance of understanding human factors is emphasised even more clearly by the following observation

> *"to understand the impact of computers within organisations, for example, you would be better advised to learn about the 'wetware' between people's ears than about hardware and software" (Heeks, 2002: 15)*

This research will contribute to this area as it concentrates on understanding the social dimension of information technology. Limited research that looks into problems that a lot of organisations face in "...*implementing, maintaining and monitoring effective IT governance*" has also been highlighted by Williams (2006: 26). This research contributes to knowledge in this area especially in the public sector. The need for further research in use of computers has also been called for by Oates (2006: 22) who highlighted that computers and related technologies are still new to human beings and still developing, hence there is a need to find out how to use them effectively. The greatest challenge to success in utilisation of information technology has been shown to be more with people than the technology (Roepke et al., 2000: 327).

Nolan (1979) found that in data processing management, an organisation has to invest lot of financial capital. According to Nolan (1979) if plotted over time, the curve shows an S shape (Figure 1.3). Although Nolan's work was during the time of data processing of the 1970's in America it is still valid today and it can be used to understand and explain increasing budget on information and communication technology.

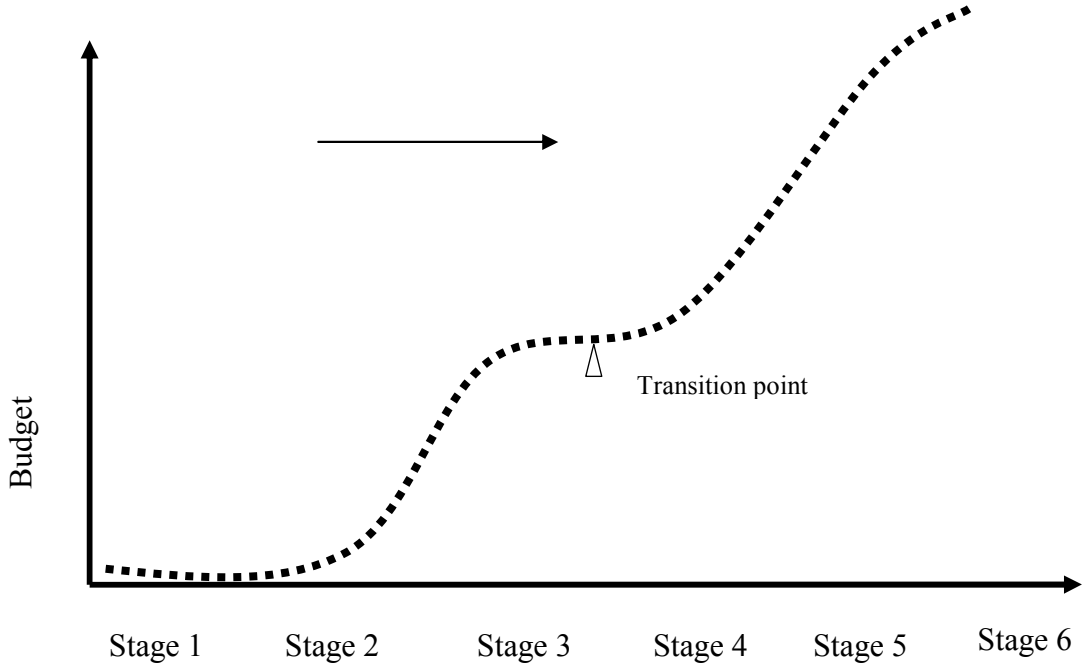


Figure 1.3 Nolan (1979: 117) maturity model

Application of the theory of psychological contract to investigate what could be the reasons for underperformance by civil servants will also provide understanding of the problem of underperformance in Botswana. This theory has not been applied to understanding the role of the users work environment in the increasing use of information technology in the workplace. However, psychometric tests provided valuable knowledge when used in information systems research. For example, Earl and Feeny (1994: 17) used the Myers Briggs Psychological Preference Test and Belbin's team-role self perception inventory to determine the qualities of a chief information officer (CIO) who adds value. Botswana's intervention measures on dealing with low performance by civil servants have been looking at contractual obligations only. Psychological contract testing has not been applied widely in information systems research; hence this research bridges this gap.

Research by Guest and Conway (1998) raised the concept of psychological contract when they looked at the state of the employment relationship in the UK. Guest and Conway (1998: ix) stated that "*Employees develop a set of informal assumptions, expectations and obligations about what the employer 'owes' them"* that can be attributed to the psychological contract. A healthy psychological contract was found to exist within the UK employment sector by

Guest and Conway (1998: vii). Despite negative publicity about UK employees, latest research by CIPD (2005: 4) still showed that this is still true. A comparison of state of psychological contract between Botswana and UK is made in this research.

This research covers the psychological contract and determines its state in trying to find out limiting factors to utilisation of information and communications technology in Botswana. A healthy psychological contract is likely to lead to the desire to perform well. It is when the motivation of employees is high that they are likely to exploit information and communications technology made available to them as observed by Bhatnagar (2000: 2). The national and public sector frameworks developed in this research contribute to knowledge about use of ICT in Botswana and can be adapted to other developing countries (Chapter 7)

1.7 Study Limitations

This research is exploratory as the aim was to find out if indeed customers are not satisfied as it is often alleged, whether Botswana government employees are content with their work environment and also if they have access to ICT as well as the required ICT skills. As it is exploratory the research does not pinpoint critical problems areas.

Customer perceptions were not specific to a particular department; hence their views might reflect the situation in a specific department. As the departments do not have structures in place to address customer complaints, a minor issue which might not have been a complaint if the customer has had the chance to express his/her feelings may turn out to be the only thing that is remembered. It is human nature to remember the bad experience and not the good ones.

There was low response rate to employee and user satisfaction questionnaires. This affected statistical analysis of results as it was not possible to do cross tabulation of variables to determine relationships. Due to time and financial constraints, interval quantitative data was collected during field study. This has limited data analysis to non-parametric analysis only.

It was very difficult to meet senior officers as they spent most of their times attending meetings. This problem of senior officers engaged in meetings for a substantial amount of time has been observed by other researchers who were studying the public service in Botswana. Document analysis such as Auditor

general reports provided valuable information. Auditor general reports have statutory requirements and hence their preparation is based on information provided by senior officers.

Future research should try and adopt an in depth explanatory methodology within a single department, focussing also on customers specific to that department. This will allow for determination of factors and specific problems that leads to underutilisation of ICT and customer satisfaction. The recently introduced Botswana Customer Service Standards Framework will also provide relevant information on accessing performance of departments.

1.8 Structure of thesis

This thesis is organised in the following structure of chapters and sections. Each chapter has a short introduction which highlights areas covered in the various sections of the chapter. This is followed by the main body of material for the chapter followed by a chapter summary.

The first section is a short abstract which covers briefly what the whole research is about; looking at why and how this research has been done, major conclusions and recommendations that have emerged from the study. There is also a section on background information about Botswana. This section provides geographical location of the country and its brief history and economic development.

Chapter 1 is an introduction chapter which discusses the statement of the problem researched, including aim and objectives as well as research limitations.

Chapter 2 and **3** cover review of literature related to this research. **Chapter 2** looks at the global view of literature. This chapter shows that there has been concern about the effect of ICT in organisational performance before. This is still continuing. Fundamental terminologies associated with this research are provided in this chapter. Maturity models regarding adaptation and utilisation of ICT are also discussed. Organisational structure and how it affects exploitation of ICT applications is also discussed. The various factors that determine success of ICT applications as derived from literature are put forward.

Chapter 3 covers literature specific to Botswana. Concern about performance level in the public service in Botswana is presented in this chapter. Previous

and current strategies that have been adopted to address the problem, their limitations, are critically evaluated. The chapter also provides ICT developments in central government of Botswana. Botswana's performance in terms of ICT diffusion is then presented and compared with other 8 international countries. These countries have been used before to benchmark Botswana's ICT developments, except Singapore which has been included in this research as it is a classic example of how exploitation of human capital and not natural resources can improve economic and social life in a country. Challenges that face exploitation and diffusion of ICT application are also discussed.

Chapter 4 addresses the research methodology. The generic view of research methodology is discussed first and this provides a foundation to justify why this research has adopted its particular research methodology. This research takes the social interpretivisim approach to knowledge creation. Rigour and relevance concepts are also discussed in this chapter. The research variables that have been derived from literature are presented. There is a discussion about how data was collected as well as problems experienced during data collection.

Chapter 5 discusses how the data has been analysed. Factors that determine which analysis method to use are also presented. Results of analysis of the various research variables are presented in detail in this chapter. SPSS was used to do quantitative data analysis.

Chapter 6 is a discussion of the results of data analysis in relation to the research objectives. This leads to Chapter 7 which discusses a proposed framework for ICT exploitation in Botswana.

Chapter 7 use materials from the previous chapters to propose an ICT framework that can help the Botswana public sector exploit the existing ICT infrastructure. A national framework is also put forward that covers the whole country.

Chapter 8 is the last chapter which draws together conclusions and recommendations deduced from this research. Further research on the topic is also provided. It is followed by list of references that have been used. The last section is a list of supporting materials that have been used and they are attached as appendices.

Overall structure of thesis is illustrated by Figure 1.4.

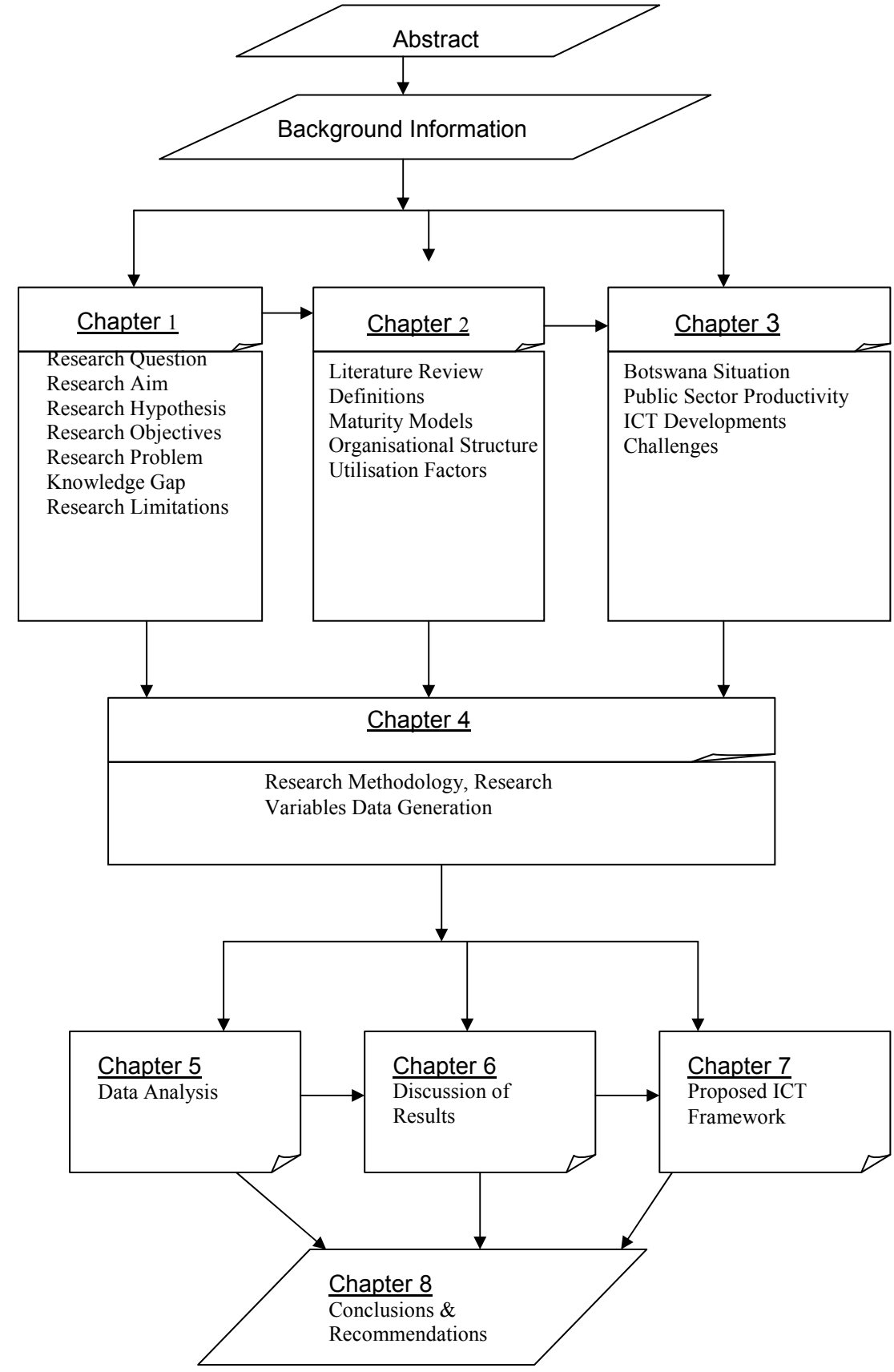


Figure 1.4 Structure of Thesis

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter looks at the literature that has been published on information and communication technology (ICT), performance/service delivery and productivity. It starts with terminology and then provides the results of previous research. A global picture is taken and this is narrowed down to the Botswana situation in chapter 3.

2.2 Terminology

In order to understand the topic under investigation, the main terminology used is explained in this section. The terms used in this research are those of information and communication technology, performance/service delivery and productivity. Broad definitions are given and then related to the case of the Botswana civil service to make it clear.

2.2.1 Information and Communication Technology (ICT).

Information and communication technology is defined by FOLDOC (2006) as "*The study of the technology used to handle information and aid communication*". This is a broad definition as there are numerous technologies that are used to deal with information and make communication easier, for example: telephone, fax, and transportation system. For this research the technology is restricted to computer technology, albeit computers are also embedded in other technologies. According to (FOLDOC, 2006) the phrase "information and communication technology" was made popular by the Stevenson (1997) report to UK government. Stevenson (1997) report looked at the best approach for the UK government to facilitate use of computers in public schools in UK. The phrase has grown in popularity throughout the world now.

Information and Communication technology has almost the same meaning as Information technology, but it is different from information systems as the following definition by (Heeks, 2002: 15) indicates

> *Information technology* (IT*) can be defined as computing and telecommunications technologies that provide automatic means of handling information. IT is therefore taken here to represent equipment: both the tangible hardware and the intangible software. A computer linked to other computers on a local area network represents one example of IT.*

> *Information systems* (IS) *can be defined as systems of human and technical components that accept, store, process, output and transmit information. They may be based on any combination of human endeavours, paper-based methods and IT. A financial information system of staff and computers that gathers data and processes it into reports used for managerial decision making represents one example of an IS*.

Peppard (1993) has argued that some literature uses the terms information systems and information technology interchangeably. However the two terms may not necessarily mean the same. According to Laudon and Laudon (2006) information systems (IS) is

> *"a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization" (Laudon and Laudon, 2006: 14)*.

The definition of information technology (IT) according to Laudon and Laudon (2006) is

> "…all *the hardware and software that a firm needs to use in order to achieve its business objectives" (Laudon and Laudon, 2006: 13)*.

This above definition of IS implies that an information system might even be paper based, which is the oldest mode through which information is stored during its flow. However, with the increasing use of computers, more and more information systems are becoming computer based. There is a very close association between computer based IS and IT as one depends on the other, for example IT will not be of benefit if it did not support IS and similarly computer based IS needs IT to succeed.

In this work technology refers to a computer with the minimum hardware and software required for it to be used to accomplish a task. This also includes a computer network that might be put in place to facilitate sharing of information. Hence even where there is no network; provided the computer has the basic resources it needs for it to be used, this will still be valid for this research.

2.2.2 Performance and Service Delivery

OED(2006) gives a total of 13 different definitions for the word performance. The definitions are based on how the word is used, for example as a noun; it has at least 4 meanings. For this research the adopted definition is

> "*The quality of execution of such action, operation, or process; the competence or effectiveness of a person or thing in performing an action: Specification; the capabilities, productivity, or success of a*

machine, product, or person when measured against a standard" (OED, 2006).

Service delivery can be defined as process and actions that government employees or agents perform to meet demands of the society or other stakeholders. The execution of actions and processes facilitate service delivery. Gortmaker et al.(2005: 49) has shown that some of the service delivery processes can be simple and basic, such as issuing a parking ticket, while others can be highly complicated, such as issuing permit for the location of a chemical plant.

There are numerous stakeholders in evaluating the performance of civil servants such as consumers, taxpayers, politicians and staff. Each stakeholder may use different criteria or standard for evaluating public sector performance. However there are tangible elements of the service delivery process which are likely to be judged in the same way, for example speed of delivery, effectiveness etc (Boyne, 2003: 368).

2.2.3 Productivity/ Effectiveness

Productivity is used extensively in economics. It is defined as

"*The rate of output per unit input, used especially in measuring capital growth, and in assessing the effective use of labour, materials and equipment" (OED, 2006).*

In the private sector productivity is defined as above. The outputs, which can be in the form of goods or services, are expressed as a ratio of inputs used to produce them, such as labour, capital cost and land (Kelly, 1988: 8), (Hope, 1995: 43) (Hatry, 1978). This definition is difficult to apply to the public sector due to the type of outputs produced by such a sector. It is difficult to package goods and services into discrete units and price them like " *a ton of bricks*" (Kelly, 1988: 8) or "*a bottle of milk*" (Hope, 1995: 43).

There are direct as well as indirect outputs from the public sector. Some productivity analysts have called for measurement output to be limited to direct outputs only to be fair to government employees (Burkhead and Hennigan, 1978, Hatry, 1978) and (Hayward, 1976). They argue that productivity measurement must not include desired consequences as they are difficult to measure, as the following observation illustrates.

"*Government employees cannot control all of the factors contributing to public safety of public health. The police can control the number of*

> *arrests they make, but cannot force citizens to report crimes or to be witness in court. Doctors can vaccinate children against diseases but they cannot ensure that children wash their hands before eating, or do not drink contaminated water, or eat junk food …. If public safety and public health (the desired consequences) do not improve, it is not fair, from this administrative efficiency perspective, to label public employees 'unproductive'" (Kelly, 1988: 9)*

The productivity of government employees must be measured against what they can control. However if citizens observe an increase in number of employees as well as resources allocated to them, they are justified in viewing government as being inefficient if the effects of such investments are not noticeable (Kelly, 1988).

The definition which is linked to the public sector is the one given by Hayward(1976) who defines productivity in government as:

> *… the efficiency with which resources are consumed in the effective delivery of public services. The definition implies not only quantity, but also quality" (Hayward, 1976: 544)*

The definition of productivity in the public sector includes both efficiency and effectiveness. Hatry (1978) defines efficiency and effectiveness in the public sector as follows:

> "*Efficiency is the extent to which the government produces a given output with the least possible use of resources. Effectiveness indicates the amount of end product, the real service to the public, that the government is providing" (Hatry, 1978: 28)*.

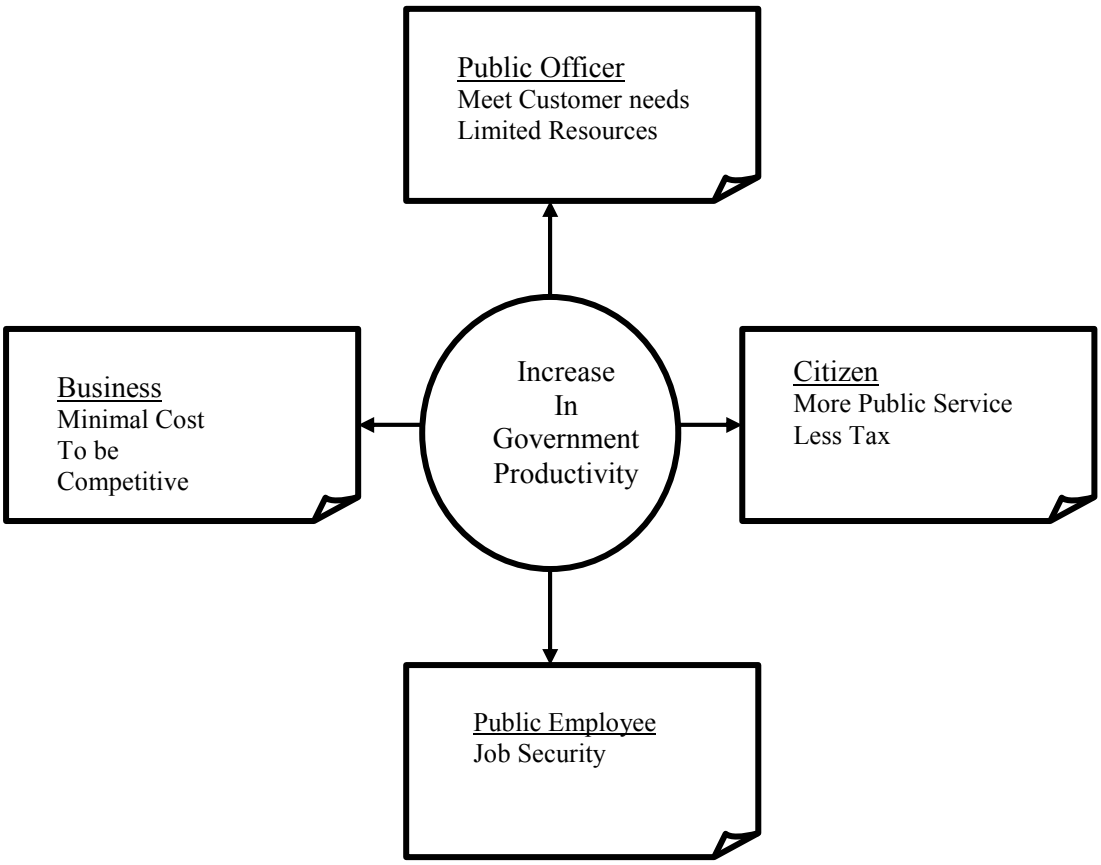


Figure 2.1 Effect of Increase in Government Productivity. Adapted from (Hayward, 1976: 544)

For this research, effectiveness or performance is a much better term than productivity (see Section 2.2.2). This is because the research is looking at improvement in services provided by civil servants using available information and communications technology. The definition which is found to be appropriate is the one which Van-Reenen and Sadun (2006: 55) call labour productivity. They define it as the amount of output produced per hour worked. There will be lack of productivity if expectation of recipients of the service offered is not met.

The role of government is not necessarily to generate revenue, but to provide an environment which is conducive for businesses. This has been argued by Kelly (1988) who wrote:

> "*Whereas in business productivity is associated with success in the marketplace and, especially profitability; in government, where profitability is absent, productivity becomes harder to identify and measure" (Kelly, 1988: 1)*

Hence the economic definition of productivity may not apply in this setting. This view has also been observed by Sugumaran and Arogyaswamy(2003: 79) who

wrote that the traditional way of looking at performance as a ratio of input to output may not be adequate in information and communications technology environment. Productivity is easy to define for manual tasks. The ability to measure productivity for manual work was first brought by Taylor (1967) in theory of scientific management. Taylor (1967) argued that workers' productivity can be improved by studying the process of doing work and reducing any redundancies. Today in the developed world manual work is almost 100% automated as observed by Ramirez and Nembhard (2004: 603). A new group of workers called knowledge workers (KWs) dominates the current labour force. As Ramirez and Nembhard (2004) pointed out the current economic drivers depend on knowledge work more than manual work; hence

> "… *the challenge today is not to increase manual worker's productivity but to measure and increase KW's productivity" (Ramirez and Nembhard, 2004: 602).*

Performance or productivity is difficult to measure when applied to the service industry. However they can be indirectly determined by the level of satisfaction of the people receiving the service. However performance of the Singapore Civil Service Computerisation Programme (CSCP) was quantified to be reduction or avoidance of some 5000 posts in government and

> "…*the government obtained a return of $2.8 dollars for every dollar spent on IT in the CSCP" (NCB, 1992: 8)*.

Productivity can best be understood by studying the work of Edward Deming, the world wide management philosopher, well known for his work that built Japan from almost nothing after the Second World War to one of the most productive nations (Deming, 1986: vii). While economists like to measure productivity, unfortunately measures of productivity are

> "*like statistics on accidents: they tell you all about the number of accidents in the home, on the road, and at the work place, but they do not tell you how to reduce the frequency of accidents" (Deming, 1986: 15)*.

Productivity measurements only serve as comparison yard sticks. The most important thing is the action taken to address problem surrounding productivity.

The impact of information technology on labour productivity has been discussed intensively by Van-Reenen and Sadun (2006). They looked at labour productivity at macro and micro level, comparing USA and Europe. At macro level, the impact has been a significant growth of about 3.5% and 1.9% for ICT

using and producing sectors respectively. This was a comparison between the period 1990-1995 and 1995 – 2001 for USA. All the other sectors in the USA economy experienced a decline. The USA was found to be ahead of Europe where the same sectors experienced negative growth except for the ICT producing sectors(Van-Reenen and Sadun, 2006: 56).

At micro level, the impact of information technology was found to be difficult to determine as there are other non-IT investments which are difficult to control. Also the difference in firms and industry made evaluation of the impact of information to be problematic (Van-Reenen and Sadun, 2006: 57).

Increase in government productivity regardless of how it is measured benefit four main stakeholders namely, public officials, citizens, government employees and the business community (Hayward, 1976: 544). Figure 2.1 shows what each stakeholder benefits from increase in government productivity.

2.3 Results of Previous Studies

The problem of whether investments in information technology lead to any improvements in productivity has been researched and debated for a long time as discussed by Oz (2005: 789). Unfortunately a lot of these studies did not produce conclusive results, according to Sircar (2000: 69). The question of information technology investments and its impact on productivity has puzzled the research community for a long time; however organisations continue to increase their investments in information technology, despite not having any evidence that it leads to any positive returns. This has been referred to in literature as "*IT productivity paradox*" (Oz, 2005: 789).

An analysis of the information technology paradox by Mogotlhwane et al.(2006a) revealed that previous research showed the following:

- Measurement errors
- Adaptation strategy
- Effective use
- Type of business

2.3.1 Measurement errors

Research that revealed measurement errors was where the problem was addressed by applying an economic model of productivity. The economic model defines productivity as the difference between output and input values. If the output value is more than the input value then there is productivity gain and vice

versa. The magnitude of the difference indicates the amount of productivity gain or loss.

The problem with evaluating the impact of information and communications technology is that it is almost impossible to isolate all the other input variables. In any organisation the input variables are many, including assets, human resource, information and communications technology etc. The problem of measurement was also highlighted by numerous researchers such as (Brynjolfsson, 1993) , (Anderson and Rust, 1997), (Strassman, 1997) etc.

2.3.2 Adaptation Strategy

Some research has revealed that it is how an organisation adapts information and communications technology that determines its effect (Bharadwaj, 2000),(Gates, 1999b). Adaptation strategy looks at the alignment of information and communications technology strategy and business strategy. The degree of miss-match can be an indicator of problems to come. This is because information and communications technology then becomes a burden that needs to be addressed along with daily demands of the business. The way around this is to get all stakeholders involved in the whole process from initiation to utilisation. Unfortunately organisations tend to rely heavily on external consultants. Often this does not work out well and may lead to increase in costs as observed by Collins and Simons (2006: 1).

2.3.3 Effective Use

Information and communications technology systems are often made with a lot of functionality incorporated. It is these that add to the price of the system. However, in reality, many people tend to use the bare minimum to get the work done. This was shown by the days of video recorders which could allow programming of television programmes well ahead of time, but few people often did so. An example that also shows lack of effective use is the current use of word processors merely as electronic type writers by majority of users. Lack of effective use has also been highlighted by other researchers like Sircar et al (2000) and Cron and Sobol (1983)

Use can be an indicator of success of ICT because if it is not used then it can not be successful (Szajna, 1993: 147). This view is shared by Fuerst and Cheney (1982: 554) who emphasise that unless a decision support system is

used it cannot benefit an organisation. In their research on perceived utilisation Fuerst and Cheney (1982: 554) also investigated age, education and user training as variables and found that user skills were the most important factors affecting usage. Snitkin and King (1986: 84) developed a model which showed that effective of use is a function of usage, user characteristics, application and system.

2.3.4 Type of Business

Some researchers have found that information and communications technology success depends on type of business (Quan et al., 2003), (Cron and Sobol, 1983). For organisations where the core business is routine in nature, such as banking, there is likely to be success. Chowdhury (2003) showed that information and communications technology was paying off in the banking industry. However with appropriate strategy, benefits can be realised in almost all business today as the technology has significantly improved.

Despite problems associated with measuring the impact of information technology, Singapore, one of the world leaders in information technology was able to determine the return on investments of information technology. The figure quoted by the National Computer Board of Singapore was almost "*2.8 dollars for every dollar spent on information technology plan" (NCB 1992 as quoted by (Choo, 1995)*.

The impact of information technology on productivity remains a problem that continues to be debated. Basden (2008: 32) has proposed a framework that uses Dooyeweerd's philosophy to show that there are a set of beliefs that form the basis of evaluating information systems. Dooyeweerd's philosophy argues that humans' reactions to their reality can be explained by a set of beliefs such as economic, legal and ethical beliefs etc. (Basden, 2008: 65).

2.4 Maturity Models

Maturity models are ways of understanding an organisation in terms of pre-set characteristics related to information technology (Underwood, 2005). Maturity models can be based on looking at how the role of IT is addressed, either as a product or process (Saleh and Alshawi, 2005), (Underwood, 2005). These two categories of maturity models are briefly discussed in the next section.

2.4.1 Process-Based Maturity Models (ProsBMM)

Process-based maturity models looks at the development processes of an IT/IS system and its introduction all the way up to utilisation. These types of maturity models are ideal for software developers. As this research is not developing an IT system these models are not considered.

2.4.2 Product-Based Maturity Models (ProdBMM)

Product-based maturity models looks at the role of IT product in an organisation and how the organisation responds to this change. There are numerous ProdBMM that have been developed over time such as Nolan (1979), Bhabuta (1988) etc.

The (Nolan, 1979) model looks at utilisation of IT/IS system within an organisation. This model has been found to be the most appropriate maturity model for this study which looks at utilisation of IT systems in central government. Nolan's model showed that IT expenditure and experience in managing IT were similar as they both exhibit the **S** shape (Earl, 1989: 30). The model is also not very difficult to use. The main limitation with Nolan's model is that it is very old and needs to be updated.

2.4.3 General Practitioner IS (GPIS)

The general practitioner IS (GPIS) measurement model was developed by (Saleh and Alshawi, 2005). This model can be used to determine the readiness of an organisation before IS investments are made. It is a very good model that can guide managers in their IT investments. The GPIS model takes into consideration the following

- IT infrastructure
- People
- Process
- Work environment.

This study has not adopted this model because, in the case of Botswana, ICT investments have already been made, hence this might affect determining the pre-set criteria that the model required before investments are made.

2.4.4 IT Value Hierarchy Model

This model has recently been developed by Urwiler and Frolick (2008: 83). It is based on psychological needs of hierarchy that was developed by Abraham Maslow (Maslow, 1954 :80-91). There are five levels of human needs and to

attain the need at any level requires that a lower level need or needs must first be met. Figure 2.2 shows the comparison between Maslow's hierarchy of needs and the IT value hierarchy.

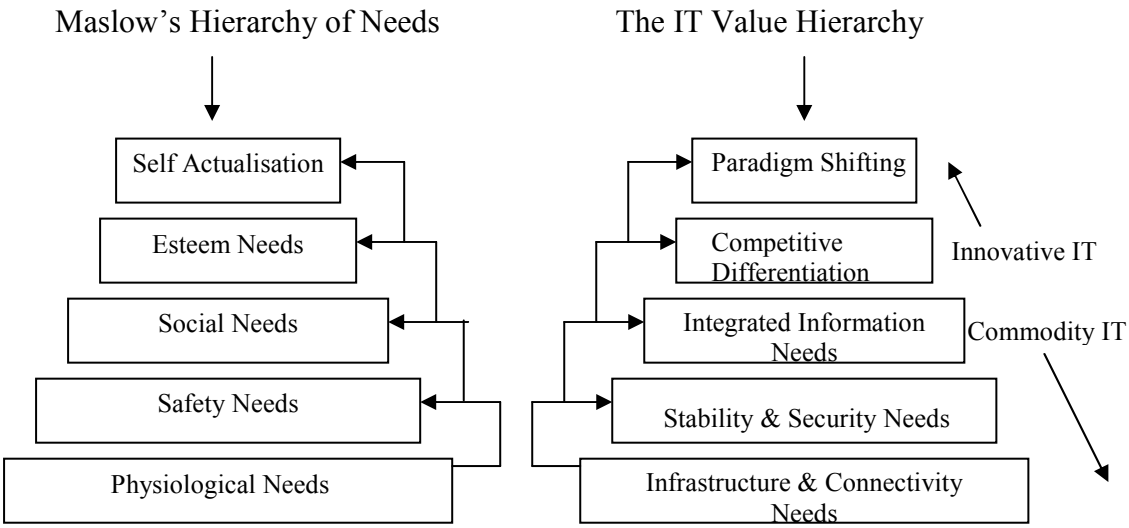


Figure 2.2 Maslow's Hierarchy of Needs and The IT Value Hierarchy. Adapted from (Urwiler and Frolick, 2008 :84&85)

The IT value framework can help an organisation to determine where it stands in terms of the value it is getting from IT by evaluating itself against pre-set conditions that describe the status of an organisation at each level of the hierarchy. Once an organisation knows where it stands it can also use the framework to look at where it wants to be and what it needs to do to get there. The fundamental principle in the IT value hierarchy is that lower level needs must be met first before higher ones can be achieved, for example the stability and security needs of IT requires that there be IT infrastructures that are digitally connected.

The lower levels of the IT value hierarchy shows organisations which look at IT as a commodity, while those at the top are those that look for innovative opportunities provided by IT that can provide more business value. Depending on the needs of an organisation and the prevailing environment, an organisation may chose to stay at a particular level, just as with human needs one can be content with just having social needs being met.

The descriptors of each of the maturity stages of the IT value needs are discussed in detail in Section 4.6.2.1.

2.5 Organisational Structure

2.5.1 Organisation

An organisation is defined as "…*a group of people working together in a formal way"* (Bott, 2005: 41). Therefore an organisation can be a school, government department etc. Another important characteristic of an organisation is that it must have a legal standing so that it can almost be treated like a person when it comes to matters relating court interference (Bott, 2005: 2).

Organisational structure comes from the fact that people working in an organisation need to have the work divided among them. It is how this work is divided and shared that builds the organisational structure (Bott, 2005: 97).

Organisations attain the status of a legal person by undergoing a registration process within the country in which they operate. There are two broad classifications of organisations namely commercial and public organisations. This distinction is based on how the organisation is run in terms of money required to run it.

2.5.1.1 Commercial organisation

A commercial organisation's main existence is to be run in such a way that there is gain in profit after meeting all the operations costs. An example of this type of organisation is a commercial bank. If a commercial organisation does not make profit, it will be difficult for it to survive for any length of time.

2.5.1.2 Public Organisation

A public organisation is the opposite of a commercial organisation. It is not in the business of making profit but just provides a service. The example here is a government department. There are also public organisations which are not government departments and these are called non-government organisations (NGO). The idea behind a public organisation is that any money that is charged to the consumer of service or product must be as little as possible (sometimes even free if it is a government department except through tax). At most the money must just meet the operations costs of running the organisation.

The success and how it is measured is different for the private (commercial) and public (government) sector. Table 2.1 shows comparison of public and private sector in terms of issues that relate to their criteria for success.

Criteria	Private Sector	Public Sector
Unit of production	Individual firm	Department, town etc
Objectives	Survival	Broad and based in constitution and political manifesto
	Profit	
Strategies	Enhance firm strength in competition	Expansion leads to conflict
Principle	Consumer sovereignty	No competition or expectation to make profit
	Productivity	
Measure	Liquidity ratio	Peace
	Profitability ratio	Promotion of liberty and justice
	Activity ratio	Win war (USA)
	Leverage ratio	etc
	etc	

Table 2.1 Comparison of Private and Public sector operations. Adapted from (Kelly, 1988: 2-3)

The organisation structure for both government and private business is characterised by the traditional triangular shape, few people at the top and more at the bottom (Figure 2.3). This was developed by the German sociologist Max Weber and is sometimes called a bureaucratic model (Bott, 2005). This stable structure is seen in all spheres of human activities, for example business, politics, family etc. People at the top are to provide leadership, this has existed with mankind due to formation of groups or association of people (Einstein and Humphreys, 2002: 1). The underlying principle of this structure is that responsibilities and roles change as you move up the structure. At the bottom tasks tend to be more routine in nature and less strategic thinking takes place here as compared to the top. This implies that more people are needed at the bottom than at the top.

According to this structure employees at operational level do routine tasks. At management level, managers use production rates from operational levels to produce reports that allow them to supervise their subordinates and monitor progress. Therefore top management have power and control due to information availed to them (Wang, 1997). At strategic level, reports from management are used to make strategic decisions. These decisions are mainly

unstructured and difficult to automate. They are often based on experience and knowledge; hence require a less routine approach.

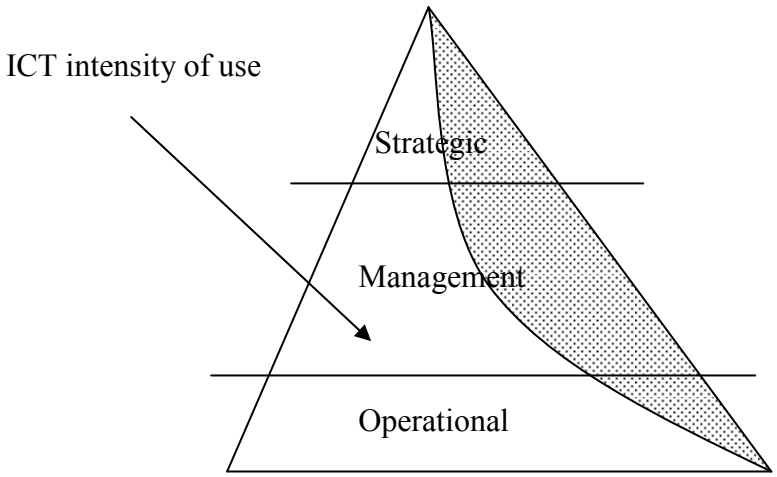


Figure 2.3 Information management and organisational levels. Adapted from (Hussain and Hussain, 1992: 310)

Herriot and Pemberton (1995: 52) referred to this pyramid structure as a military model while Peters and Waterman (1982) referred to it as the Roman Catholic Church five layers of corporate governance, namely

> " *…the laity, the priest, the bishop, the cardinal, and the Pope" (Peters and Waterman, 1982: 270).*

This is because instructions and power comes from the top.

It is now argued that with the use of information and communications technology, manual tasks can be automated, hence employees at the bottom require the same information as those at the top. They are equally capable of using information. However as Gates (1999a) observed, middle managers and their subordinates need business information as much as senior managers but often they have less. The biggest problem regarding this is that it is human nature to have control and not to loose it, hence top management are not willing to let go control to those below. The pyramid structure suits politicians as it allows for power to be mainly at the top (Bannister, 2001: 66).

The 21st century has brought in a new type of product that is driving business. In the majority of developed countries, most work that is mainly manual has been automated; this has significantly reduced human effort in the production process (Ramirez and Nembhard, 2004: 603). Organisations have changed from manual

intensive organisations to information-managing institutions; they have become knowledge-based organisations. A knowledge-based organisation is made up mainly of specialists who have to deal with information that determines success or failure of an organisation (Drucker, 1988: 45).

The change in the core of an organisation business from being labour to being information intense has challenged the pyramid organisational structure. This is because in a knowledge-based organisation the number of management levels and the number of managers is significantly reduced. This is because managers are now not managing as they neither make decisions or lead. If they exist they only serve as re-layers of information (Drucker, 1988: 46). Information technology is changing the pyramid structure for those organisations that learn to succeed in a knowledge based economy (Dervitsiotis, 1998: 115). A knowledge-based organisation needs an almost flat structure for it to function effectively using its employees the majority of whom are knowledgeable i.e. specialists (Laudon and Laudon, 2006: 83).

There is a need to turn the traditional pyramid upside down. This has also been observed by Carlzon (1989) who stated the following regarding this organisational structure:

> "*The traditional corporate structure resembles a layered pyramid with a pointed top, several intermediate levels, and a base connected with the market. At the top of the company sit the chief executive and a number of highly qualified vice presidents – well educated, skilled specialists in finance, production, exports, and sales."(Carlzon, 1989: 3)*

The main responsibility of the top layer is to make all decisions that control and run the corporation. These decisions keep the top management fully engaged. It is the responsibility of middle management to turn decisions of top management into policies and convey them to the rest of the corporation. It is not appropriate to call these people middle management as they do not have the opportunity to make their own decisions for their responsibilities. They are merely messengers who convey the decisions of top management. Those at the bottom of the pyramid are the people who face customers. Unfortunately they are powerless and not free to respond to individual customer needs as they arise (Carlzon, 1989: 4).

Beer et al.(1990: 158) have shown that in USA the most successful companies where change programs succeed are those that have moved away from the

rigid hierarchical and bureaucratic model of organisation structure. The drivers of success to change were shown to be in small units and divisions far away from the corporate head office (Beer et al., 1990: 159). In his inaugural address the new president of Botswana called for changes in bureaucratic control in the public sector to respond to the needs of the nation (Khama, 2008).

2.5.2 Power in organisations

In any organisation power and control plays a very important role in the structure of the organisation. Using ICT effectively has been shown to have the ability to reduce the power base of top management (Sawhney and Prandelli, 2000: 33). Whether an organisation is centralised or decentralised depends on how power is distributed. In a centralised structure much power and control is kept at the top of the organisation. In a decentralised structure power and control is also delegated to the lower rank of the organisation. Bott (2005: 105) has argued that in an organisation where there is much talent at lower levels it is best to adopt a decentralised structure. But this is very difficult as top management want to maintain their power.

There has been a shift from manual and clerical work to knowledge work and as Drucker (1988) put it

> *"The centre of gravity of employment is moving fast from manual and clerical workers to knowledge workers who resist the command-and control model that business took from the military 100 years ago" (Drucker, 1988: 4)*.

Knowledge workers are themselves specialists in their field and there is need to adapt management style that will enable them to use their expertise to the benefit of an organisation. A knowledge based organisation is made up mainly of specialists who are capable of directing and evaluating their own performance through feedback from colleagues, customers and supervisors. To improve customer service McNealy (1994: 55) calls for reversal of the pyramid in order to be responsive to customers. Hence different style of management is required. In some developed countries cost of ICT is no longer an issue, the biggest barrier to utilisation of ICT are organisational issues which revolve around power dynamics as to who is in control (Björk, 2003: 114).

Organisational issues as barriers to the utilisation of ICT are more likely to be experienced in the public sector due to three forces that play a part in running the public sector. There is the political force, public as political constituents and

the employees who are often professionals. The interests of these three forces are often not in alignment. Employees have very little influence and power as shown in Figure 2.4. Politicians' interest is often to pursue issues that raise their agenda in the general public. On the other hand employees look for best practice and meet their professional ethics in doing their work which may not satisfy the majority of the public.

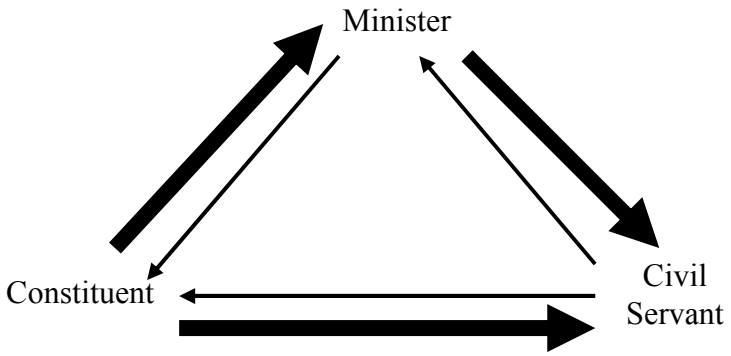


Figure 2.4 Degree of influence/power within public sector. Source (Bannister, 2001: 70)

As shown in Figure 2.4 public service employees are subjected to immerse pressure coming from the public as well as politicians. However civil servants have very little influence on the public and politicians. Considering that civil servants have knowledge that they have acquired through intense training, insufficient power and influence to the public and politicians creates an environment that is not conducive to development. The problem of poor service delivery in Botswana comes mainly from politicians and members of the public.

One of the major advantages of use of ICT is in its ability to provide relevant and accurate information faster to where it is required. Since having relevant and accurate information allows a person to have power to make decision, it can be argued that computerised information systems have the ability to distribute power within an organisation. This has also been observed by De (2005) who stated the following:

> *"Redistribution of power occurs when certain information, relevant and necessary for doing work, is made available by the new system to those who did not have this access before" (De, 2005: 28)*

Technological advancement in telecommunication, computer networks and user interface etc has facilitated empowerment of end users at operational level. This is because employees at operational level can use IT to manage information

related to their work (Hussain and Hussain, 1992: 3). Combined with the fact that employees at operational level are knowledge workers, this also can act as a facilitator to the benefit of the organisation.

The public sector operates through procedures and line of commands. For example there might be only one person, often head of a department, who can sign a document to make it valid. This process was necessary because the authorising officer had to certify that all the relevant checks have been done. Now that ICT can enable a junior officer to do the same check, for example check details in a database, there is probably now a need to look into this issue. Wheatcroft (2007: 119) illustrates this by showing how in a supermarket where only the supervisor is given the right to look for product in a database, just one item without a bar code can cause delay and affect more than one customer while waiting for the supervisor to retrieve the information. The way around this is to empower the cashier to do exactly what the supervisor does. Customer relations can also be enabled to people who receive request from customers directly. Everyone in the organisation must have some customer relations capability as they can play part in providing result of service request as shown in Figure 2.5

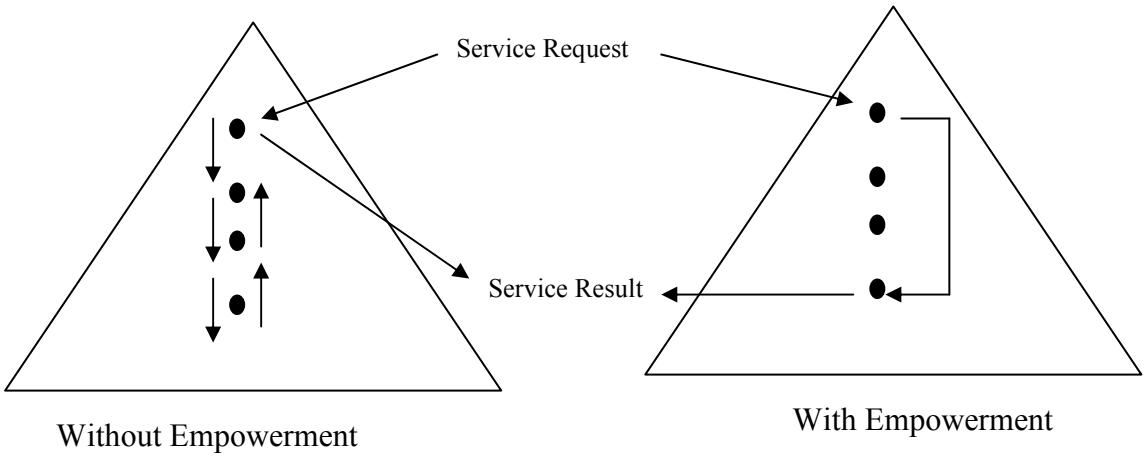


Figure 2.5 Examples of Empowerment (Wheatcroft, 2007: 120)

Empowering employees is one of the principles of team based assessment approach which has been shown to lead to success in a case study of an organisation that was dealing with US government contracts (Killingsworth et al., 2001: 9).

Respect for authority and power distribution has been observed to dominate the perception of employees in Botswana's public service. Those in authority expect those under them to be obedient and they are expected to rely on their seniors for almost every aspect of their work. This was observed by Blunt and Jones (1997) who even wrote that

> *"The impression which emerges vividly from the Botswana data is of an organizational culture where authority is exercised in a rather paternal way and where deference to authority figures is high. This type of hierarchical relationship involves also a degree of dependence on seniors by more junior individuals, and this is accepted as normal" (Blunt and Jones, 1997: 17)*

Since information technology has the capability to provide workers at the bottom of the organisational structure with analysed information, this empowers them to be capable of making decisions on that information. Hence they need to be empowered to do so without relying on rigid administration structure of power and control (Peppard, 1993: 8).

2.5.3 Change Management

The introduction of information technology into an organisation leads to some changes especially if it is to be used to deliver expected results. This is due to the fact that information technology is capable of providing required information to anyone irrespective of their position in an organisation. This can bring challenges to an organisation; hence it needs to be a well managed process as was observed by Peppard and Steward (1993) who wrote that

> *"Information is a resource which is closely linked with status, power and authority. By redefining or redistributing information in an organisation both positive and negative consequences can be experienced for all parties involved" (Peppard and Steward, 1993: 269)*

Introduction of information technology in an organisation introduces change. The introduction of change requires careful planning and no assumption must be made that people will just change. The only form of change which seems to always be acceptable is where there is a higher degree of personal gain such as salary increase, or benefits such as being given a company car (Peppard and Steward, 1993: 276).

The introduction of an automated manual task in an organisation may introduce the following examples of resistance to change by employees according to Peppard and Steward (1993: 277).

- Uncertainty in relation to the future (will they still have a job?)
- Need to learn new skills (they may feel that they are unable to do so)
- Loss of status, money authority etc.
- Loss of power due to removal of discretion in performance of task
- Requirement to relocate to a different geographical location
- Break-up of a work group which has been together for a number of years

The majority of the learning process in using information technology is acquired by using and experimenting with the technology (Peppard and Steward, 1993: 283). Hence where there are political powers of the technology being controlled, for example, when and who can use what, this may increase resistance to change. Although some form of control is required, such control must not prevent innovation of using the technology, which may come from where it is least expected.

2.6 Skills in ICT

There are some skills that are required to operate ICT. It is important to provide employees with minimum competency to be able to operate a computer. In the UK, the NHS staffs are reported to have gained an extra 38 minutes after getting the computer skills. The extra time is gained by not struggling with using a computer and is used to provide extra care to patients (Wheatcroft, 2007: 107). If employees do not have such skills, this may become a barrier that will prevent them from utilising ICT. This is particularly true for older employees who have undergone formal training before ICT penetrated the labour market. It therefore shows that while in the past being literate was the issue, now employees need to also be computer literate. Computer illiteracy and lack of knowledge on ICT are the major reasons for under utilisation of ICT in many countries (Acar et al., 2005: 714). Wheatcroft (2007: 108) has shown that organisations can lose about 7.2% of their working week by not utilising ICT facilities to their maximum capability. The EU is continuously looking at member states to empower their workforce with ICT skills (Tijdens and Steijn, 2005: 60).

In Europe the European Computers Drivers Licence (ECDL) has been set up to prepare citizens of such countries to benefit from ICT. This certification programme is expanding globally and an international version of ECDL has been developed called International Computer Drivers Licence (ICDL). Currently there are about 107 countries in the world using ICDL (Wheatcroft,

2007: 107). Some countries have adopted ICDL for their labour force (UAE, 2004).

ICT in work uses a lot of keyboard operations. Secretaries and other typing pool staff used to be known for producing high quality documents over a reasonable period of time. This was because secretarial staff were trained on keyboard skills, something which is not often done with other employees (Wheatcroft, 2007: 107). Previous research has also shown that there is a strong association of technology use and the skills that employees have (Bartelsman and Doms, 2000: 591), (Mahmood et al., 2001: 110).

2.7 Service to Customers

There has been a significant acknowledgement by governments all over the world about the potential of ICT to improve quality of service to society. Improvement in quality of service serves the public well and helps to maintain jobs while also supporting private organisations to work better and create more jobs as a result (Deming, 1986: 139). The emergence of e-government is to enable citizens to interact and access government services online. It is therefore important to monitor how members of the community perceive the quality of service from governments that have established ICT infrastructure to improve quality of service. If ICT facilities are under utilised, this can lead to decline in the quality of service offered to customers (Sauer, 1993: 1).

While provision of computers may help employees provide a better service to customers, they can also do the opposite especially where work ethics are not very strong. For example internet availability means that an employee can be engaged in the internet doing things which do not bring value to the organisation or do not help to serve the customer. As Deming (1986: 139) has long pointed out *"computer can be a blessing. It can also be a curse"*.

Service is different from a product, for example it can not be produced in huge amounts, packaged and discounted to customers (Wheatcroft, 2007: 1). It is therefore very difficult to maintain quality control in the service industry. Quality of service is determined by the customer receiving it. Customer satisfaction and retention have been shown to be one of the most important factors for growth of E-business (Dubelaar et al., 2005: 1251).

In a service industry like government departments, customers request some service which may not necessarily be a product. The way the customer is received and treated develops a certain perception about the quality of service. In the private sector, (Carlzon, 1989: 3), Wheatcroft (2007: 116) and McNealy (1994: 55) calls this the moment of truth (MOT) and it affects customer retention.

The moment of truth has been shown to be about 15 seconds for the air line industry (Carlzon, 1989: 3). Jan Carlzon was a successful chief executive officer who took over presidency of Scandinavian Airlines (SAS) in 1981 when the company was facing decline service and morale. Within a year, Carlzon managed to turn SAS into a profitable and well sought after air line using moment of truth philosophy (Denning and Dunham, 2003: 19). Carlzon (1989) illustrates the impact of moment of truth by stating the following:

> *"If we are truly dedicated to orienting our company toward each customer's individual needs, then we cannot rely on rule books and instructions from distant corporate offices. We have to place responsibility for ideas, decisions, and actions with the people who are SAS during those 15 seconds: ticket agents, flight attendants, baggage handlers, and all the other frontline employees. If they have to go up the organizational chain of command for a decision on an individual problem, then those 15 golden seconds will elapse without a response, and we will have lost an opportunity to earn a loyal customer" (Carlzon, 1989: 3)*

The primary role of any government department should be to provide service to the nation in the most economic way as required by law or regulation (Deming, 1986: 6).

Customer service has been used as one of the measures of identifying business value of ICT to an organisation (Melville et al., 2004: 295). This is because the type of service that customers get from an organisation can determine whether they will continue to use services or buy products that the organisation provides. For quality to improve there must be continuous improvement in design of product or service. A consumer of the product or service is the most important component of any production line (Deming, 1986: 26).

2.7.1 Customer Satisfaction Barometers

Satisfaction is very difficult to define. According to Oliver (1997: 39)

"satisfaction is an internal frame of mind: it is tied only to mental interpretations of performance levels".

In the majority of organisations, customer satisfaction is thought to be possible to archive by appropriate organisational culture, training and customer responsiveness. However these managerial approaches cannot guarantee satisfaction. This is because management cannot see "inside the head" of human elements involved. Hence there is a need to look at behavioural elements to supplement management strategies to archive desired customer satisfaction (Oliver, 1997: 7). Meeting customer demands is one of the important factors that determine the value of efficiency and effectiveness of a service being provided (Boyne, 2002: 18).

The role that customer satisfaction plays in the life of an organisation is highlighted by use of customer satisfaction measure. Developed countries have set up institutions to monitor customer satisfaction to enable them to introduce benchmarking standards (Grigoroudis and Siskos, 2004). These countries monitor customer satisfaction to develop a customer satisfaction index which supplements other measurements of economic activity such as consumer price index (Grigoroudis and Siskos, 2004). Some of the satisfaction barometers currently in use are as shown in Table2.2

Barometer	**Country**	**Research Agency**	**Source**
Swedish Customer Satisfaction Barometer (SCSB)	Sweden	Michigan National Quality Research Centre Swedish Post Office Stockhom School of Business	(Grigoroudis and Siskos, 2004: 338) ,(Anderson et al., 1994: 59)
German Customer Barometer	Germany	German Marketing Association, Deutshe Post Ag	(Grigoroudis and Siskos, 2004: 340)
American Customer Satisfaction Index (ACSI)	USA	Michigan National Quality Research Centre American Society for Quality Arthur Anderson	(Evans and Lindsay, 2002: 158) (Grigoroudis and Siskos, 2004: 342)
European Customer Satisfaction Index	EU	European Organisation for Quality European Foundation for Quality Management	(Grigoroudis and Siskos, 2004: 343)

Table 2.2 Examples of Customer Satisfaction Index Barometers

Botswana has recently also introduced a service level framework that provides commitment that each ministry or department will try to uphold to meet the needs of customers (DPSM, 2008). This is a welcome development as it provides a basis on which customers can judge performance of government departments.

2.8 Employees/users

Employees of an organisation play a significant role in its success. For this reason issues related to human resources are very important in order to enable an organisation to get the best out of its employees. Organisations and their employees form a very important relationship. Organisations have certain roles that only the employees can execute for the company. In exchange for doing such duties, employees expect to be rewarded for their effort. In order to enable a cordial relationship to exist between the employer and employee, there are contractual obligations that both parties agree to, often in the form of an employment contract which state the duties of an employee (Pozzuolo, 1978: 799). Such a contract is legally binding as both parties can seek court intervention if it is not honoured. Other scholars argue that there is another type of contract that exist between employer and employee which is not documented and they call it the psychological contract. The psychological contract is discussed in the next section.

2.8.1 Psychological contract

A psychological contract is a set of expectations that the employers have towards their employee and vice versa (Koh et al., 2004: 357). Herriot and Pemberton (1995) define the psychological contract as

> *"The perception of both parties to the employment relationship, organisation and individual, of the obligations implied in the relationship" (Herriot and Pemberton, 1995) as cited in Guest and Conway (1998: ix).*

These expectations are not written down but yet they are deemed to be important in the employee and employer relationships.

The psychological issues have also been found to be the reasons why despite the UK economy doing very well towards the end of the 1990's, UK's productivity rates was still estimated to be about 20% behind France and Germany and almost 40% behind US. Griffiths (2000) attributed this gap to lack of UK managers to invest in human capital.

> *"Top-down, hierarchical management and command-and –control cultures, styles and practices persist in the UK, even though they are highly inappropriate – especially in the burgeoning service sector" (Griffiths, 2000: 51)*.

Managers need to understand psychology so that they can have the ability to harness and win the hearts that drive employees to work to their best and deliver results (Griffiths, 2000: 51).

Previous initiatives to address problems associated with productivity in the Botswana public service concentrated mainly in human resource and formal aspect of employment service (see Chapter 3). For example senior employees have been trained up to master's level, but they are often lost to parastatals and other private sectors in Botswana. The Botswana government has at times been referred to as training ground for the private sector, as trained personnel often resign from the public service after they have been trained to serve in it (Molokomme, 2008). As the problem of poor performance continues, this research has focussed on the psychological contract to provide a different perspective in trying to find solution to problems of unsatisfactory service delivery in Botswana public sector. Concentrating on employment contract might be failing to trace the root course of the problem. The main assumption with concentrating on the employment contract is that employees must deliver since they are trained and paid to do the job. For this reason upper management sometimes even take tough action by threatening or expelling those who are viewed to be non-performers, sometimes referred to as lazy supervisors or dead-wood (BOPA, 2006c).

2.8.2 Effective Utilisation of ICT

The effective utilisation of ICT depends on the type of hardware infrastructure. For example is the hardware and software appropriate in terms of specification and functionality? However, even if these are in place, there can still be inadequate usage. Users operating in an organisation are central to effective usage that can result in efficiency or productivity gains (Smith, 1997: 10). Effective use of IT that is available has been shown to lead to positive IT impacts (Kohli and Devaraj, 2003: 128). This issue is also shared by Deming (1986: 14) who emphasised the need to determine if the current technology has been used to its full capacity before investing in another new one.

Academic research has shown that deployment and investment in IT only bring about 20-25% of business value. The remaining 75-80% business value lies as an iceberg which can only be realised when IT is used intensively by managers, employees, customers, partners and suppliers (Marchand, 2004: 127).

Employees or users are important in determining the effective use of technology and there is nothing that can replace human power in organisations. Automation and use of the latest technology have been shown not to be the answer. Only quality determines success (Deming, 1986: 12). This view has been emphasised clearly by Strassman (1997) who stated the following on this issue:

> *"Unless robots end up running completely automated businesses, the relationship between computerization and profitability will remain a random scatter diagram for many years to come" (Strassman, 1997: 40).*

It is therefore necessary to determine the rate of use of ICT as well as level of support that employees experience as a way of determining utilisation. Also employees attitude to work, as well as other psychological factors, have been found to affect utilisation of ICT (Mahmood et al., 2001: 110).

The numbers of computers per population as well as the number of internet users per population have become some of the global measurements used to measure development of a country and compare it with others (WORLDBANK, 2007d). In some countries which are leaders in the use of ICT, statistics on the number of internet users per population is determined every year; for example in Finland this has been collected since 2000. The percentage of internet users has increased from 50% in 2000 to 79% in 2007. In collecting statistics on internet use, respondents are also asked what they use it for (Finland, 2007).

2.9 Information

It is important to bring into perspective what information is in order for the role that IT can play to be understood. It is very difficult to define information. The classical definition is often data that has been processed or given meaning (Drucker, 1988: 46). To be able to convert data to information also requires knowledge; hence this definition does not inform much. To understand this definition data must first be defined. Davenport defines data as

> *"observations of states of the world, for example there are 697 units in the warehouse"(Davenport, 1997: 9)*.

Information that has the most important value is knowledge, according to Davenport (1997: 9).

The relationship between data, information and knowledge can best be represented by a continuum as shown in Table 2.3.

Data	Information	Knowledge
Simple observations of status of the world • Easily structured • Easily captured on machines • Often quantified • Easily transferred	Data endowed with relevance and purpose • Requires unit of analysis • Need consensus on meaning • Human mediation necessary	Valuable information from the human mind. Includes reflection, synthesis & context • Hard to structure • Difficult to capture on machines • Often tacit • Hard to transfer

Table 2.3 Data, Information and Knowledge (Source: (Davenport, 1997: 9))

The use of IT in this continuum decreases from left to right while the involvement or role of a person increases as you move in the same direction.

2.9.1 Desirable Characteristics of information

The value of information to its recipient depends on its quality. For information to be of high quality it must be:

- Relevant
- Accurate
- Concise
- Well-presented
- Complete
- Up-to-date
- Cost-effective

The above are according to Martin and Powell (1992: 13). Information technology if used appropriately has the potential to help achieve all of the above. One of the above is more likely to be listed as a major drive to invest in information technology.

It has been shown that the cost of running manual systems is directly proportional to the volume of data i.e. it costs twice as much to handle manually 200 documents than 100 documents (Martin and Powell, 1992: 5). However when using a computer based system, apart from the initial set up cost and upgrades, cost does not increase with volume of data as shown in Figure 2.6

Maximum benefit of an IT based system is obtained when dealing with a large volume of data.

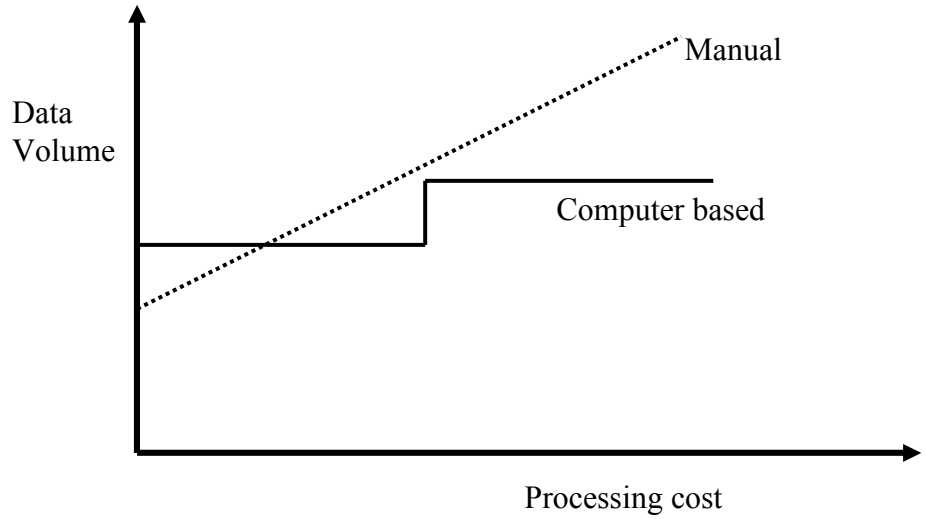


Figure 2.6 Data volume and processing cost for manual and computer based systems. Adapted from (Martin and Powell, 1992: 5)

2.10 Summary

In this chapter terminology of relevant terms related to the research topic has been defined. A critical review of literature has been conducted. The literature has been critiqued to determine the knowledge gap to which this research can contribute. Various maturity models that can be used to understand the role of ICT in organisations have been explored and relevant model which were found to be suitable for this research have been selected. Organisational structures, ICT skills, employee issues that can affect exploitation of ICT have also been analysed. This chapter concludes by defining characteristics of information that can be handled better using ICT.

The next chapter looks at literature specific to Botswana in context to what has been found in the global literature review of chapter 2.

CHAPTER 3: BOTSWANA'S PRODUCTIVITY & ICT

3.1 Introduction

The debate on level of productivity in Botswana has a long history. It can be traced as far back as the 1980's. At that time there were very few computers in government departments as compared to the current situation. Venson (1986) observed a number of factors that led to low productivity in Botswana and among them computerisation is not included, because at that time it was not a tool of trade. However, when Thapisa and Jain (2000: 92) were looking at level of productivity in library services, lack of technology was one of the factors that contributed to the problem.

The debate intensified at the beginning of the 1990's. The president of the time Masire (1991) referred to lack of productivity as "*culture of laxity*". It was through such sentiments that government set up Botswana National Productivity Centre (BNPC) in 1995 to try and instil a sense of desire to perform better among the nation.

Botswana has experienced numerous industrial disputes since the mid 1990's. At first these were mainly from people employed in blue collar jobs, who due to their low education were not paid enough. However this trend continued even up to those highly educated such as academics at the only university in the country, the University of Botswana, where staff held demonstrations regarding pay disputes (BOPA, 2002). Later these labour disputes even covered the mining sector such as Debswana mines, despite its being one of the best paying companies in the country (BBC, 2004). The biggest issue for these industrial strikes is related to what employees think are the low salaries which they are paid. Payment structure in Botswana does not favour citizens. It has been shown that the salary of an expatriate artisan can be as high as 16% that of a citizen artisan and for top manager expatriate the salary is 82% that of a citizen manager (Mogalakwe, 2008: 433).

The Botswana government has introduced numerous productivity improvement strategies in the past such as (Kereteletswe, 2004: 15):

- Organisation and methods of the mid 1980's
- Work improvement teams in 1993
- Performance management system in 1999

- Computerised personnel management system in 1996

Unfortunately these measures have not managed to solve the problems associated with productivity in Botswana. But some of these initiatives have been successful in other countries, for example work improvement teams were successful in Japan and Singapore (Putti, 1985: 301). There has been detailed comparison of western leadership theory in East Asia and Africa by Blunt and Jones (1997). From this work it is clear that there are fundamental differences in all the elements of leadership style between East Asia and Africa. For example in Africa, preoccupation with rules and proceedings dominate leadership style while in East Asia it is collective mutual duties (Blunt and Jones, 1997: 19). This might explain why systems that worked in raising productivity levels in Asia have not delivered the same results in an African country like Botswana. There has to be a lot of customisation and cultural infusion of such systems to fit into African leadership style.

A detailed study by Jones et al.(1996) has shown that perception of the role of managers and leaders' roles in Botswana differ from western theories about such management practices. Using data from Botswana Jones et al.(1996: 463) have shown that managers in Botswana's public service are more concerned with their relationship with their supervisors at the top of the administrative structure than with ministries performance. In Botswana "*good managers are people-oriented rather than task oriented" (Jones et al., 1996: 463).*

The above may explain why productivity initiatives of eastern Asia are not succeeding in Botswana. These productivity initiatives are not able to fit in the African value system (Jones et al., 1996: 467)

3.1.1 Privatisation

The Botswana government has adopted a policy to privatise some of the national assets. There is a perception that privatisation will lead to improved service delivery (Mogae, 2007). Botswana might not be ready for privatisation. The country does not have an industrial base and its economy is based on revenue from the mining sector. However revenue from the mining sector has led to the country's growth in wealth. While mining employs a lot of people, it can only employ a certain number, especially due to increase in modern mining methods which require less and less human power. The result of this is that

government is the largest employer in its process of looking after the welfare of the people.

The private sector is fairly small and all of it depends on business from the government for it to survive. For example commercial banks rely on government employees to seek loans on which the banks make profit. There have been attempts to encourage manufacturing, but this is facing stiff competition for exports especially as the cost of utilities are high in Botswana. For example, being an arid country, water is scarce and very expensive.

With a small private sector, small population and growing unemployment of qualified youths, Botswana probably is not yet ready to go the privatisation route. This is because there are very few people who will be able to have financial power to participate in privatisation of state assets. Also it has been acknowledged that employees in the public sector do not earn enough to undertake any form of investment (Sebetlela, 2006).

The Botswana government has within the last few years been trying to empower and support the growth of the private sector by outsourcing a lot of its functions such as procurement of goods. Unfortunately this has also been seen to be encouraging corrupt practices among the private companies and government employees (Makgekgenene, 2008).

3.1.2 Utilising ICT

The government is also looking at ICT as a possible solution to improved service delivery. The drive to utilisation of ICT in the public sector is going at the same time as privatisation. The government is coming up with too many initiatives, some of them even running concurrently, for example privatisation and ICT exploitation. It has been shown that quality improvement can be achieved by employees working smarter and not harder (Deming, 1986: 69). The utilisation of ICT has the potential to improve quality of service by allowing government employees to enjoy work by working smart. There is a need to map the evolution of information technology in the civil service with the productivity debate in order to find how the two overlap. Computerisation in central government was introduced gradually from around the middle of the 1990's. The information and communication technology infrastructure has been gradually improving over time. This was also observed by Duncombe and Heeks (2001) who acknowledged that Botswana was a selected site for

research work on information and communication technology's and small enterprises as it had

> *"relatively well-developed information and communication technology infrastructure, and its favourable policy environment" (Duncombe and Heeks, 2001: 1)*.

This is an indication that government has the desire to move into the information society of the 21st century.

There is a need to define productivity so that unit of measurement and analysis can be determined. Also this will provide a platform from which to build the research argument. The importance of defining productivity is illustrated by the recently published work by Duarte and Restuccia (2006: 1) where they reported increase in productivity in Botswana from 1965 to 1996. However Duarte and Restuccia defined productivity as ratio of gross domestic product (GDP) to number of workers. In 1965, Botswana was one of the poorest countries in the world; however as discussed in background information section, political stability has led to economic growth, hence increase in GDP. It is therefore inevitable that if GDP growth is used to measure productivity, this will show positive growth in Botswana. For this reason, GDP is not an accurate measure to be used to measure productivity.

For this research productivity or performance is defined as any improvement that results in saving time, money, effort, energy etc. The unit of measurement for this is pattern of growth in ICT expenditure, customer satisfaction and employee relations. The most important factor is not the value of productivity, but the quality of service received by customers, according to Deming (1986: 5).

There has been concern about improvement of productivity of the public service in Botswana with concern often raised by government ministers and senior government officials. Unfortunately there is lack of in-depth empirical studies on this problem and how to measure productivity (Hope, 1999: 108). Lack of detailed study to verify the existence of poor service delivery in Botswana has still not been addressed (Icegate, 2006: 8). Some ministries and departments sometimes conduct their own customer satisfaction, for example the Ministry of Local Government initiated a pilot study on customer satisfaction in 2002 (Kgakge, 2002). Unfortunately follow up studies to this have not been conducted. The issue has mainly surfaced as stories in newspapers and from

political circles. This research aims to fill this gap in problems regarding service delivery in Botswana.

3.2 ICT Development in Botswana

The deployment of information technology in central government up to now is fairly developed. A wide area network called Government Data Network (GDN) connects all government departments, which also provide high-speed access to the internet as observed by Little and Bose (2004a). The government is leasing the network from Botswana Telecommunications Corporations (BTC). This network links major towns namely Gaborone, Francistown, Maun, Ghanzi, Kasane and Lobatse. The network covers the country fairly well as shown in Figure 3.1.

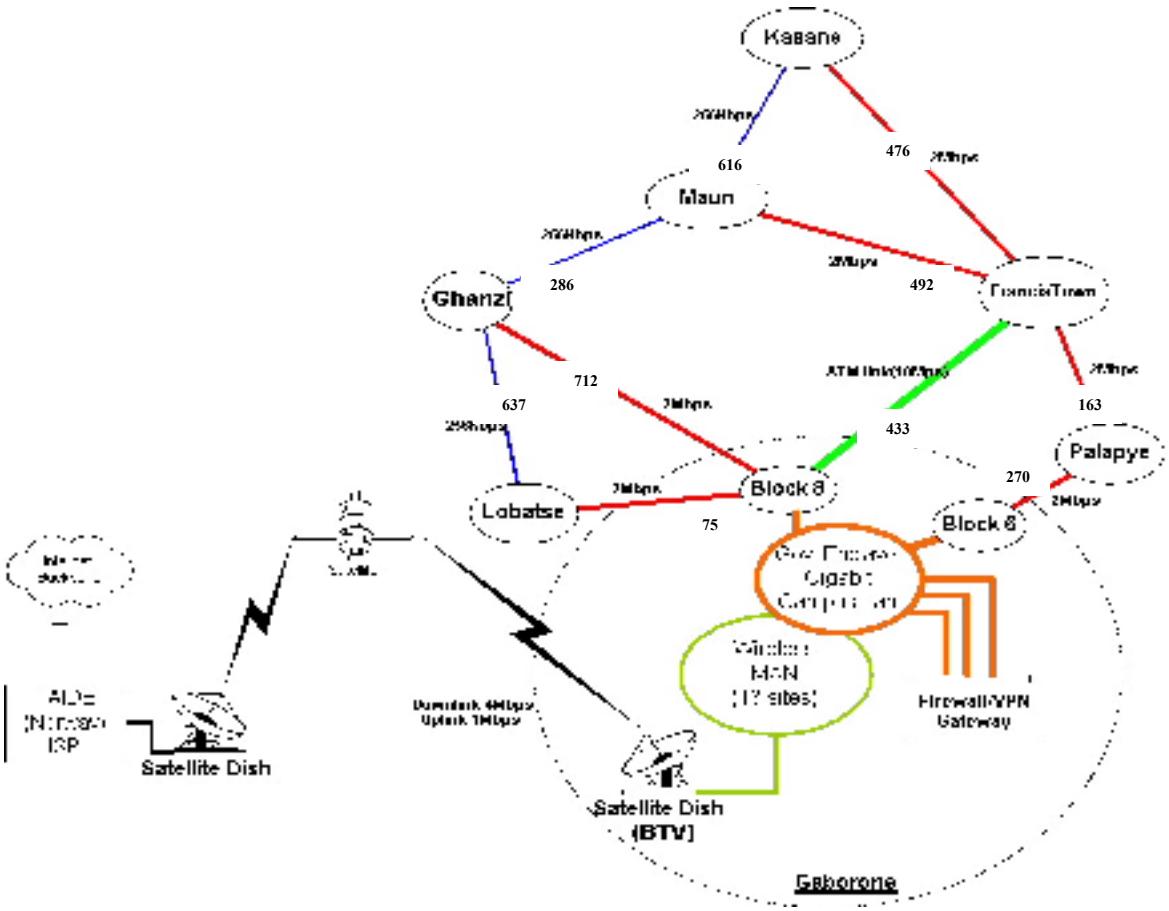


Figure 3.1 Botswana government data network. Source: (Little and Bose, 2004b: F7) Numerical values indicate the traversable total distance in Km, not the shortest distance

3.2.1 Capability of Botswana Government Data Network (GDN)

Figure 3.1 shows data transmission speed capability of Botswana Government Data Network (GDN). The lowest speed is 256 Kbps and the fastest is 10 Mbps. The highest speed connects the two major cities in the country namely Gaborone and Francistown. Francistown acts as a major service centre for the northern part of the country. The network speed of 10Mbps between Gaborone and Francistown is equivalent to the advertised speed of some of the top advertised broadband download speed in the world (BBC, 2007).

The bulk of information generated in government offices involves filling in forms, i.e. it is text based. Since text does not take a lot of space, there is potential for documents to be exchanged using the Botswana government data network. Assuming that an A4 page can hold 2134 characters (including spaces), then a page can hold about 300 bytes, since a single character takes 8 bits or 1 byte of memory. Table 3.1 shows an estimation of GDN speed in terms of number of pages containing text.

Speed	256 Kbps	2 Mbps	10 Mbps
Bytes/page	300	300	300
Pages/second	853	6 667	33 333

Table 3.1. Capability of GDN.

GDN is capable of sending over 500 pages of text per second. This has a huge potential in government use where the bulk of daily tasks involve documents being moved from one place to another. GDN has the potential to transmit official documents faster between the 7 areas which it connects.

The development of this infrastructure has been associated with huge investments. According to Little and Bose (2004a), investments in information and communication technology in the last three development plans is as shown in Table 3.2

NDP No.	Duration	Amount in Pula (P)	% of Government Budget
7	1989-1996	19.3 million	.2
8	1996-2003	600 million	2.7
9	2003-2010	1.3 billion	3.7

Table 3.2. Information and Communication Technology Expenditure from NDP 7 to 9. Source: (Little and Bose, 2004a: B3)

The huge investment in IT in Botswana is similar to what happened in the US in the mid 1990's. According to Davenport(1997: 6), 50% of capital spending was on IT in the US. The US spending on IT rose from 3% of GNP in 1990 to 5% in 1995. Unfortunately the effective use of information technology did not go up at the same rate.

It is now clear that the productivity debate started well before deployment of information and communication technology. The two are out of phase. However the expectation was that as information and communication technology diffusion increase, there will be a corresponding improvement in public service performance. Unfortunately this is not the case. Up to now there is still debate on level of productivity, which is not at satisfactory level. Venson (2005b) when speaking in a public meeting indicated that civil servants who do not perform to their best were denying the public service provided by government. Rammidi (2005) expressed similar sentiments and even suggested that members of the public must be allowed to assess performance of civil servants so as to detect non-performers. Maine (2005) in launching Ombudsman annual report stated, *"even in the days of email, there is still delay in attending to official mail*".

The problem of level of productivity in Botswana is seen by the public through comments raised in public forums e.g. Kgotla meetings, politicians in their debates in parliament and elsewhere, Sebetlela (2005), as well as the business community, Ibrahim (2005), and the academic community, Thapisa (2000). This shows that the problem is genuine and ways must be found to deal with it. Botswana seems to be experiencing the public sector crisis that many countries experience in the 1970 (Heeks, 2002: 10).

Botswana is a vast country with a significant portion of the population living in rural areas. There are very limited employment opportunities in rural areas; hence this leads to urban migration. Unfortunately the country does not have an industrial base big enough to create employment opportunities. Duncombe and

Heeks (2002: 62) stated that the major sources of livelihood in rural communities in developing countries are Micro-and-Small Enterprises (MSE's). This is equally true for Botswana. The big issue is how information and communications technology can reach rural communities to benefit MSE's.

In a study by Duncombe and Heeks (2002: 66) the use of telephones was confirmed to have a positive impact in MSE's in Botswana. This provides an indication that the diffusion of information and communications technology to such communities has the potential to improve the livelihood of rural communities. Duncombe and Heeks (2002: 71) also highlighted that information processing requirements of MSE's can be made cost-effective by improving paper based methods. This is especially true because it will take some time for information and communications technology infrastructure to cover rural areas.

The importance of improving information services to rural communities is summed up as

> *"Unless the social and cultural realities of the poor are recognised, and unless the role of these enterprises is understood, a lot of wasted investment of time, money and energy lies ahead." (Duncombe and Heeks, 2002: 72)*

There is a need to look into the current operation of the civil service to make it more efficient. The civil service has grown in size since independence. For a long time the appointing authority and management of the entire civil service was handled by one department, namely Department of Public Service Management (DPSM). The government has now introduced decentralisation to give ministries and departments the management of their employees. Decentralisation was one of the three reforms recently introduced in the public service to address problem of low performance. The other two are computerisation of personnel management and performance management system (Selepeng, 2002: 4).

The flow of information from source to where it is needed has a relationship with service quality. If the time span of information flow is within a customer expectation, the customer will judge the system to be effective. On the other hand any delays that exceed customer minimum expectation will be judged to be not efficient. Gates (1999a) stated that investments of a typical company are about 80% for technology, which could make it efficient, and yet they only get about 20% benefits.

Botswana's investment in ICT in the public sector is high by African standards, considering the fact that in the majority of African countries there is low investments in ICT, hence low internet penetration (Polikanov and Abramova, 2003: 49). For Botswana the situation is different in the public sector and other government funded institutions where almost every employee has access to a computer and internet especially in the capital city.

3.3 ICT Implementation in Botswana

The introduction of IT in Botswana has not completely replaced manual systems. For example to get a national identity card (Omang), an applicant fills in a paper form. The information in the form is then captured into the computerised national system while the paper form is securely stored. There is the desire to eventually have the manual system replaced by the computer based system. The Department of Civil and National Registration runs both manual and computer based system as it is only at head office of the department that the system is computerised and district office run manual system (Namogang, 2005: 8). This approach is close to what (Martin and Powell, 1992: 222) call "*parallel running"* of manual and computer based system. Figure 3.2 shows implementation changeover strategies.

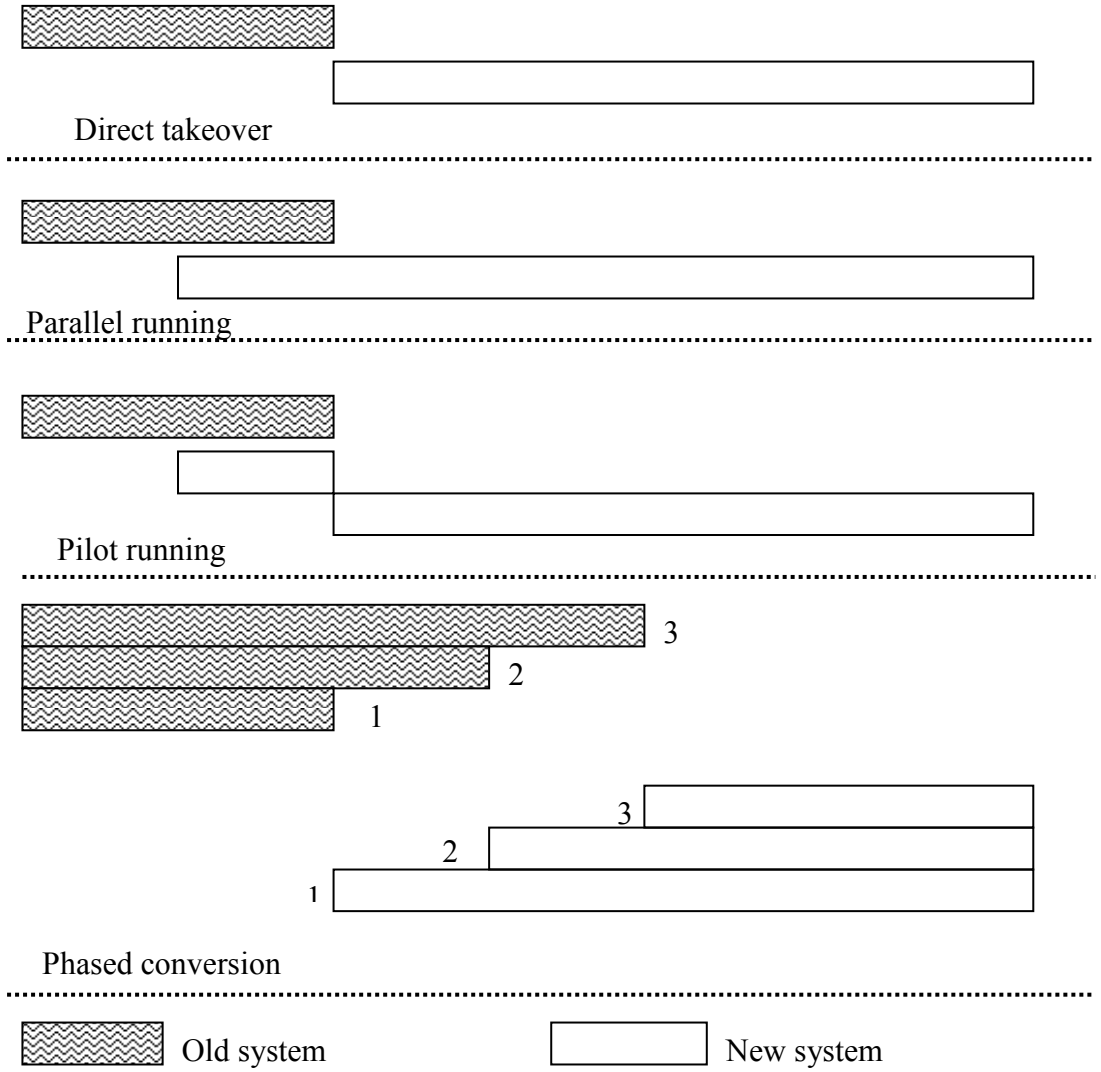


Figure 3.2 Implementation changeover strategies. Source (Martin and Powell, 1992: 222)

Although the Botswana government introduces IT systems after successful piloting in phases, unfortunately the manual system is often not abandoned or moved to the next phase. In reality both old and new systems are left to run side by side. The main disadvantage with this is that cost benefits are not realised as the manual system costs have to be met as well as those of keeping the new system running. Reluctance to change from old system to a new system can be for a number of reasons such as:

- Resistance to change especially senior managers (Kereteletswe, 2004: 261).
- High staff turnover especially after being trained at postgraduate level (Molokomme, 2008)
- Developing countries are prismatic societies in nature (Riggs, 1964: 27)

3.3.1 Using Appropriate Technology

Developing countries heavily rely on importing IT products or IT solutions from western developed countries (Bhathagar, 2000: 6). This is because developing countries do not have industrial base to develop such products. The problem with this is that it leads to western ideas and systems being forced upon local context of developing countries. However, there should be attempts to localise the technology to the local conditions. Often this is not the case as locally available skilled manpower is not utilised for some reason such as corruption.

Some developing countries, like India, have taken up the challenge and are succeeding in exploiting the technology to their benefits. An example is when there was a proposal to import an automatic milk fat content measurement machine that was used in Europe. The cost of the machine was about $8000 and was very expensive for local co-operatives and also was not going to work well for the dusty conditions of rural India (Bhathagar, 2000: 7). This was abandoned and a semi-automatic milk fat measurement machine was developed locally at 20% of the cost of the European machine and it actually proved to be better for the Indian environment.

The main reasons why governments in developing countries get away with poor project management is that there is no audit to find out the impact of new applications that have been introduced. The media in such countries concentrate in covering the launch of new system. When the time to get the benefits arrives, often they are embarking on another new system or idea.

The important thing to note is that information technology cannot be forced down on people who are not willing or do not see the benefits. Public officers need to be motivated to improve their effectiveness first, they can then be introduced to technology to support them later (Bhathagar, 2000: 7).

3.4 IT Specific Issues in Productivity in Botswana

It can be observed that as information and communication technology diffusion have increased in public institutions, there is still concern that level of productivity is below expectations. The interesting thing now is that there are instances where information technology is also blamed for contributing to the problem. In an article of Botswana Daily News of 25th July 2005, customers of Botswana Building Society complained about inconvenience associated with

using the society's automated teller machines. The main problem was that the automated teller machine was not up to date with customer balances in their accounts.

Livestock Identification System (LIS) is a computerised information system that was introduced in the Department of Animal Health and Production (Ministry of Agriculture) in 2001. It was introduced as a response to the demand by the European Union that required having a system in place that will allow back-tracking of all beef products from Botswana entering the EU market. The Botswana government had to respond to such a demand to protect its lucrative market of EU, especially since the country has not been able to meet the agreed quota of beef supply to the EU.

In response to the above, the government introduced LIS in 2001. This system has its history in Australia. However there is a difference in the pastoral farming system between the two countries. In Australia livestock is reared in commercial farms with fairly developed infrastructure e.g. electricity, telephones etc and this enable farmers to be able to monitor their stock. In Botswana, most of the farmers use communal grazing areas where animals mix with each other and individual farmers are not able to keep good records about their livestock. Infrastructure is also not developed in communal areas nor in the few farms available. The LIS system is presenting some problems as observed by Raborokgwe (2005) who argued that lack of staff to implement the system effectively was contributing to delay in farmers selling their livestock.

In Botswana the problem seems to be, not lack of information technology infrastructure like in majority of African countries, but the use of the existing technology to deliver what it was intended for. This is illustrated by the Botswana Auditor general which showed that the Department of Civil and National Registration had 15 workstations which were bought for data capture but only 9 were being used for that purpose (Namogang, 2005: 4).

3.5 The Network Readiness Index

The growth and diffusion of information technology among different countries of the world has been tracked by using Network Readiness Index (NRI). The Network Readiness Index is a global measure that compares "*the degree of*

preparation of a nation or community to participate in and benefit from ICT developments" (Dutta and Jain, 2005: 4).

The methodology used to collect data for the network readiness index is based on questionnaire that is sent to CEO's of major organisations in participating countries (Mia and Dutta, 2008: 7). Unless CEO's have measures in place to collect primary data, they may provide their own opinions which may fail to capture reality on the ground. This is particularly true for Botswana where the same figure for computer penetration has been quoted for the last five years (see Section 5.3.26). However the Network Readiness Index provides an instrument for monitoring global growth of information technology on an annual basis despite its limitations on how data is collected.

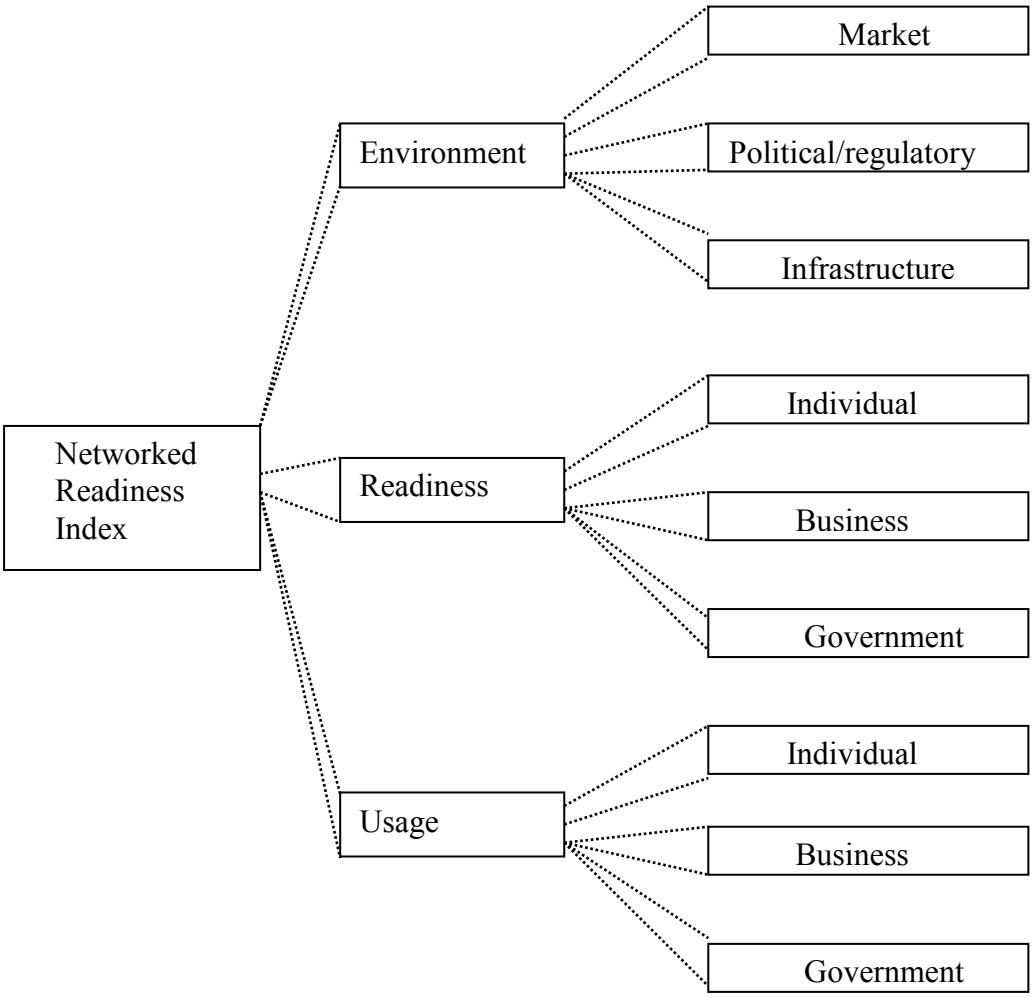


Figure 3.3 The Network Readiness Index Framework
Source: INSEAD as quoted in (Dutta and Jain, 2005: 4)

The network readiness index has three major components namely Usage, Readiness and Environment. Each of these components has further three sub components as shown in Figure 3.3.

Usage, Readiness and Environment supplement each other and all the three need to be in place to facilitate exploitation of ICT. For example if the environment is conducive but usage or readiness within a society is low, the overall network readiness of such a society will be low.

Readiness and usage can be looked at from how individual members of the community, the business community and the government access and utilise ICT. Each of these has its own set of variables that build up the country's overall network readiness index. Each of these components has a major role to play and is discussed in the next section.

3.5.1 Environment

The environment component is a measure of the prevailing environment ability to support ICT exploitation (Dutta and Jain, 2005: 6).It has three sub components namely market, political/regulatory and infrastructure. Dutta and Jain (2005) describe each of the component of NRI as discussed in the next section.

3.5.1.1 Market Environment

The market environment is an evaluation of necessary human resource and business that can support “a knowledge-based economy”. Status of macro-economic variables, openness to trade, commercial funding as well as skilled labour force and corporate governance build the market environment.

3.5.1.2 Political/Regulatory Environment

The rule of law, often determined by independent judiciary system has a big role to support development. Specific regulations relating to development of ICT are also important regulatory environments.

3.5.1.3 Infrastructure Environment

The ICT infrastructure measures the presence as well as quality of required ICT technology. The quality of ICT infrastructure determines the types of services that can be provided by using ICT.

3.5.2 Readiness

How ready a nation is to exploit ICT is determined by key players in an economy of a nation. The key players in any country are citizens, business and government. The availability of appropriate skills of using ICT by individuals, availability and affordability of ICT facilities for corporations as well as government use of ICT facilities build the NRI readiness component.

3.5.2.1 Individual Readiness

Individual readiness assesses how individual citizens of a country are ready to use and gain from ICT. This includes literacy rate, access, as well as connection to the internet by individuals.

3.5.2.2 Business Readiness

Business readiness is a measure of how private businesses, irrespective of their size, benefit from ICT exploitations. It looks also at their desire to invest in enabling their employees to gain ICT skills.

3.5.2.3 Government Readiness

Government readiness is a measure to determine how a government of a country is utilising ICT. It also looks at whether " *the policy-making and internal processes of the government and in the availability of government services online" (Dutta and Jain, 2005: 9)*. The government desire to exploit ICT is reflected in government short and long term policy that encourages diffusion and exploitation of ICT. The government must lead by example in this initiative and also by taking steps to empower citizens to use ICT as well.

3.5.3 Usage

The usage component of NRI measures the extent of ICT usage by major stakeholders in a country. These major stakeholders are similar to that of the readiness component i.e. they are individuals, business and government. Where data about the stakeholders is not available, changes in behaviour, lifestyle as well as economic and non-economic gains brought about by introduction of ICT are used.

3.5.3.1 Individual Usage

Individual usage measures the status of adopting and using ICT by citizens of a country. This is determined by looking at technologies that enable connectivity such as telephone/internet connection rates as well as status of internet use and e-commerce.

3.5.3.2 Business Usage

Business usage measures the deployment and use of ICT by the business sector of a country. The main factors here are status of business-to-business and business-to-consumer e-commerce. The use of ICT in activities like marketing and degree of transactions made online as well as use on new telephone lines and mobile phones by the business.

3.5.3.3 Government Usage

A government usage of ICT measures how the government of a particular country benefits from utilising ICT. The role of government is more than that of prioritising ICT availability, but also making government easily accessible to its citizens by encouraging ICT use in providing services. The most important factors in government usage are level of government services that can be accessed online as well as success in encouraging use of ICT.

3.5.4 Calculation of NRI and its sub components.

Dutta and Jain (2005) showed how the actual values of NRI and its sub components are calculated from their variables. Data of variables is collected on annual basis using Executive Opinion Survey questionnaire in a country (Dutta et al., 2006: 257). The variables about which data is collected are shown in Table 3.3.

Network Readiness Index = $\frac{1}{3}$(Environment) + $\frac{1}{3}$ (Readiness) + $\frac{1}{3}$(Usage)

Environment = $\frac{1}{3}$(Market) + $\frac{1}{3}$ (Political/Regulatory) + $\frac{1}{3}$ (Infrastructure)

Readiness = $\frac{1}{3}$(I R) + $\frac{1}{3}$(B R) + $\frac{1}{3}$(G R)

Where

I R = Individual Readiness

B R = Business Readiness

G R = Government Readiness

Usage = $\frac{1}{3}$ (Individual Usage) + $\frac{1}{3}$ (Business Usage) + $\frac{1}{3}$ (Government Usage)

Sub-Component	Variables
ENVIRONMENT	
Market	Availability of scientists and engineers
	Venture capital availability
	Sophistication of financial markets
	Technological sophistication
	State of cluster development
	Collaboration in cluster development
	University-industry-collaboration
	Quality of scientific research institutions
	Subsidies for firm-level research and development
	Brain drain
	Ease of access to loans
	Administrative burden
	Ease to start a new business
Political/Regulatory	Effectiveness of lawmaking
	Laws relating to ICT
	Effectiveness of judiciary
	Intellectual property protection
Infrastructure	Telephone mainlines
	Secure internet servers
	Internet hosts
READINESS	
Individual	Quality of math and science education
	Quality of educational system
	Quality of public schools
	Internet access in schools
	Buyer sophistication
	Buyer dynamism
	Residential telephone connection charge
	Affordability of internet access
Business	Investment in training
	Availability of training services
	Quality of business schools
	Business investments in R&D
	Business monthly telephone subscription
	Business telephone connection charge
Government	Government prioritisation of ICT
	Government procurement of ICT
USAGE	
Individual	Cellular mobile subscribers
	Telephone subscribers
	Public payphone
	Telephone lines
	Telephone sets
	Broadband-DSL Internet subscribers
	Broadband-cable modem
	Internet users per 100 inhabitants
Business	Prevalence of foreign technology licensing
	Firm-level technology absorption
	Capacity for innovation
	Availability of new telephone lines
	Availability of cellular phones
Government	Government success in ICT promotion
	Government online services

Table: 3.3 Variables of Network Readiness Index

Source: (Dutta and Jain, 2005: 23)

3.6 Example of ICT introduction in Government

3.6.1 UK e-government Initiatives

According to Beynon-Davies and Williams (2003), use of ICT in UK government started in 1997 with the new labour government. The biggest step was the launching of electronic government agenda which was targeting local government. This was called Local Government Modernisation Agenda (LGMA) (Martin, 2002: 133).

The need to introduce ICT in UK government was influenced by similar initiatives in the private sector. Private companies were reporting gains from introduction of ICT, as shown by the following example.

> *"The extent of the efficiency improvements which can be achieved are exemplified by – the Oracle Corporation saving of £71 million through the deployment of web-enabled, self-service application for functions such as personnel records, training, travel expenses and pay; and British Gas productivity improvements with it now processing 29,000 invoices per staff when previously only 6,400 paper invoices per staff were processed (paragraph 3.8 and 3.9)"(NAO, 2002: 7)*

As Beynon-Davies (2003) showed, the aim of the UK modernisation agenda was to improve the quality of life of local people. To achieve this aim, local authorities were expected to provide the following:

1. High-quality local public service.
2. Effective vision and leadership to the community.
3. Engagement with local people and inspiring public confidence.

To monitor progress of introduction of ICT in local authorities, the UK central government and the Welsh Assembly government developed a set of "*key performance indicators*" (Beynon-Davies and Williams, 2003: 141). The instrument used to measure the key performance indicators was NAWP1.5 which was developed by the Society for Information Technology Management (SOCITM) (Beynon-Davies and Williams, 2003: 140).

The UK government also set the following target 25 % of government services to be offered online by 2002, while for England there was a further target of 100% for all government services to be offered online by 31st December 2005. The agency that has been monitoring this reported in early 2006 that the 100% target has almost been met by many local governments (SOCITM, 2006).

One of the problems facing the UK government was that not everyone had access to the internet; hence this may deny some members of the community the benefits of using online government services. In 1999 only 10% of households had connection to the internet and the figure rose to 53% in 2004 as observed by (Pinder, 2004: 3). The non-connected were suspected to be the elderly, low-income or some disadvantaged groups. This was addressed by making ICT facilities available in public libraries and offering free training to members of the public. So anyone could become a member of a local library and access internet and hence online government services.

Introduction of ICT within UK government has been successful; the country has been among the top 15 in Network Readiness Index for sometime now. Also the major impact has been reduction in the number of government employees from 750,000 in 1976 to 450,000 in 2004 (Irkhin, 2007: 84). Although there are other reasons for decline in the size of the public service, for example privatisation, e-government introduction also has had an input.

The diffusion and spread of ICT in the UK government was not a smooth one. Lack of skill was not only limited to citizens, but even political leaders and senior government officials were not ICT literate as can be seen by the following reply to a journalist question on why it was taking time for government ministers to respond to emails. Roy Dibble, Head of Government Centre for Information Systems (CCTA) replied as follows:

> *"Your questions are currently sitting on my desk. When the minister received your e-mail message, it was printed off and sent to me, by post. One of my staff has written to the relevant agency heads with a request for information. Their staff will prepare the information and send it to my office where it will be collated and returned to the Minister's office, also by post. He will check the information and one of his staff will type it on to e-mail and transmit to you" (Margetts, 1999: 7).*

This illustrates that every nation had problems with lack of skills in ICT. The most important thing is to put in place measures to encourage citizens to develop such valuable skills.

The following are some of the areas where application of ICT in UK has had good impact, according to NAO (2006: 11):

Land registry has developed a new system that allows for conveyancing using the internet. The benefits of e-conveyancing will be in providing faster, detailed

service to solicitors and customers. The Driver and Vehicle Licensing Agency (DVLA) is also at an advanced stage of implementing almost 100% transaction regarding vehicle and licences transactions to be done using the web. A pilot study of this gave good results.

In the UK private sector, the impact of use of ICT continued to get better. According to Clark (2005) a survey covering about 300 businesses in UK and Ireland in 2005 showed that 84% of business managers and 76% of IT managers attributed effective use of IT to have been the main influence on productivity gains experienced within the last three years up to 2005. However this study still identified that there is still room for improvement for businesses to gain more from their IT investments.

3.6.1.1 The Unsuccessful Cases

The UK e-government initiatives have not been as smooth as initially envisaged. It is in the health care system where problems have occurred, for example the 1992 London Ambulance Service incident (Beynon-Davies, 2002: 206). Currently the government is facing problems with the NHS in its Connecting for Health programme. The programme is going beyond budget and looks certain to be behind schedule. The biggest lesson that can be learnt from this is as observed by Sauer and Willcocks (2007: 195) that no country has found it easy to apply IT in the health care system. This is due to the following according to Sauer and Willcocks (2007: 195):

- Professional tensions and bureaucracy
- Political interference
- Large IT projects are risky
- Difficulty in justifying investments in IT over hospital and services
- Falls belief that IT will deliver
- Lack of understanding of the processes and practice of health and how to change them

The success of a project is related to its size; hence mega-programmes by their nature do not always go according to plan (Sauer and Willcocks, 2007: 200). Risk of large IT projects has also been noted by (Nolan and McFarlan, 2005: 102). This is mainly because mega-programmes take time and involve many stakeholders.

3.6.2 Singapore Success in ICT

Singapore does not have mineral or natural resources to exploit to boost its economy. The people of Singapore stood up to utilise *"their skills and diligence with education and technology to sustain the momentum of their economic growth" (Choo, 1995).* Singapore had the vision to see the potential for the impact of use of computers well before the computer revolution of the 1990's. The first IT plan was between 1980 and 1985. The success of building an intelligent island was achieved by three phased plans to drive the vision for exploiting the computer power. Each phase had a time frame of between 4 and 5 years apart from the IT 2000 as shown in Table 3.4.

Period	IT Plan	Target Groups	Strategic Goals	Enabling Technologies
1980-1985	Civil Service Computerisation Programme	Public Sector Government Ministries & Departments	Raise productivity Improve service delivery Develop IT manpower	Transaction processing, Data modelling, Database management system
1986-1990	National IT Plan	Private Sector IT industries Local companies	Develop local IT industry Promote business use of IT IT R&D	Software Engineering Expert systems Electronic Data interchange
1991-2005	IT 2000	Industry sectors Communities Individuals	Increase national competitiveness Improve quality of life	Broadband networks Multimedia Telecomputing

Table: 3.4 Singapore's Computerisation Plans. Source (Choo, 1995: 3)

The IT 2000 was a blue print document that built on the results of the previous plans. It was an ambitious vision which was ahead of technological development.

> *"The computer will become a multi-purpose information appliance that integrates the functions of the television, telephone, and computer to deliver sound, images, text and data" (Choo, 1995: 3).*

Singapore relied on its own human resources which were developed in the first plan of the civil service computerisation programme.

There was also strong collaboration between the National University of Singapore (NUS) and the Ministry of Education of Singapore. According to (Press, 1997), the emphasis was to develop within five years the following:

- Network technicians
- Nation of trained, demanding users

Singapore's early development of the network was led by NUS through its department of Information Systems and Computer Science. The department contributed to about 25% of IT manpower needs of Singapore (Press, 1997). According to (Periasamy and Sia, 2007: 420) Singapore has been consistent in obtaining high rankings in issues that support business, for example

- Political risk
- Workforce productivity
- Quality of life
- Prospect of making profits

The earlier investments in developing measures to exploit ICT in Singapore are delivering benefits. The country has had problems in the process of starting business due to investors having to apply for permit from different agencies. In 2005 One-Stop Business Licensing Portal (OBLS) was established. This allowed for 24 hour online accesses to apply for different licences from just one website. The OBLS project earned Singapore

> *"2005 United Nations Public Service Award in the category of Application of ICT in government: e-government" (Periasamy and Sia, 2007)*

3.7 Benchmarking Botswana

Botswana has developed its ICT policy under a framework called Maitlamo. Maitlamo is a Setswana word which means commitment to accomplish a dream. The Botswana government engaged a Canadian consulting company called Public Sector Transformation Group (PSTG Consulting). Canada is well known for successful development and exploitation of ICT (CMA, 2005).

The PSTG report (Little, 2004c) was presented to government in 2005. The report was the first of its nature that identified position of Botswana in the global picture of a connected world. Botswana was compared with seven other countries namely Canada, Estonia, Malaysia, Mauritius, Namibia, South Africa and Trinidad & Tobago, as shown in Figure 3.4. Singapore was not included in Little (2004b) study. It is included in this study as it has maintained a stable position of always being within the top three countries. Also Singapore has a small population like Botswana.

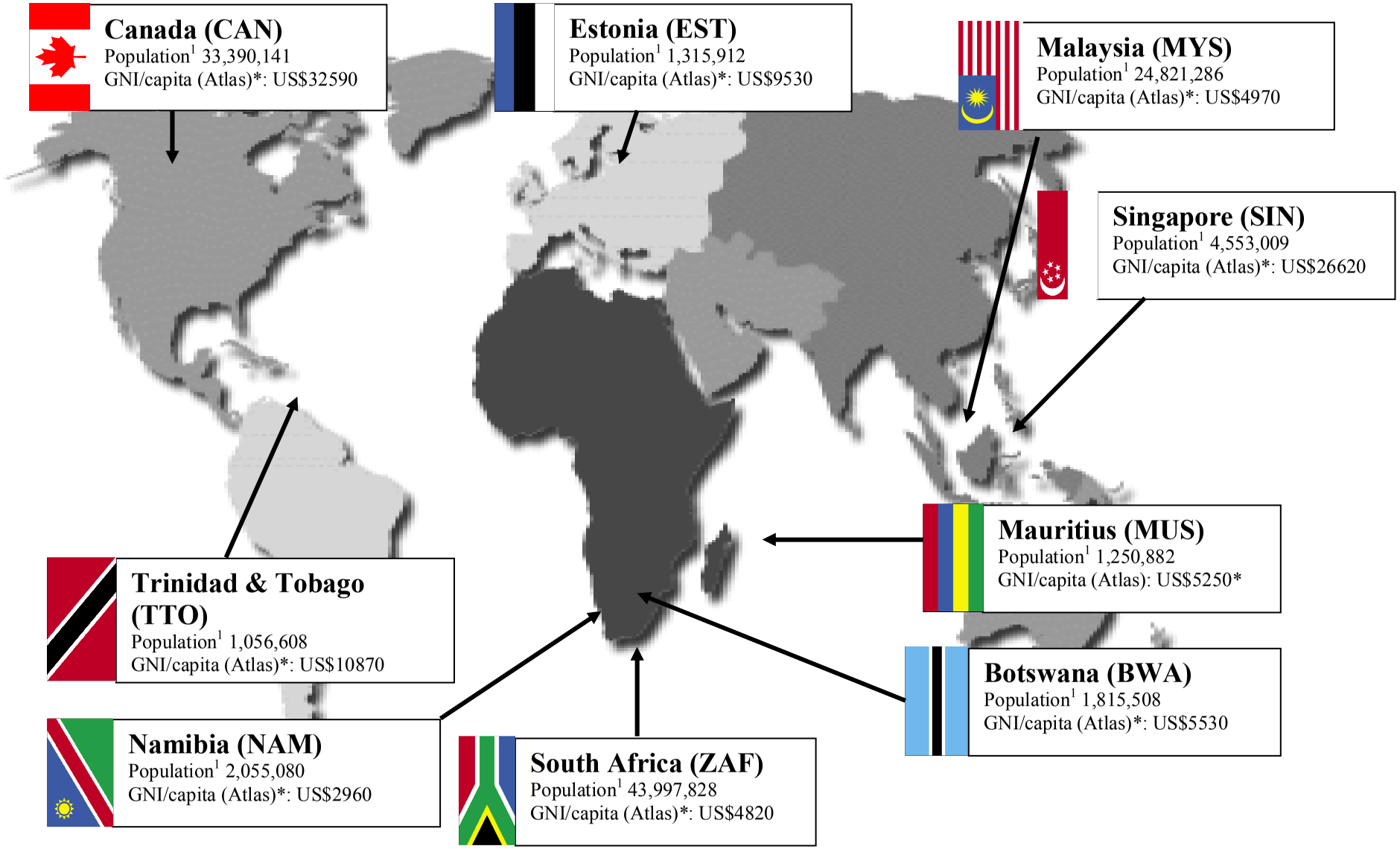


Figure 3.4 Benchmarking Botswana Countries
Source:[1] (CIA, 2007), * (WORLDBANK, 2007d)

The geographical locations of countries selected in benchmarking Botswana are shown in Figure 3.4. The criteria used to select the countries was to build on Little (2004b) work which compared Botswana to the rest of the world.

3.7.1 Economic and Population Comparison

A tool that the World Bank uses to compare economic performance of countries is gross national income (GNI). The World Bank defines GNI per capita as

> *"the gross national income, converted to U.S. dollars using the World Bank Atlas method, divided by the midyear population. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad" (WORLDBANK, 2007d)*

It was previously called GNP (Gross National Product) and is an ideal evaluation measure used to compare countries.

The GNI per capita and population of the benchmarking countries are shown in Figures 3.5 and 3.6 respectively. Apart from Canada, Singapore and Trinidad & Tobago, all the countries had GNI of less than US$50,000 in 2002. Botswana had the highest value of the three African countries included here, namely South Africa and Namibia. Botswana maintained this position also in 2005. This is despite the fact that Botswana depends a lot on South Africa as the main trading partner. South Africa has strong industrial base as well as ports through which Botswana's imports and exports pass. Estonia almost doubled its GNI in 2005 from the 2002 value.

In terms of population, the countries had populations of less than five million except Malaysia, Canada and South Africa. Botswana has the smallest population of the other African countries included here namely South Africa and Namibia. For each individual country, no significant increase in population was experienced in the two years. This is contrary to GNI per capita where some countries experienced huge growth e.g. Singapore, Canada and Estonia.

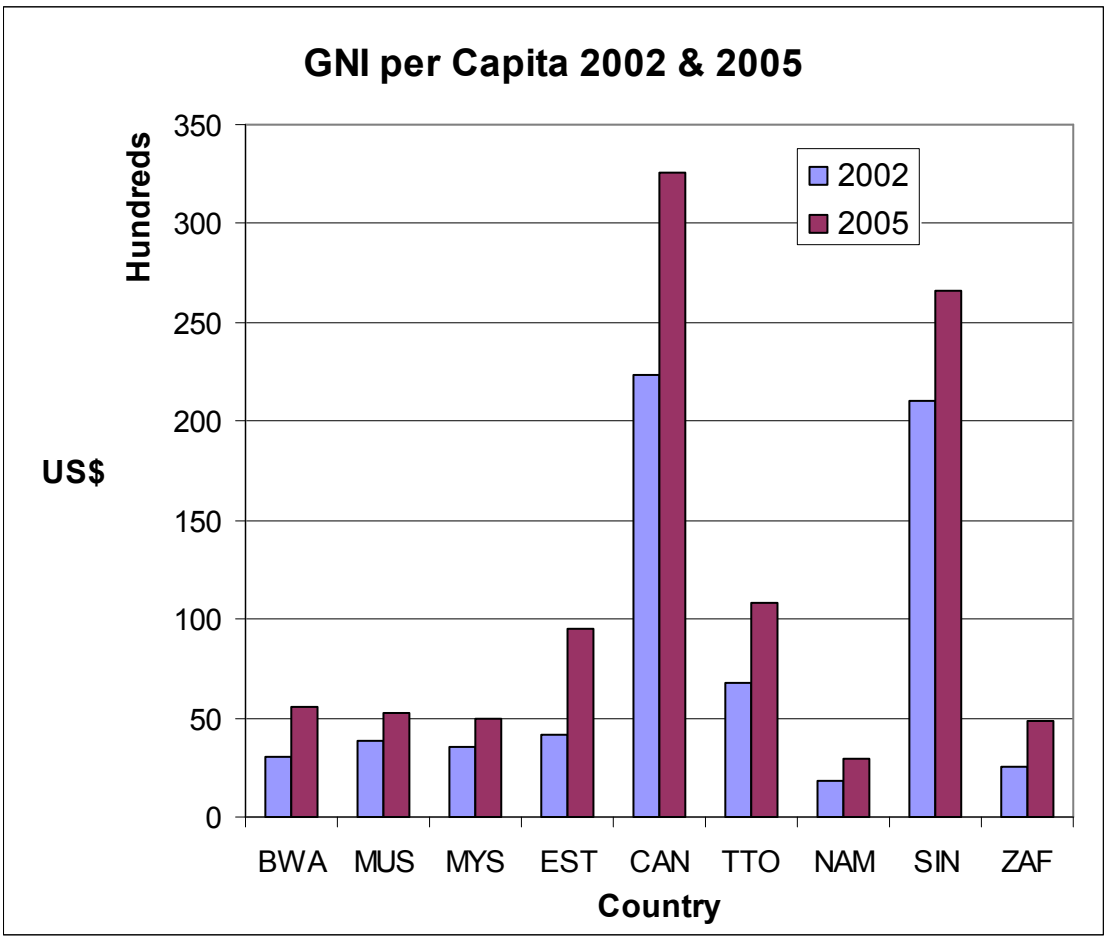


Figure 3.5 Comparison of GNI per Capita Atlas Method (Current US$) for 2002 & 2005 (Country code is as shown in Figure 3.4)

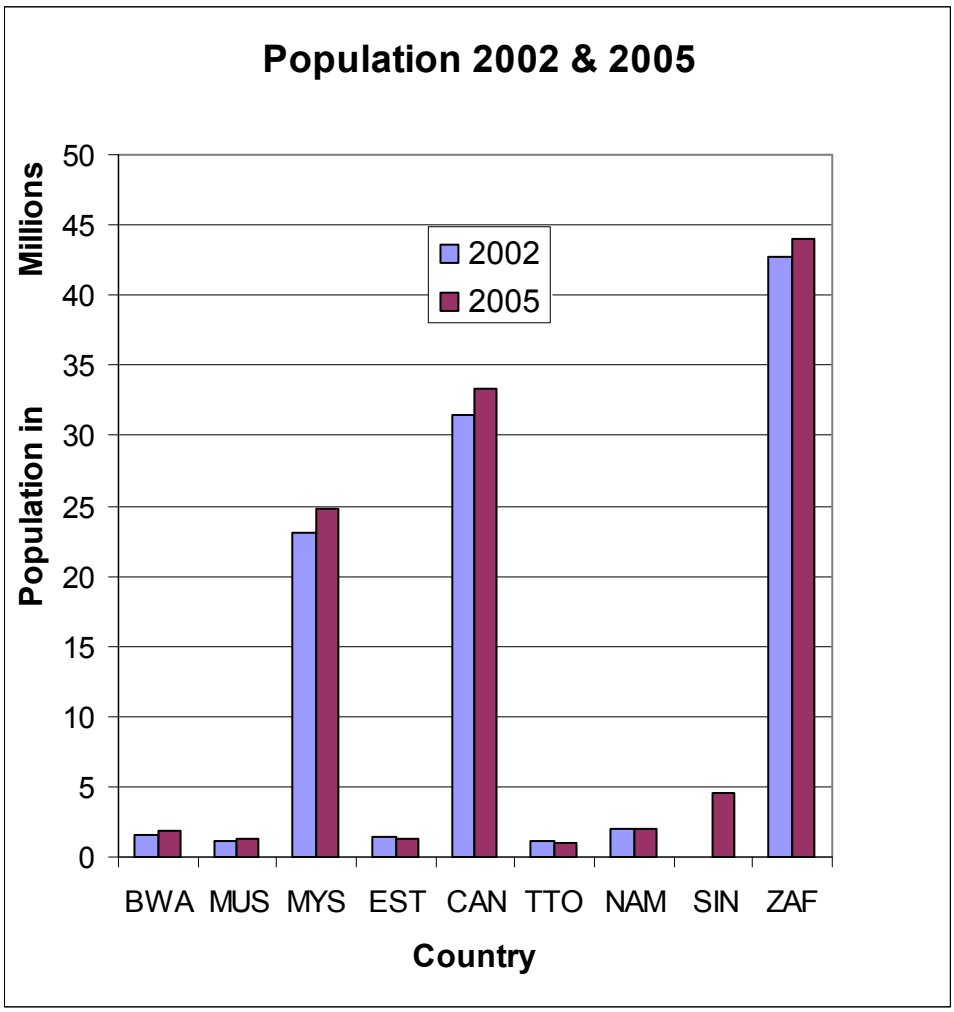


Figure 3.6 Comparison of Population for 2002 and 2005. (Country code is as shown in Figure 3.4)

Botswana's GNI per capita is higher than that of South Africa, Namibia, Mauritius and Malaysia (Figure 3.5). Botswana's population is also among the lowest in the 8 countries being compared in this study (Figure 3.6). The economy of Botswana as well as the small population gives the country an advantage in implementing development policies. Unfortunately despite fairly good economy and small population, the country is not doing well in terms of network readiness index and corruption perception index as shown in Figure 3.7 and 3.8.

3.7.2 Comparison of Network Readiness (NRI)

This comparison was based on NRI. From this work it emerged that despite investments in education and information technology infrastructure, Botswana's NRI was declining. This work is extended further here to show that the decline in NRI of Botswana has continued as shown in Figure 3.7.

Botswana's decline in NRI is surprising as the country has high GNI higher than some of the countries that have experienced improvement in their NRI ratings. For example Malaysia GNI per capita is less than that of Botswana and also has a population almost 12 times that of Botswana, but Malaysia's NRI ratings are improving.

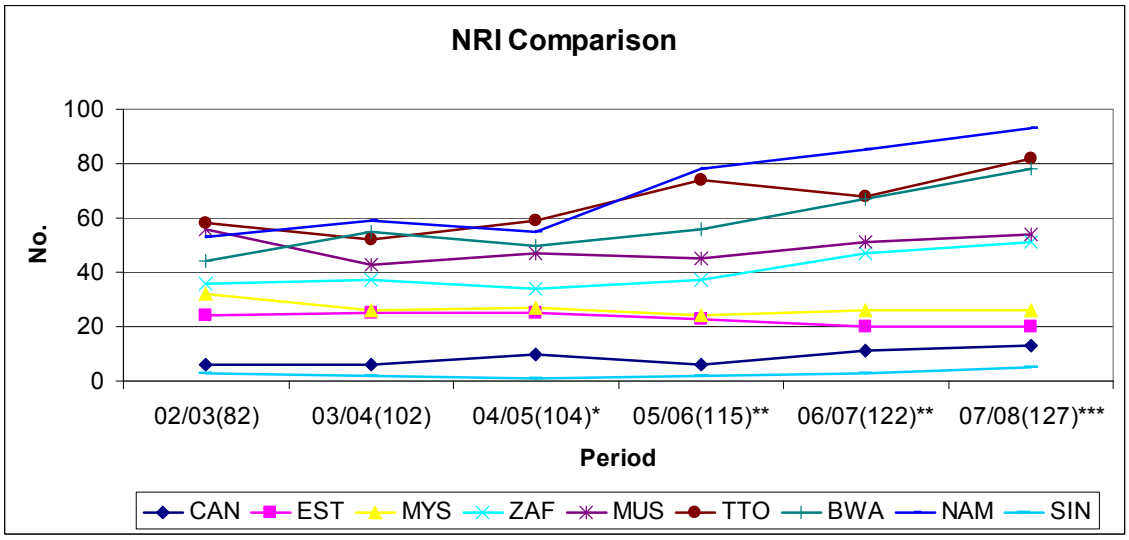


Figure 3.7 Botswana's Declining NRI (2002 to 2006)
Source: (Little, 2004a: 3), * (Dutta and Jain, 2005: 5) and ** (Mia and Dutta, 2007: 10), ***(Mia and Dutta, 2008: 9)

The NRI varies from year to year for all the countries. No single country maintained the same position. The biggest concern is that all the three African countries have seen significant decline in their NRI over time. Comparison of 2002/2003 and 2007/2008 show that the decline for the three African countries is as follows: South Africa (-15), Botswana (-34) and Namibia (-40).

Singapore has maintained its position within the top 3 for most of the period, though the country dropped down two places to become the 5th in 2007/2008. This shows that the previous initiatives such as the IT2000 project that the country embarked upon are delivering the results. These were discussed in Section 3.6.2.

Another country that has made significant progress in this area is Estonia. Estonia improved its position from 24 in 2002 to position 20 in 2006 and 2007. Considering the fact that this country also doubled its GNI in the same period it is worth understanding background information about the country which could have lead to this success. Estonia is the first country to allow internet voting at national level. It has broadband access similar to that of many western

countries (Ray, 2007). The development of internet voting was first piloted in local elections in 2005 (Trechsel and Breuer, 2006: 40).

There is a close similarity on the trend of network readiness between Botswana and South Africa. Although South Africa scores better than Botswana, the pattern of growth of network readiness for the two countries is closely related as can be seen from Figure 3.7. There is a lot of economic activity between Botswana and South Africa and a lot of South African ICT companies do business in Botswana.

3.8 Corruption and ICT

Corruption is an act of infringement of rules and is not socially acceptable within a certain set of standards of a society or group. Transparency International defines corruption as "*the abuse of entrusted power for private gain*" (TI, 2007). It is a very difficult concept to deal with, as to declare something to be corrupt can only be valid in a court of law if there is evidence, but by nature, the act of corruption does not take place within a public domain.

It is important to know the level of corruption perception in a country in relation to ICT diffusion. This is because ICT has the capability to exacerbate corruption and other criminal activities in a cyber space (Edappagath, 2004: 167), (Kshetri, 2005: 542), (WSIS, 2003: 6). The role of ICT in corruption is through

> *"…the acceleration and relative democratization of information technologies that can move information and monies instantaneously and discretely around the planet. Together, conditions like these seem to have created a hothouse for the flourishing of an unprecedented corruption without frontiers" (Galtung, 2001: 192)*.

Corruption is such an important issue that Transparency International is monitoring it globally since it was formed in 1993 (TI, 2007). Figure 3.8 shows corruption perception index of the countries being compared in this research. From the figure, Singapore is maintaining its position of being the least corrupt country, followed by Canada. There is a huge gap between Singapore/Canada and the rest of the countries. These two countries can be referred to as the least corrupt. Estonia is making significant progress to break out of the league of corrupt countries. The country has maintained third position since 2005 to date.

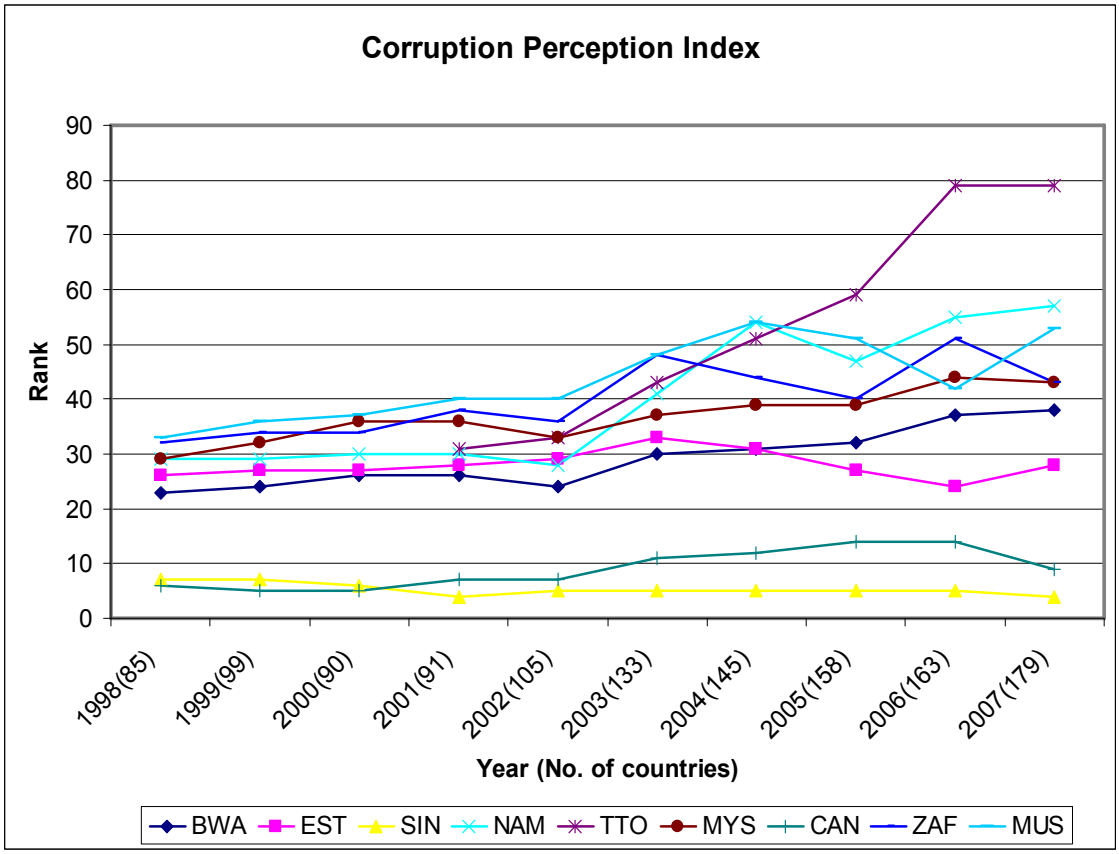


Figure 3.8 Corruption Perception Index of selected countries for this research. Source (TI, 2007)

Singapore is succeeding in maintaining a low corruption index as shown in Figure 3.8. This is probably due to effective law enforcement and the socially law-abiding nature of people of Singapore. Singapore is one of the few countries which have enacted numerous legislation targeting cyber crime (Edappagath, 2004: 170). Singapore has succeeded in having strong political leadership and good pay structure (Quah, 1999: 483).

Although at the beginning Botswana was in the third position, the situation is gradually declining. This trend is also experienced by Botswana's neighbours South Africa and Namibia. Botswana has a lot of trading with South Africa. South Africa has seen a dramatic increase in the level of corruption since 1994 (Pillay, 2004: 586). Since corruption is high in South Africa this appears to penetrate into Botswana. The pattern of corruption perception index for Botswana is very similar to that of South Africa. However unlike the comparison of the network readiness, Botswana is in a better position than South Africa regarding corruption perception index as shown in Figure 3.8

There appears to be a close relationship between the corruption perception index and the network readiness of a country. Comparison of Figure 3.7 and 3.8 shows that countries with the lowest corruption perception index also have the best network readiness ratings. Canada and Singapore positions in both ratings reinforce this point. Since the corruption perception index and the network readiness index are developed by two independent bodies, this further supports the theory that the least corrupt countries are more likely to be able to harness and exploit information technology to gain social and economic advantage.

3.9 Botswana ICT Policy

After intense consultation with various stakeholders, Botswana developed its ICT policy from Maitlamo project. The ICT policy was approved by Botswana parliament in August 2007 and is in the process of becoming a law (BOPA, 2007).

Botswana ICT policy set out clearly the benefits that can be gained by having ICT in place through out the country. Its development has been carried out covering the following major areas (MCST, 2007: 4):

- Community Access & Development
- Government
- Learning
- Health
- Economic Development & Growth of the ICT Sector
- Infrastructure & Security
- Legislation & Policy

Botswana is a consumer of ICT as the country imports all ICT related goods. This is not surprising, as the country does not have manufacturing industry, for example hardware production. However, the policy is also fostering this consumer approach rather than addressing it. Being a consumer country has a lot of disadvantage because it does not bring in foreign currency but instead money is sent outside.

The development of Botswana ICT policy is a welcome development. The biggest challenge is in implementing the policy. Unfortunately policy implementation does not have a very good record in Botswana. It is common for majority of ministries in Botswana to return funds allocated for implementing development projects (Gaolathe, 2008: 20).

3.9.1 Mega-Programme

The government ICT policy is setting the scene for a very big project. The country does not have a very good record when it comes to project implementations. While the Botswana government has the financial capability to meet the cost of implementing the ICT policy, the size and magnitude of the project present big challenges. Undertakings of major projects have greater risk and often have cost overruns and perform to below expectations. This then make them barriers to the economic growth that they were set up to facilitate (Flyvbjerg et al., 2003: 3).

In a country that covers a large terrain with the population spread unevenly throughout the country, for example majority of people in urban and semi-urban centres, this presents an even bigger challenge. When analysing the problems that the UK National Health System have with its IT project, Sauer and Willcocks (2007: 197) developed the following table regarding large IT projects or mega-programmes (Table 3.5).

Characteristic	**Typical Effects**
Very long-time frame	External volatility more likely, turnover of key personnel unavoidable
Scale of resource required	No single organisation can supply the resources and capabilities required
Impossibility of planning accurately	Changes to budget, schedule and scope
Unpredictability of how the programme process evolves	Relationships ebb and flow. Some parties to the programme will loose commitment
Vast number of stakeholders/users	Meaningfully engaging and communicating with all stakeholders/users is impossible
Normal project uncertainty on a massive scale	All the project delivery problems are to be expected but because of scale and complexity their impact is massive
Accumulation of problems	Encourages the naysayers and promotes the tendency to criticise thereby damaging reputation

Table 3.5 Characteristics and Effects of Mega Project. Source (Sauer and Willcocks, 2007)

3.9.2 Challenges to Botswana ICT Policy

The ICT policy aims to establish ICT facilities to communities. One of the major challenges to this is electric power distribution. Electricity is not evenly distributed through out the country. Rural areas are poorly served when it

comes to electricity in Botswana with only about 12% connectivity (Ketlogetswe et al., 2007: 1330). Connectivity here means actual connection of residential homes to the national electricity power supply.

Botswana has embarked on extending the national grid to cover more rural areas. As illustrated in Figure 3.9 (National Electricity Grid Map) the national grid covers the majority of major settlements (BPC, 2006: 64). The government data network also covers a significant portion of the area covered by the national electricity grid. Unfortunately, connection of households is still low due to high cost (Kgame, 2008). Electricity supply is not stable especially in rural areas where power failures are common.

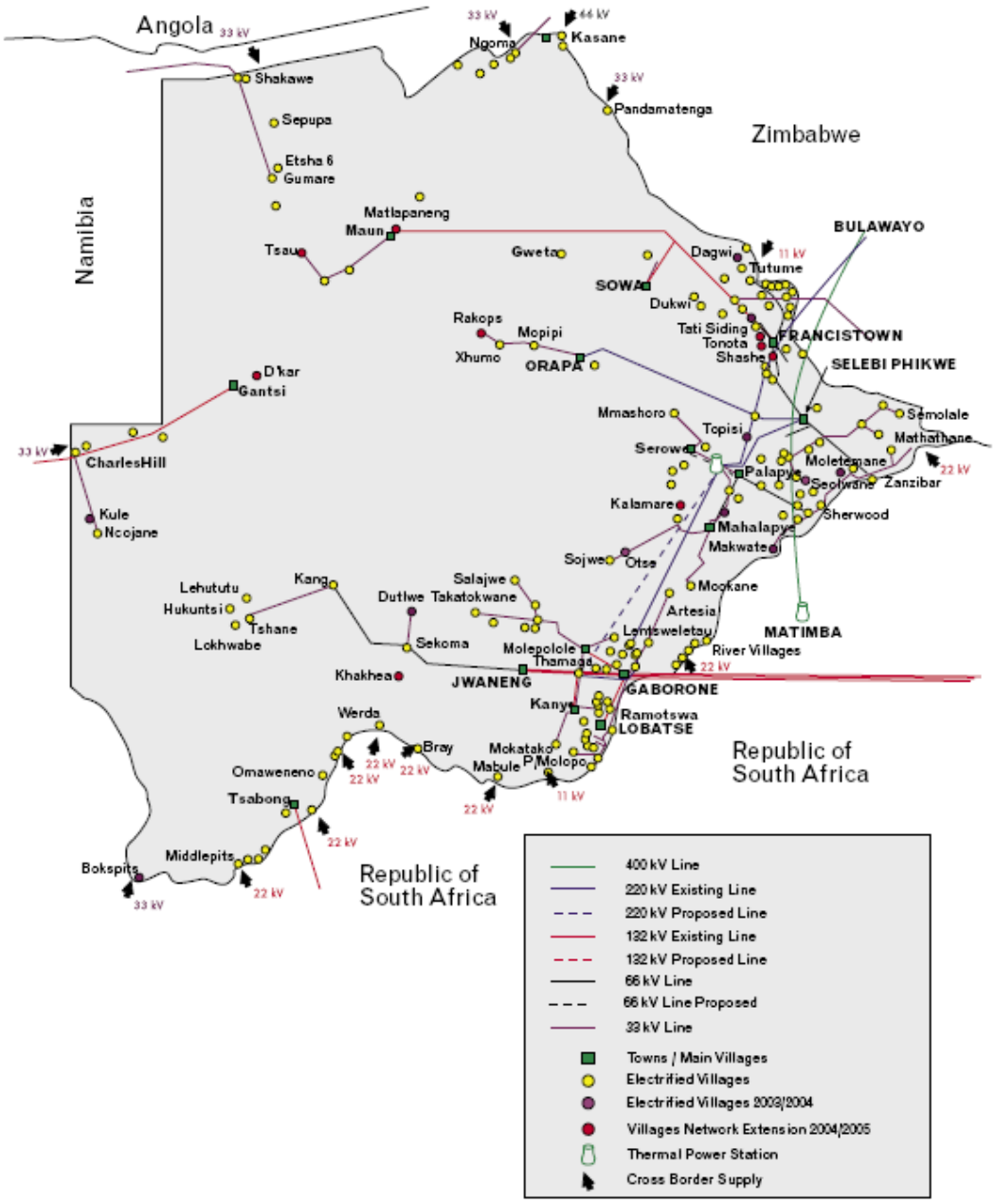


Figure 3.9 National Electricity Grid of Botswana. Source (BPC, 2006: 64)

The role that electricity plays in use of computers has been summed by Chinn and Fairlie (2004) who wrote *"… clearly a PC is of limited use without adequate or consistent power supply" (Chinn and Fairlie, 2004: 9)*. ICT goes hand in hand with electricity as computers require electricity to operate (Nolan and McFarlan, 2005: 102).

3.9.2.1 Electric Power Distribution in Botswana

One of the fundamental infrastructures for ICT is electric power. This is because computers require electricity to function. Like many developing countries, availability of electricity in Botswana is concentrated in urban areas. However, over the last 10 years, the Botswana government has and continues to invest in electrification of rural areas (Gaolathe, 2008: 16). The distribution and maintenance of the Botswana national grid is the responsibility of Botswana Power Corporation (BPC), which is one of the parastatal organisations with a lot of financial backing by the government.

Unfortunately, Botswana imports about 80% of electric power from South Africa (BPC, 2008) and all the neighbouring countries as shown in Figure 3.9. The remaining 20% is obtained from the only power station in the country, Morupule Power Station. This over dependence on foreign source of power was a concern in the late 1980s and the thinking then was that Botswana must utilise her abundant coal deposits and expand Morupule Power station. This project was going to produce more power than the country needed according to focus at that time, hence there would be a possibility to even export it to other countries. Unfortunately the economic focus did not predict the significant economic growth in Botswana that was to follow, which lead to increase in electricity consumption. Economic growth was driven by the mining sector, especially diamonds, which continue to contribute significant to Botswana GDP (as discussed in background section). Botswana invested heavily in infrastructure development such as roads, buildings and electrification of rural areas, which has lead to increase in consumption of electricity.

The government abandoned the expansion of Morupule Power station, and found it cheaper to import rather than produce excess power, which was going to be difficult to export as most of the neighbouring countries were almost self sufficient in electric power, especially South Africa where electricity was already very cheap.

Unfortunately in January 2008 South Africa realised that domestic electric consumption has far exceeded production. Although the government of South Africa has been aware of this, there have been no major steps taken to address it, the fact that lead to the South African president stating that the government was to blame for shortage of power (FinancialTimes, 2008: 11). This power

shortage in South Africa has lead to electricity rationing as one of the emergency measures, a move that has negative effect on production in the mining sector (Cutifani, 2008: 11). Also small and medium size businesses and domestic consumption are to be hard hit most as they cannot afford to provide electricity through other means like use of generators. One of the measures was to cut or reduce electricity being exported to neighbouring countries like Botswana. The South African government was under pressure to cut export of electricity to meet domestic needs.

Botswana was relying on an agreement that it had with South Africa to buy electricity from Eskom, the South African energy company. Botswana was faced with no alternative, but to pursue South Africa not to completely cut off power supply to Botswana. The final agreement was to reduce the amount of electricity being sent to Botswana (Gaolathe, 2008: 16).

Botswana through BPC has introduced short and long term measures to respond to reduction in imported electricity from South Africa. Some of the short term measures are public education to minimise use of electricity to avoid waste as well as rationing electricity supply. This means some parts of the country are switched off to supply others alternatively. These measures, just as in South Africa, have a negative effect on domestic and industrial use. The mines are among the largest consumers of electricity in Botswana and load shedding is going to affect their production. As Botswana's economy depends heavily in the mining sector, in the long run this is going to affect government revenue.

Lack of availability of electricity has been shown to affect the use of computers at primary schools in Botswana. It was estimated that about 345 computers were acquired for use by primary schools but could not be used because the schools did not have electricity (BOPA, 2006b).

3.9.2.2 Lack of use of Solar Power

Botswana has a potential for use of solar energy as the country experiences approximately 320 clear sunny days per year (Tsiane, 2007: 83). Not only does the country have exposure to the sun, but also the amount of radiation is also high as it has been stated that

> *"Botswana is endowed with excellent solar energy and a high intensity of radiation per square metre" (Mogae, 1999)*.

The potential for use of solar power as a form of energy has been shown to be very high as can be shown by the following observation

> *"Botswana receives more than 3200 h of sunshine yearly with an average daily radiation on a horizontal surface of 21 MJ/m^2-day, thus making the country one of the highest solar radiation zones in the world. An estimated 4 450 000 PJ/year or about 1300 million GWh/year solar energy falls on the entire land area of Botswana and with a useful energy conversion efficiency of only 10%, the solar energy resource is an astronomical 130 million GWh/year or 445 000 PJ/year" (Fagbenle, 2001: 421)*.

Botswana's current energy demand is about 547 MW, based on the fact that the country imports 410 MW which is 75% of domestic consumption. Botswana's energy requirements can therefore be met by just using about 0.04% of available solar energy. Even if only 1% available solar energy is converted to electricity, this will still exceed the country's needs.

Unfortunately this renewable source of energy has not been exploited apart from isolated and localised applications. The largest applications was the pilot study at Manyana village to determine social acceptability of solar powered street lights (Fagbenle, 2001: 430) and the building of Motshegaletau Solar Photovoltanic Power Station (Mogae, 1999). The power station was a pilot project by Botswana Technology Centre (BoTeC) and it has capacity to produce about 5.7 kW (Fagbenle, 2001: 431). Some of the major barriers to the use of solar power to meet domestic energy needs are cost, theft as well as lack of available technical support to maintain solar power panels (Fagbenle, 2001: 432).

Botswana has not fully exploited the use of solar energy because globally solar energy is not widely used, hence the price of solar energy converters are very high. Also know-how about the technology is not as widely available as that for conventional electricity, for example the majority of universities offer training in electrical and electronic engineering.

Botswana can focus on being a centre for research and development on use of solar power. This research should focus on current problems limiting utilisation of solar energy which are capture/conversion and storage of solar energy (Lewis and Nocera, 2006: 15731). As Botswana is experiencing over 300 days of bright daylight, this may not require a lot of storage but capture of radiation and conversion to electricity for direct use. Unfortunately research and

development in developing countries, especially in African countries, has not been given enough funding (UNESCO, 2002). Such countries are consumers of results of research carried out by western countries. With the current global energy crisis and the drive towards use of environmentally friendly renewable energy as stipulated in UN millennium development goal no. 7 which calls for measures to *"ensure environmental sustainability" (UN, 2008)*. Botswana stands to gain in researching the development of solar power as an energy source as well as solar powered technological artefacts to be used in other applications. Also development of skilled human resources in solar power can benefit the country and the international community. Recently a renewable energy research centre has been established at the University of Botswana (UB, 2008).

Results of research take time; hence research and development may not meet immediate needs of a society. This is a dilemma faced by authorities when it comes to funding research, especially in developing countries where immediate problems such as disease and basic food demands require immediate attention. Dahl and Lopez-Claros (2006: 115) estimate that it takes about 10 years of research and development of technology before it becomes commercially available.

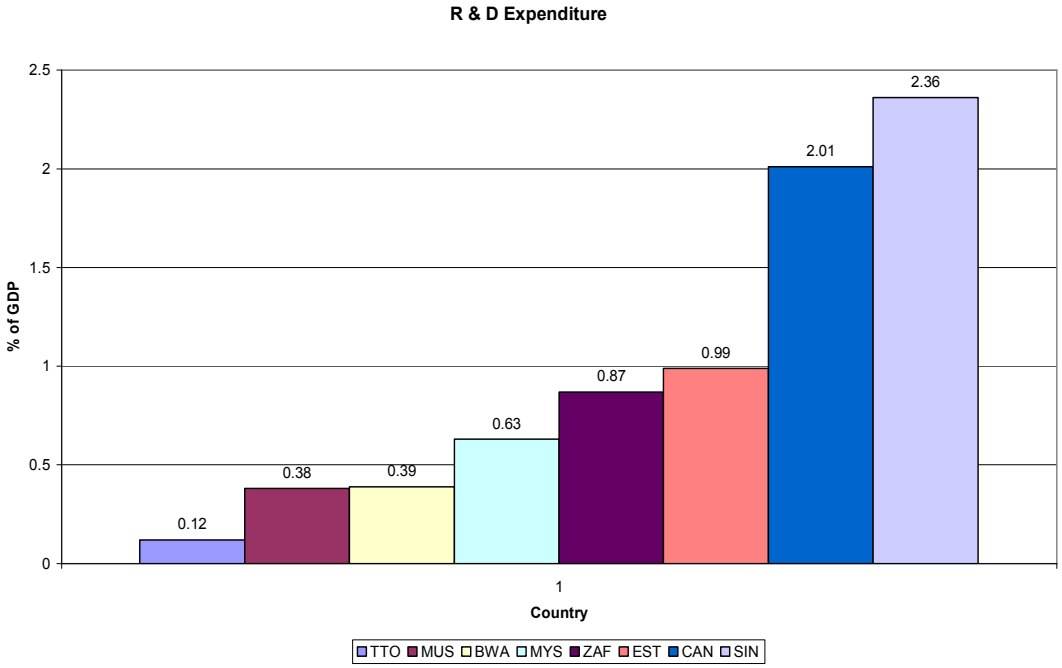


Figure 3.10 Expenditure on R&D as % of GDP of Selected Countries. Source: (UNESCO, 2002)

Figure 3.10 shows expenditure on research and developments of Botswana in comparison with the selected countries (See Section 2.16). Botswana is among

countries which spend less on research. This may explain why there has not been any development coming out of the country in terms of use of solar power.

Developing countries, even those who are classified as high middle income countries, spend less on research and development. For example Botswana expenditure on research and development as a percentage of GDP is about 0.39% compared to western countries like Scandinavian countries where this is over 1%. The country with the highest spending on research and development is Israel with about 5.04% (UNESCO, 2002).

Considering that energy consumption of a typical personal computer is about 800W for a base unit with a flat screen visual display unit, this makes developing a solar powered battery for a computer to be possible. Developed countries have almost sufficient electricity, hence; are not under any pressure to develop such technology for a computer. Also the majority of developed countries are in the cold regions of the globe and do not receive much solar radiation.

3.9.2.3 Settlement Policy

Botswana has a small population that is distributed unevenly due to the fact that almost two thirds of the country is covered by the Kalahari Desert. The country has unreliable rainfall and relies mainly on underground water to meet domestic and pastoral farming needs. As a result of the economy of the country doing well, the government has continued to provide basic infrastructure such as roads and health facilities to every settlement in the country. This capability of government to provide basic amenities has lead to the mushrooming of small settlements, as residents expect that it is the responsibility of government to provide them with such facilities.

Botswana faces a challenge in terms of energy demand and other business activities. The population is small and distributed in villages which can have population of about 500 people (Duncan et al., 1998: 126). The figure of 500 was to try and encourage people to avoid setting up small settlements and expecting services to be delivered. Most of settlements and villages are considerable distance apart. It becomes a big challenge to distribute an electricity grid to cover such areas. Also villages do not provide vibrant market to attract businesses (UNDP, 2004: 5). The long term approach to this solution

is investment in research to utilise solar energy which is available anywhere in the country.

The growing increase in the number of areas that qualify to be settlements under the current Settlement Policy continues to increase and it is straining the resources of Botswana government. This increase at times has been attributed to politicians who use these settlements to advance their own interests (BOPA, 2008c).

The use of information technology has the potential to enable distribution of government ministries around the country. All ministries are located in the capital city, Gaborone. The main reason for ministries to be located in one city was to enable coordination and easy interaction and sharing of information between ministries and also for ministers to be within accessible distance from the president. This planning of establishing one city as a capital city dates back to the pre information technology era where it was difficult to travel. However information technology make it possible to share information quickly irrespective of distance, hence development of cities in the 21st century needs to utilise information technology to distribute economic activities around the country.

Botswana, with its fast speed GDN, can benefit by distributing ministries across the country to use the technology and reduce shortage of demand for more land, as well as distributing employment opportunities across the country. Since Botswana government is one of the largest employers in the country, by distributing locations of ministries across the country, this will also address problems of rural migration to Gaborone. Gaborone is already facing shortage of land for future expansion and this has resulted in numerous problems associated with high demand for land in Gaborone and surrounding areas.

3.9.2.4 Lack of e-government implementation strategies

Botswana is interested in participating in the modern information society by trying to create an environment that will support the growth of the ICT sector in the country. The potential for benefits derived from ICT is there in Botswana. For example small population in rural areas considerable distant apart can benefit from using online government services (Nganunu, 2006). Botswana has come up with a road map on areas that can benefit from use of ICT as well as an ICT policy (MCST, 2006).

The ICT policy has set 6 e-government initiatives which have target dates as to when to be achieved. These are shown in Table 3.6.

e-government initiative	Target Date	Target group
make all appropriate Government Services and Information available on line	December, 2009	
establish Community Access Centres	December, 2012	all communities of over 2000 inhabitants
provide all schools in Botswana with modern computers and access to the Internet	December, 2010	Teachers, children
networked and Health care information and applications	December 2010	health care facilities
Necessary legislative environment	December, 2006	E-Commerce and E-Governance
Access to ICT Technologies	December, 2016	all citizens

Table 3.6 Botswana e-government initiatives. Source (MCST, 2006).

What is lacking from the ICT policy are implementation strategies for these initiatives. The establishment of community access centres in settlements with 2000 people is against the principle of settlement policy which recognises a settlement to have at least 500 people (See Section 3.9.2.3). As Deming (1986: 19) has shown, the two most important question facing management in improving quality are

1. Where do you want to be five years from now?
2. How may you reach this goal: By what method?

If there are no answers to all the above questions, then the desire will just be hopes and *"hopes without a method to achieve them will remain mere hopes" (Deming, 1986: 20).*

3.10 Knowledge Gap from Literature

This chapter has shown that previous research on lack of exploitation of IT was mainly in the private sector. The public sector has not been intensively researched. It is important to also research this problem in central government as government institutions are the most intensively used sectors in any country. This is because every government has set of policies that it wants to implement

to improve the quality of life of the nation. Singapore is among the few countries where ICT has been researched in the public sector. As a result Singapore is often used as a benchmark, for example by Finland (Markkula, 2006: 6).

According to Walsham (2001), in trying to find out if the world is benefiting from information technology investments, it is better to understand what a better world is. This is because the use of information technology may make an economic activity efficient, but this may increase the work load for the few people left after reductions of employees. This provides benefit to those who have access to this market activity (Walsham, 2001: 251).

> *"But we all know deep down that the world market is unfair. If you are born in a Bombay slum, your opportunities for sharing in the wealth of the world are likely to be more limited than those of the child of an affluent westerner" (Walsham, 2001: 252).*

The Botswana government has attempted numerous initiatives to address the problem of perceived low performance in the public sector. Some of the initiatives have been summarised by Kereteletswe (2004: 15) to be the following:

- Organisation and Methods of the mid 1980s
- Work Improvement Teams in 1993
- Computerised Personnel Management System in 1996
- Performance Management System in 1999

All the initiatives that have been undertaken were systems which were successful in countries where they were developed. Work improvement teams (WITS) was developed and used in Japan and has been used successfully in Japan and Singapore (Putti, 1985: 301). Performance management system (PMS) is based on the American total quality management (TQM) philosophy (Washington and Hacker, 2005: 403). Computerisation of the public sector was also an initiative to improve public sector performance. Kereteletswe (2004: 93) referred to these many productivity initiatives in Botswana as *"…overload of improvement agendas"*.

3.11 Summary

The problems associated with effective use of IT that make significant contributions to an organisation still remain inconclusive. While success is reported in some sectors, the global picture remains not so good. For example, a study by KPMG in 2002 still showed that 56% of companies have had to

cancel at least one IS project because of failure. In the same year another study by Hackets Group reported that the failure rate of IS projects was 30% (Brown et al., 2007: 91). These figures are almost the same as around 1994 when Standish Group reported the following (as cited in (Strassman, 1997: 7)).

- 31% of IT suffered cancellation before completion at estimated cost of US$81 billion
- 53% of IT projects suffer 90% over runs above original estimate at a penalty of US$59 billion
- Only 16% of IT projects are successfully completed on time and within budget
- These factors were worse for large organisations

Most organisations, especially in developed countries like US, have over 30 years of experience with IT use, but unfortunately most of them continue to face problem with implementing information systems (Brown et al., 2007: 91). Also extensive research has been conducted in the area and has come up with possible solutions, but unfortunately implementation failure continues (Brown et al., 2007: 93). Brown et al. (2007: 93) have lately showed that this might be due to how commitment, knowledge, communication, planning and infrastructure are addressed at various stages of initiation, adoption, adaptation and acceptance. The focus must be on the right issue at the right time (Brown et al., 2007: 91)

The literature review has revealed success and failure regarding the impact of IT in organisations and majority of it covers private sector with minimal publication on public sector. The case is worse for Africa in general where there is little publication on the subject. Call for more studies to look into work practices, organisational structure as well as attitudes in the African environment where ICT is being introduced has been made by Adeya(2001: 19). (Baker et al., 2007: 352) This knowledge gap has been addressed in this research by using Botswana as a case study.

CHAPTER 4: RESEARCH APPROACH & METHODOLOGY

4.1 Introduction

This chapter discusses the research methodology that has been adopted in this research. In order to investigate the research objectives stated in the introductory chapter an appropriate research methodology needs to be developed. The previous chapters on literature review have revealed the gap in knowledge that exists in literature regarding exploitation of information technology in Botswana. In this chapter a theoretical background to research methodology is provided. This then leads to the discussion of the research strategy and methods that have been adopted in this research.

4.2 Methodology

Methodology can be defined as

> *"… the discussion of how a particular piece of research should be undertaken and can be understood as the critical study of research methods and their use" (Grix, 2001: 36)*.

Using this definition it can be deduced that research methodology is how a particular scholar takes a particular research strategy or method rather than others. Closely related to methodology is the philosophical stance of the researcher. Yin (2003b) refers to research strategy as research design and defines it as

> *"…a logical plan for getting from here to there, where here may be defined as the initial set of questions to be answered, and there is some set of conclusions (answers) about these questions" Yin (2003b: 20).*

Both definitions mean almost the same thing, the fundamental question is that there is an inquiry, which is systematically investigated and valid conclusions made.

Research is not easy to define although commonly used as observed by Saunders et al. (2003: 2). The everyday use of the word research also leads to what Philip and Pugh (2005: 47) calls intelligence gathering. That is collecting important information to answer a "what" type of question. Saunders et al. (2003: 3) define research "*as something that people undertake in order to find out things in a systematic way, thereby increasing their knowledge*". The Joint

Funding Councils of the United Kingdom (JFCUK) defines research as "…*original investigation undertaken in order to gain knowledge and understanding*" (JFCUK, 2002). Saunders et al. (2003: 3) goes further and states the following as characterised of good research:

- Data is collected systematically
- Data is interpreted systematically
- There is a clear purpose to find things out.

Saunders et al. (2003: 48) summed it all up by noting that good research is one that address the 'why' question and looks for explanations, relationships, comparison etc.

Research methodology has three main distinct areas namely research strategy, data generation methods and data analysis. All the three stages are inter-related and are executed in a sequence, starting with strategy, then data generation and finally data analysis. The research strategy is influenced by the type of research undertaken, which is linked to the research question being addressed.

The most important point to consider when you chose a research strategy is how the research intends to use theory. Theory can be defined as *"… what is going on in the situation, phenomenon or whatever that we are investigating" (Robson, 2002: 61)*. Research where theory and hypothesis are developed first and then deciding on the strategy to generate data to test the hypothesis is called a deductive approach and is used by those who take the positivist approach (Robson, 2002: 62). If on the other hand data is collected first and then theory is developed from data analysis, this is called the inductive approach.

Component	The Questions
Purpose(s)	What is the Study trying to achieve?
	Why is it being done?
	Are you seeking to describe something, or are you seeking to explain something?
	Are you trying to assess the effectiveness of something?
	Is it in response to some problem or issue for which solutions are sought?
	Is it hoped to change something as a result of the study?
Theory	What theory will guide or inform your study?
	How will you understand the study?
	What conceptual framework links the phenomenon you are studying?
Research Questions	To what questions is the researched geared to providing answers?
	What do you need to know to achieve the purpose of study?
	What is feasible to ask given the time and resources that you have available?
Methods	What specific techniques will you use to collect data?
	How will the data be analysed
	How do you show that the data are trustworthy?
Sampling	From whom will you seek data? Where and When?
Strategy	How do you balance the need to be selective with the need to collect all data required?

Table: 4.1 Elements of Robson Framework for Research Design

Source: (Robson, 2002: 81)

Research plays a crucial part in nations that invest in it to gain economic advantage. Israel, a country which has one of the highest investments of GDP in research (See Section 3.9.2.2) has intensively developed its agriculture and industrial sector (CIA, 2008a). Developing good researchers is increasingly receiving attention especially in developed countries. The skills to do research are gained by practice, hence in the UK, PhD is now considered to be a process of learning at the end of which a candidate must demonstrate possession of academic descriptors [(QAA, 2001), Phillips and Pugh (2005: 52)]. The process of PhD is learning by discovery or tackling a maze (Marshall and Green, 2007: 64).

> *"That is why the PhD is regarded as an educational process, and not just a thesis or research output. Once you have done one PhD, you are well equipped to tackle any future research maze" (Marshall and Green, 2007: 65).*

By engaging in discussion with supervisors, peers, conferences and aiming to write journal articles, the most important practical skills that a good researcher needs are developed. Figure 4.1 combines factors to consider when choosing research design with Robson's framework for research design (RFRD). Robson's framework has been used as it links all the fundamental stages that the research process entails.

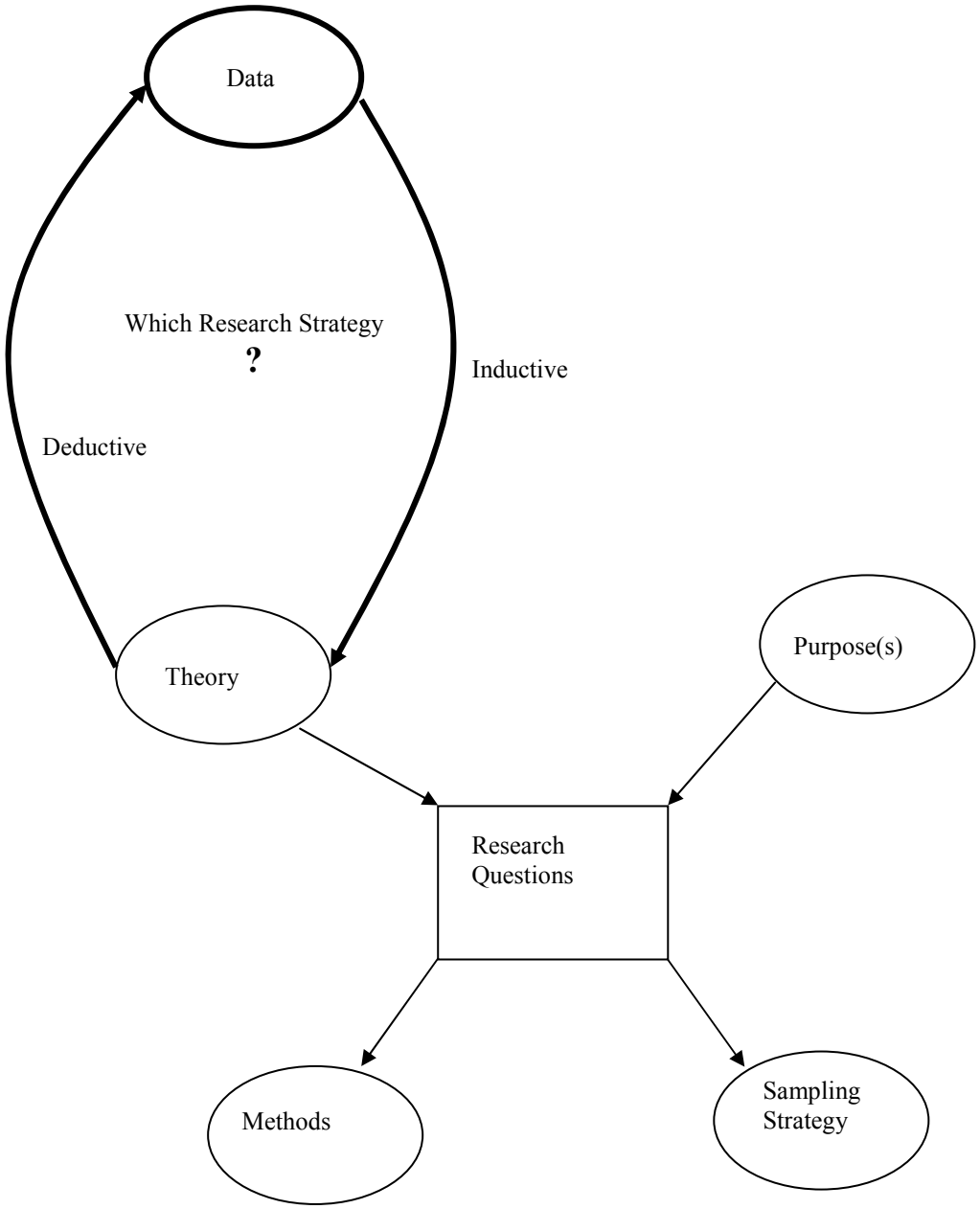


Figure 4.1 Research Strategy and Robson Framework for Research Design (RFRD) Source: (Robson, 2002: 82)

The role that data and theory are viewed to play has a significant influence on the research strategy to be used. In research where data is used to develop theory or inductive research, strategies commonly used are survey and case study. Such research turns to be more towards enterpritivisim, i.e. generating knowledge through social interaction with the environment.

Figure 4.2 shows research strategy, data generation and data analysis methods. It is common for more than one strategy to be used in a single research project; this is encouraged as it allows for different research strategies to complement each other, hence increasing the vigour of the research. This is called triangulation Yin (2003b: 97).

The main sources of data depend on the research strategy that has been chosen. Some of the most common forms of data collection instruments are questionnaires, document analysis, observations and experiments. As with strategy, it is common to use more than one source of data. The final stage is analysis of data that has been collected. If the data is in numeric form, quantitative analysis is used. This involves grouping data together to detect underlying principles and in the process build the theory. Alternatively if data is in other form other than numeric, for example, recorded interview, open ended questions, qualitative analysis of data is used. Qualitative analysis does not combine data to generate numeric meaning like frequency, mean or standard deviation. Here data is interpreted to show emerging patterns from critically analysing the data.

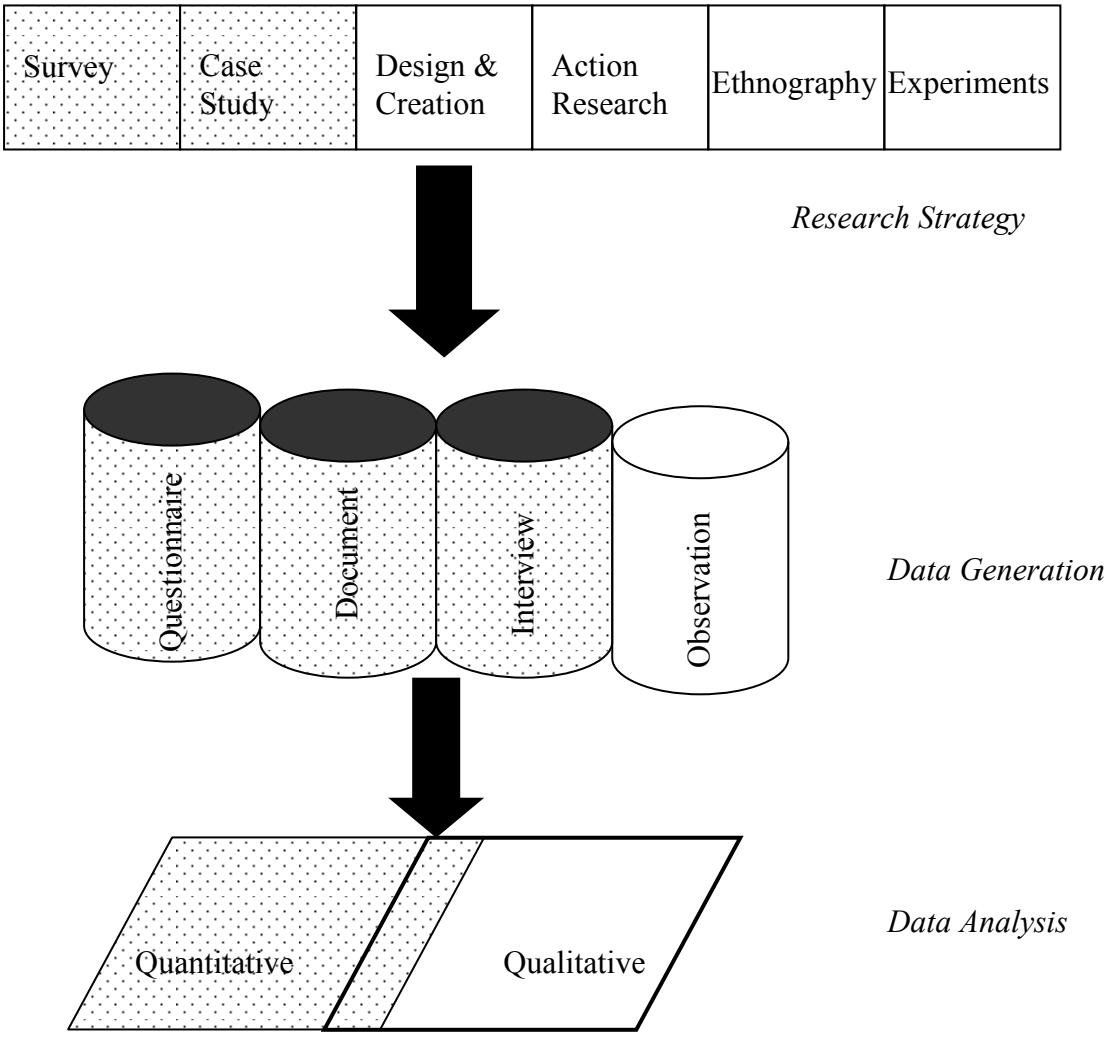


Figure 4.2 Stages of Doing Research, Shaded areas show those used in this research.

4.2.1 Experiment Strategy

Experiment as a research strategy is a way of discovering knowledge by controlling variables that take part in a phenomenon under investigation.

> *"In academic research, an experiment is a strategy that investigates cause and effect relationship, seeking to prove or disprove a causal link between a factor and an observed outcome" (Oates, 2006: 27)*

In experiments all the factors that take part in a phenomenon must be known and then controlled. The idea is to introduce one variable at a time and then observe the effect. Experiments are popular in pure science research such as physics, chemistry etc. This strategy was not adopted for this research as it is not possible to control variables. Where the subject of study involves

individuals, it is practically and ethically difficult to conduct experiments (Rose and Sullivan, 1993: 21). ICT infrastructure has been provided in all government ministries; hence it is not possible to have a department as a control group to run the experiments. Also this will not be an easy thing as it would be seen to disrupt day to day running of government institutions.

4.2.2 Design and Create

Design and create is where the focus of research is to develop a product. This strategy involves the creation of artefacts and in computer science, where the main focus is to create programmes or hardware, this strategy is popular. The contribution to knowledge of the designed artefacts is on the role such artefacts play in the society they exist (Oates, 2006: 109). Since this research is not aiming at producing an artefact i.e. computer programme or any ICT product, this strategy is not suitable for this research.

4.2.3 Action Research

Action research is a strategy where there is a very close relationship between the subject being researched (participant) and the researcher (Saunders et al., 2003: 94). The researcher is not viewed as an outsider, but as part of the team. The subject under investigation is often practitioners in an organisation and they have a vested interest in the research undertaken. The research involves taking action as a result of changes being introduced and observing the impact of such a change. This strategy was not adopted because the researcher did not have time to gain acceptance into the selected departments as a member since he is not an employee. However, future research must look into making it possible for this strategy to be used as it has potential to offer more insight as to what takes place inside Botswana government departments.

4.2.4 Ethnography

Ethnography is a research strategy that has its origin in the field of anthropology (Saunders et al., 2003: 93). Ethnography looks at understanding and interpreting the social world. A researcher using this strategy needs to have plenty of time and resources as social phenomenon often takes time for change to emerge. Using this strategy, a researcher becomes a member of the community under study for a long period of time to gain acceptance and trust by the community (Robson, 2002: 186). This strategy is not ideal for this research

as the focus is not on people's long term attitudes, but only on the period when they are employed. Also employees are not homogeneous, but different in many aspects.

4.2.5 Survey

Survey as a research strategy is a method of collecting large amounts of data from a population (Saunders et al., 2003: 92). This is in order to detect if certain believe is true or detect the presence of certain phenomenon. A sample of the population is selected and then results are generalised to the whole population. This strategy is one of the two adopted for this research as discussed in Section 4.3.

4.2.6 Case Study

Case study is a research strategy that looks at the reality of a particular case and investigates it. It can be defined as

> *" … an empirical inquiry that investigates a contemporary phenomenon within its real-life context especially when the boundaries between phenomenon an context are not clearly evident" (Yin, 2003b).*

Case study involves investigating phenomena in their real life situation and it uses multiple sources of information (Robson, 2002: 178). This strategy was adopted for this research in order to get an understanding as to what is happening inside a government department regarding the use of ICT applications. This research is exploratory hence case study strategy is ideal to determine the status of a situation.

4.3 Justifying Research Strategy Adopted

The two research strategies adopted for this study are survey and case study. Case study is an ideal strategy because it allows for studying a real problem in its true settings. Since ICT is spread all over government departments and ministries, it is best to chose a few representative departments and do an exploratory study instead of a large study that encompasses all the departments. Survey was used because the main purpose of this study was developed from concern among members of the public about the status of quality of service by government departments. Survey is an ideal strategy as it

allows for a sample to be selected and studied instead of the whole population. Both strategies allow for generalisation of the results to the whole population.

Face to face interviews may not be suitable for determining customer satisfaction. This has also been observed by McNealy(1994), who observed the following regarding face to face interview:

> *"Very few people have the personal confidence, temerity, and self-assurance to honestly evaluate our performance in a face to face situation" (McNealy, 1994)*

It is therefore ideal to use quantitative rather than qualitative research for customer satisfaction (McNealy, 1994: 101). The use of a questionnaire allows respondents to provide information independently on their own, and hopefully not intimidated by the presence of the researcher.

The use of case study research in human issues related to information technology is one of the research methods advocated by Walsham (2001), the other is action research. This is because in-depth case study and action research enable the researcher to gain deeper understanding about human issues related to information technology which include "*power and political actions, perceptions and feelings, and cultural norms and values*". It is difficult to study these in detail using any other methodology (Walsham, 2001: 247). Unfortunately in-depth case study and action research requires more time and cost which the researchers may not have.

4.4 Doing Research

The process of carrying out research, according to Oates (2006) involves 6Ps, namely **purpose**, **product**, **process**, **participants**, **paradigm** and **presentation**. The purpose of this research is to develop a framework to help the government of Botswana exploit information technology effectively. This has been discussed in section 1.1. The product will be the contribution to knowledge through understanding barriers to exploitation of information technology. This is for developing countries of Sub-Saharan Africa, where the problem has been under researched. It will also provide a framework from which the Botswana government can build appropriate strategies for exploitation of information and communications technology.

4.4.1 Process

The process of conducting this research has been through the author synthesising the problem and formulating the research question. An intensive literature search was conducted which revealed that the problem has been looked at before, mainly in western countries particularly in USA. No specific studies have been undertaken covering developing countries and yet they also have basic information and communications technology infrastructure. This is because the internet has long managed to penetrate every country in the world both rich and poor, as observed by Petrazzini and Kibati (1999: 31). Often it is assumed that technology in developing countries is of low status compared to the developed world. Also lack of trained manpower is a common reason for lack of development in developing countries. A comparative study has been made to compare Botswana and selected countries in terms of technological availability (see Section 3.7).

4.4.2 Participants

The main participants were public servants of selected government departments based in Gaborone, the capital city of Botswana. Criteria for choosing the government departments were availability of information and communications technology infrastructure, providing service to the majority of the population and also based in Gaborone. This type of sampling where the selection of a sample is based on characteristics of organisation is called purpose sample or theoretical sample (Attewell and Rule, 1991: 300). The three departments that were selected as case studies are shown on Table 4.2. This is to allow for reduction in cost and travelling time. Also Gaborone, as the capital city is well suited for this study as it has more infrastructures compared to the other towns and villages.

A sample of the population of Gaborone was taken as customers of services provided by government departments. A cross section of the population of Gaborone was surveyed. This was to provide a snapshot of the population. The sampling was based in Gaborone, the capital city with population of 186007 according to the 2001 population and housing census (CSO, 2001). This population is distributed among various localities of Gaborone. This census is the latest one and gives demography of the population as well.

Ministry	Department	IS in Place
Office of the President	Directorate of Public Service Management (DPSM)	Computerised Personnel Management System (CPMS)
Labour & Home Affairs	National Registration	National Identity System (NIS)
Works & Transport	Roads Transport & Safety	Vehicle Registration & Licensing System (VRLS)

Table: 4.2 Departments selected as case studies

The primary function of a computerised personnel management system (CPMS) is to manage records about government employees. The National Identity System function is to register information on all Botswana citizens who are 16 years old and above. The Vehicle Registration & Licensing System (VRLS) function is to assist in the management of vehicle records and drivers licence.

The Directorate of Public Service Management (DPSM) is responsible for management and human resource issues to all employees working for Botswana Government. One of the business strategic goals of this department is "*to continuously improve service delivery in the public service"* (DPSM, 2006: 1). The next section discusses the paradigm for this research.

4.4.3 Research Paradigm

Research paradigm is sometimes referred to as a philosophical stance. Philosophical stance is the philosophy that the research takes. There are numerous types of philosophy as well as definition. Basden (2008) has provided an intensive literature review on philosophy particularly as it relates to information systems. Basden (2008: 20) summarises philosophy as the back stage view which allows a researcher to gain a wider and cross-disciplinary position that facilitates understanding of how views of the truth interrelate. Saunders et al. (2003: 83) define philosophy as the belief and thinking that an individual has about what is knowledge and how it is created and developed. From the various definitions provided by literature it can be deduced that philosophy deals with theory of how knowledge is created and it has a significant influence on how a researcher initiates and approach research. The researcher's view of reality is influenced by a set of beliefs that Guba (1990: 17) defined as a paradigm. The pure science paradigm, for example physics,

chemistry etc, where the use of scientific observation and experimentation is used, as noted by Mogotlhwane et al. (2006b) is well established. The scientific method of knowledge creation is well established because of its history of use. There are two philosophical stances underlying research, namely ontology and epistemology.

The research objectives introduced in Section 1.4 are all looking at ICT as a social rather than a technical issue. This is because the research problem does not imply any weakness or technical failure of ICT. This is why the methodological approach of this research is that of social science rather than that of pure science. The methodological approach is illustrated in Figure 4.3

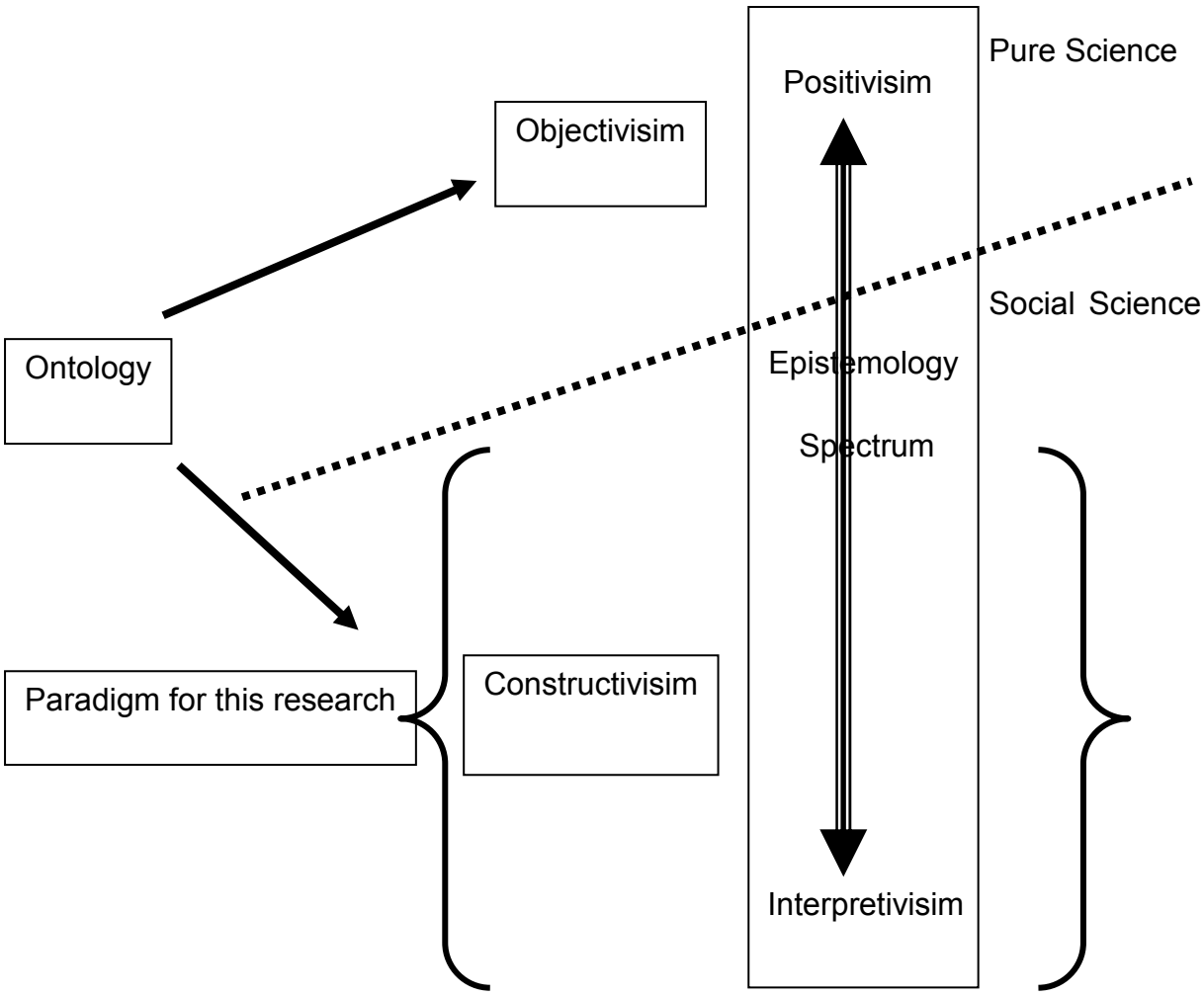


Figure 4.3 Research methodological approach

4.4.3.1 Ontology

Ontology can be defined as what is known or what constitutes social reality, according to Crotty (2003: 10). It is that view which one takes regarding what makes up social reality. The two ontological positions are objectivisim and constructivisim. The main difference between the two positions is mainly on how a researcher believes knowledge is created. Under objectivisim knowledge is out there waiting to be discovered. This is the stance used by pure scientists as discussed in section 4.2.1; it uses scientific observation and experimentation to generate new knowledge. On the other hand constructivisim takes the view that knowledge is socially constructed by our interaction with our environment. This is used mainly by social scientists to study human behaviour. It is not as old as the objectivism view.

For this research, the ontological position taken is that of constructivism. This is because the research is looking at relationship between employees and information technology availed to them. The research is to explore factors that could be leading to lack of exploitation of information technology. It is not possible to conduct experimentation as the participants are people who cannot be manipulated like objects. Having discussed the ontological stance, the next section will look at the epistemological view and explain why a particular stance has been adopted for this research.

4.4.3.2 Epistemology

It is difficult sometimes to differentiate epistemology from ontology. This is because both of them are concerned with knowledge. Epistemology looks at the theory of how we come to know what we know. It is more the process of knowing. Grix (2001) wrote that it is

> *"… derived from Greek words epistemo (knowledge) and logos (reason), epistemology focuses on the knowledge-gathering process and is concerned with developing new models or theories" (Grix, 2001: 27)*.

Our ability to learn and the methods we use to learn for acquiring knowledge are constantly changing over time.

The two major positions under epistemology are positivisim and interpretivisim. Of late other stances have emerged for example feminism, critical inquiry etc., according to Crotty (2003). Positivisim focus on using natural science methods

for gathering knowledge. Interpretivisim takes the opposite view of positivisim, it argues that cultural, historical and other issues that allow people to interact are fundamental to knowledge creation. In the process of this social interaction knowledge is created and this can not be explained purely by conducting scientific experiments. The choice of which experiments to do may be socially determined by for example, a funding mechanism.

For this research the epistemological stance that is taken is that of interpretivisim. This is because the research looks at the interaction of people (government employees) with the computing technology that the government has availed. The problem of how this technology is used is a social problem and can not be investigated well using the positivistic approach.

Crotty (2003: 5) does not separate epistemology and ontology. Crotty (2003) included the elements of ontology as discussed by Grix(2001) to be part of epistemology. This research advocates for Grix(2001) approach as it makes it easy to understand and follow the argument of formulating research. Ontology and epistemology are the background theory that influence the research, hence it might be appropriate to treat them as informing the theoretical perspective, as Crotty (2003: 10) had showed how they are intertwined.

The research methodology framework is as shown in Figure 4.4

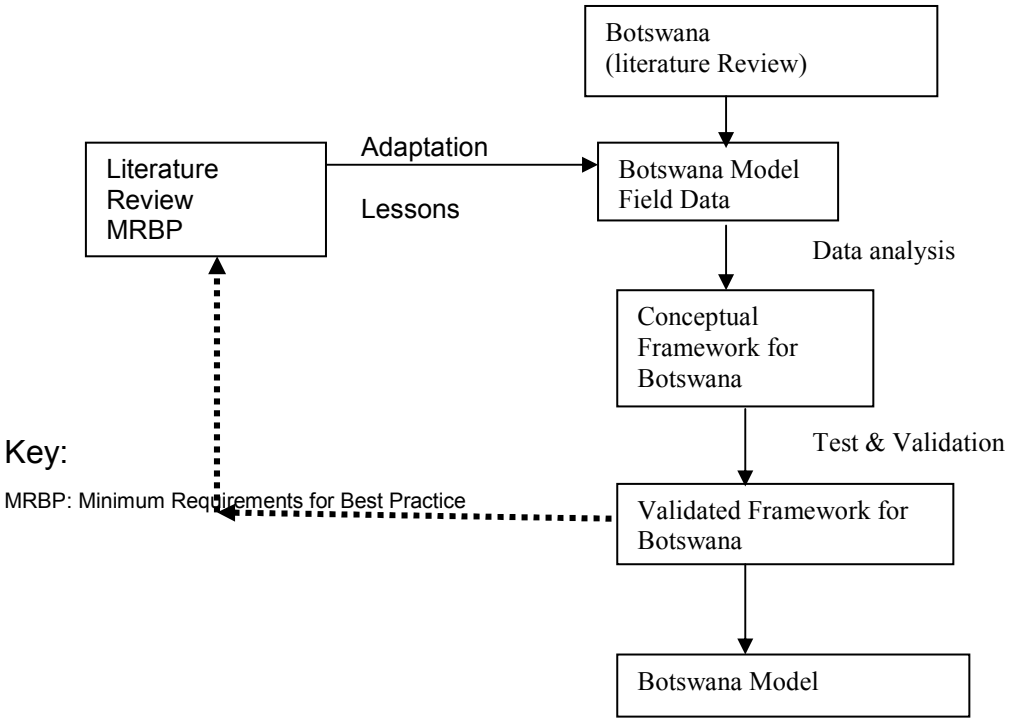


Figure 4.4 Research Methodology Framework.

An intensive literature review on the problem of public sector service delivery and information and communication technology developments has been undertaken. A global view of literature was taken in order to find out if the problem has been researched previously. A detailed review of literature specific to Botswana was undertaken during data collection in Botswana.

In order to determine benchmarks against which to develop a model for Botswana, minimum best practice requirements for a selected group of countries was determined. This group of countries selected as examples of best practice are Singapore, Estonia and UK. Singapore and UK were not included in Little (2004c) study. Singapore is used in this work as it is recognised by numerous studies to have succeeded in developing and using ICT effectively. It has a population of almost twice that of Botswana but with a small geographical space. UK is included as Botswana has had a long working relationship with the country dating back to colonial days. Political and administrative processes are almost similar between the two countries.

This research used survey and case study research approach (as illustrated in Figure 4.2) as these make it possible to explore a phenomenon in its real life environment.

4.5 Rigor and Relevance of Research

Research plays such a crucial role that it is often aimed at producing the results that are relevant to the benefit of society. This is shown by the amount of money that is often invested in funding research projects. Rigor in research relates to how systematic the research has been executed i.e. has the right information been collected, analysed and interpreted correctly as well as has the right instruments been used to collect the data. Relevance has to do with how useful the research is. There is lack of consensus especially in information systems (IS) research as to whether rigor and relevance can coexist. According to Applegate (1999: 1), relevance can not be attained from a single study but is built over several studies which together leads to systematic creation of knowledge.

Relevance of IS research has been discussed in detail by Benbasat and Zmud (1999: 4) . But they only confine relevance to practice i.e. relevance of IS

research to practitioners. For example they state that IS professionals like to read articles which are shorter, use more exhibits, have less discussion of related literature etc(Benbasat and Zmud, 1999: 5). However relevance of research may not yield results immediately, hence there is a difference between research to generate knowledge and to solve problems.

For this reason, research must be made relevant to those who have interest in it. Blaster et al. (2006: 221) has identified four factors which affect relevance of research. These factors are discussed in the following sections.

4.5.1 Significance

The concept of research being significant covers both statistical as well as common sense relevance. For statistical meaning significance implies that any result that can be obtained from the sample used in the research is not just by chance i.e. any difference obtained is due to some systematic variations between the variables and not just due to chance (Salkind, 2004: 144), (Kerr et al., 2002: 44). For common sense meaning, 'significance' means how important results are taken to be.

Since it is not completely possible to control all variables to ascertain that variation is only due to variables being measured, there is always a chance that the observation might be wrong. To get around this researchers use significance level to state the risk they are willing to take that the results are not 100%. This is called significance level (Salkind, 2004: 143).

There are numerous statistical tests that can be applied to test significance level of variations in variables (Kerr et al., 2002: 48), (Salkind, 2004: 180), Kerr et al. (2002: 49) have stated that in order to choose the appropriate test the following questions must be considered.

- What is the research question?
- How many dependent and independent variables are there?
- Was the data gathered by means of an independent, related or mixed design?
- What type of scale was used to measure the variables?

The test statistics used to test for significance is the null hypothesis. The null hypothesis is a statement that is taken to be true in the absence of any knowledge about the variables. It is formulated by considering that in the absence of any knowledge about relationship between variables in a population,

the best a researcher can do is to guess that there is no relationship (Salkind, 2004: 106), (Siegel and Castellan, 1988: 7). Statistical tests are then used to prove or disprove the null hypothesis. Since the null hypothesis refers to the whole population, it is difficult to test the null hypothesis directly; hence there is always a chance that incorrect decisions can be made about the results of null hypothesis. There is always a possibility that the null hypothesis is rejected when it is actually true making what statisticians call type I error. Accepting the null hypothesis when it is false is a type II error (Kerr et al., 2002: 45), (Salkind, 2004: 146), (Siegel and Castellan, 1988: 9). Table 4.3 shows when both types I and II can be made.

		Action You Take	
		Accept	**Reject**
True nature of the null hypothesis	The null hypothesis is really true	No error	Type I error
	The null hypothesis is really false	Type II error	No error

Table 4.3 Different types of errors. Source (Salkind, 2004: 145)

The types of test that can be used to test for statistical significance can be divided into two groups namely parametric and non-parametric tests (Siegel and Castellan, 1988: 33). Parametric tests are used for interval data while non-parametric are used for ordinal as well as nominal data (Kerr et al., 2002: 49). In this research data was collected as ordinal and nominal data to increase response rate and minimise time required to complete questionnaire. Hence only non-parametric tests are used to do statistical significance tests.

4.5.2 Generalisation

Generalisation is used to indicate how the research findings are a true representation of reality. It is used to determine whether the results of research can be taken to apply to a wide scope beyond that which was constrained by research environment. This is an important issue because it is almost impossible to study the whole population. However it is important to have a

feeling of how representative the findings of research are. This is particular true for social research for example if a location has been selected to determine internet penetration in a country, how representative of the whole country is that location.

The results of this work are to be generalised, hence the sample size chosen was to allow generalisation. A 95% confidence level was used in the quantitative analysis; this is the commonly used confidence level. The confidence level of 95% implies that there will be a 95% chance that true value of the whole population lie within values obtained from the sample. Such values as mean, standard deviation, mode etc calculated using sample data will have 95% chance to be those of the whole population. Since the whole population is not included, a marginal error or accuracy of range will be +/- 3%. For marginal error to be zero, then the whole population must be used as observed by Oates (2006: 100).The marginal error gives a range within which the true values of the population lie.

There are statistical tables that can be used to determine the sample size based on the confidence level and marginal error. For this research the values were obtained using online sample size calculator (GSS, 2006).

4.5.3 Reliability

Reliability refers to how well the research has been executed. In other words if it was possible to repeat the research process under the same conditions, will the same results be obtained. It is an indication of the variability in the response to survey that is due to the differences in the opinions of the respondents and not due to confusion or multiple interpretations.

Reliability of research can be increased by following an appropriate methodology and reporting both the expected and unexpected finding that emerged from the study. There is a need to conduct an internal consistency reliability test to determine if the various items used in a test are consistent with each other i.e. they represent truly as far as possible an area of interest (Salkind, 2004: 282). Reliability can be increased by repeating the survey to the same group after some time and correlating the responses or as Cronbach emphasise this by stating that:

"The preferred way to find out how accurate one's measures are is to make two independent measurements and compare them" (Cronbach, 1951: 297).

However this is not often possible as it is difficult to control the environments of the respondents. Cronbatch Alpha (α) can be used to estimate internal consistency reliability as shown below:

$$\alpha = \left(\frac{\kappa}{\kappa - 1}\right)\left(\frac{S_y{}^2 - \sum S_i{}^2}{S_y{}^2}\right)$$ (Salkind, 2004: 283)

Where

Κ is the number of items
$S_y{}^2$ is the variance associated with the observed score
$\sum S_i{}^2$ is the sum of the variances for each item

The value of reliability coefficient obtained from the calculation of α must, according to [(Salkind, 2004: 287), (Bryman and Cramer, 1994: 72)]

- be positive
- be as large as possible between 0 and +1

As a rule of thumb Bryman and Cramer (1994: 72) argue that α value must be equal to or greater than 0.8 to show high internal consistency reliability.

4.5.4 Validity

Validity is a term used to indicate whether the methods and other steps taken during the conduct of research were appropriate for the research that has been undertaken.

Rigour and relevance in management information systems research does not have consensus in literature. Researchers coming from positivistic school of thought argue that information system research lacks relevance (Benbasat and Zmud cited in (Lee, 1999). However, as Lee (1999) argues, research in natural science is different from professional research. This is because

"…natural sciences pursue the goal of truth in formal proposition; inquiry in the professions pursues the goal of effectiveness in action" (Lee, 1999: 29)

This is also shown by the fact that the role of natural science is to generate knowledge on how the reality is while for professional inquiry the important thing is to produce knowledge about how to take steps that will meet the needs of the real world (Lee, 1999: 29).

4.6 Research Process

The research process for this research is as shown in Figure 4.5.

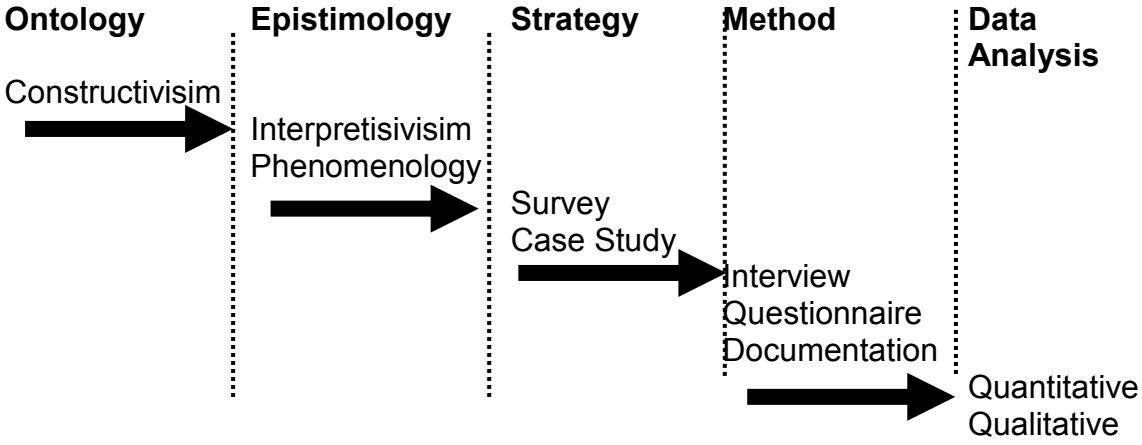


Figure 4.5 Research Methodology, Adapted from (Crotty, 2003: 5)

The research has been influenced by the researcher's personal experience as well as official and public concerns with the state of service delivery by some of central government agencies. This research proposes that something can be constructed out of what is perceived as lack of satisfactory performance by employees. This research adopts the ontological stance of constructivisim. The problem under research is more of a social phenomenon and does not sit well with the objectivisim position.

For the epistemological position, interpretivisim phenomelogy is adopted. This is because the interpretivisim approach is founded in constructivism ontology; hence a positivistic stance is not appropriate for this work. An inductive approach has been used to search for a theory that links the various research variables as discussed in section 4.2. As the research involves people using technology and their interaction with it, it is not ideal to use a deductive approach as people's views change, hence can not easily be experimented.

The phenomelogical approach is used to avoid the researcher using his personal perception as well as that obtained in literature to influence people's views. According to Gray (2004)

> *"phenomenology insist that we must lay aside our prevailing understanding of phenomena and revisit our immediate experience of them in order that new meanings may emerge" (Gray, 2004: 21)*.

4.6.1 Research Strategy

Research strategy is an overall approach that a researcher adopts in order to answer the research question as noted by Saunders et al (2003). There are numerous research strategies; however Oates (2006: 33) and Saunders et al (2003: 83) identified 6 strategies namely: survey, design & create, experiment, case study, action research and ethnography. These were discussed in section 4.2.

For this research the two strategies adopted were survey and case study. A survey has been used to investigate customers' opinion on quality of service received from government departments. The population of the study is the whole nation. It will be costly and beyond the scope of this research to conduct a national study, hence a sample of national population based in Gaborone was taken as the population.

Case study as a research strategy can be used *"… when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context"(Yin, 2003b: 1)*. Since the researcher has no control over operations of government departments, this strategy is ideal for this research and has been adopted.

4.6.2 Research Variables

The interactions of the various concepts in an organisation are shown in Figure 4.5. This is a top level conceptual framework. The dotted line indicates the area that has been covered by literature. For example Shaw et al. (2002) looked at causes of dissatisfaction in end-user support. Gates (1999a) covered business management and how it was not taking advantage of information technology. Gates (1999a) advocated for change to take advantage of information technology. Davenport (1997) proposed a new approach to information management that shows that managers may not consider information generated by computers to be more important that that obtained from other sources.

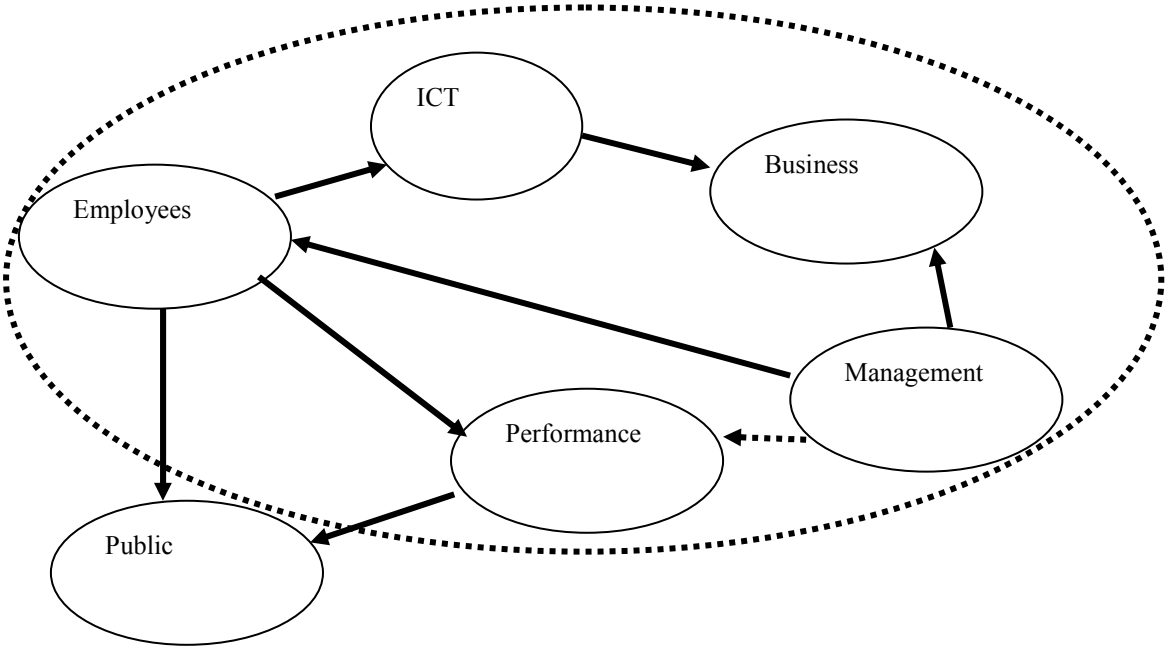


Figure: 4.6 Research Conceptual Model

The conceptual model illustrated in Figure 4.6 indicates the various concepts in an organisation. Each concept can be further expanded to look at it in details; hence this is the top level view. For this research the main focus is in employees, public, performance, management, and information technology. The interaction of all these concepts leads to a certain degree of outcome/performance. Beynon-Davies (2002: 180) pointed out that employees ability to use information technology is fundamental to decisions that need to be made based on information generated. Gates (1999a) goes further and argues that middle managers need as much information as top management, but often they are not allowed to have it. This highlights the importance of usability of information technology. CSTB (2000: 6) called for further research to look at relationship between organisations, people and the technology they use. This research contributes to such a call for research in this area.

The following sections discuss the various variables that have been investigated in this research, based on the criterions that have been obtained from literature regarding effective utilisation of ICT. These are shown in Figure 4.7

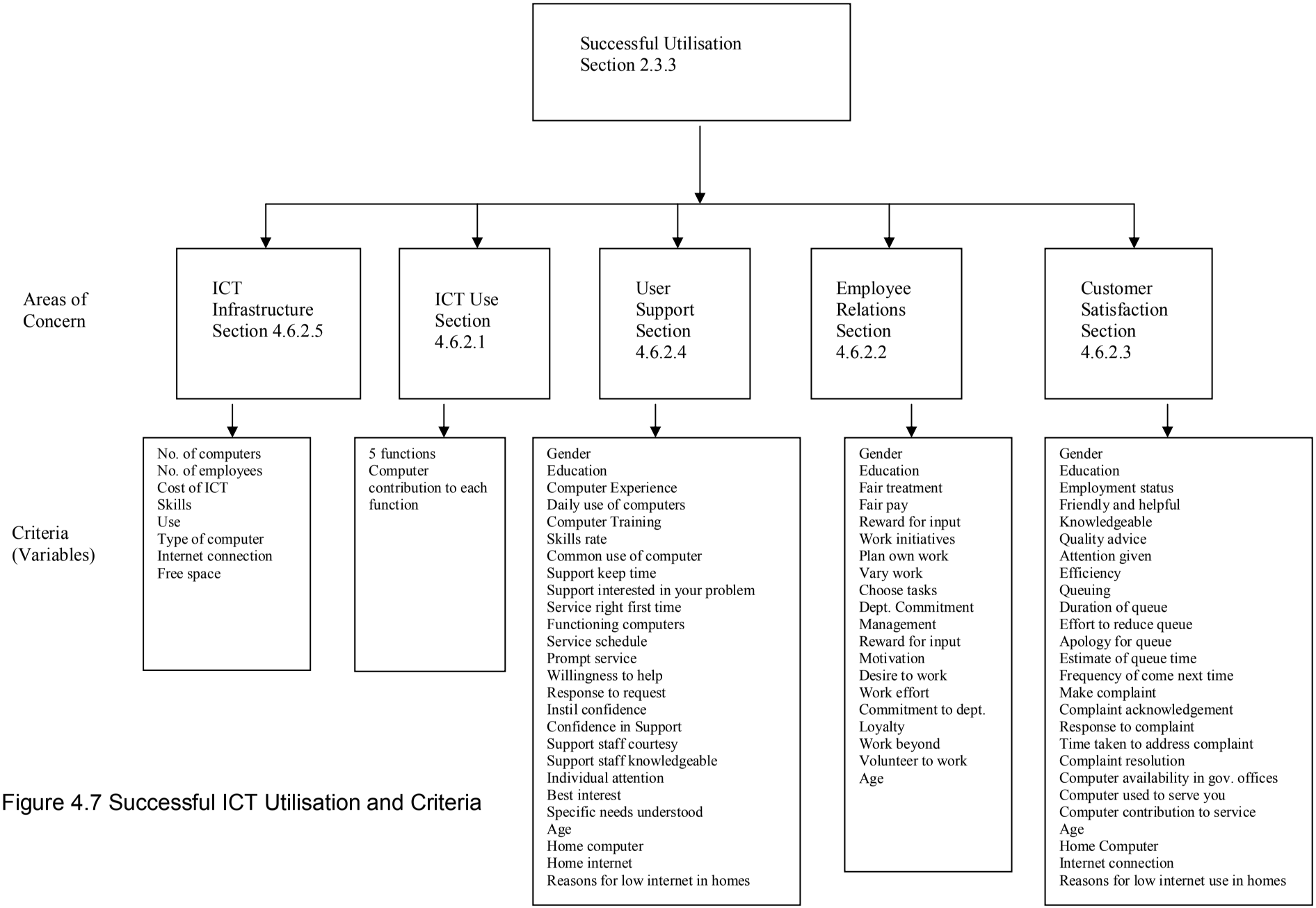


Figure 4.7 Successful ICT Utilisation and Criteria

4.6.2.1 Determining Maturity Level

The most popularly used model to explain how computer technology evolves in an organisation is the Nolan (1979) model (discussed in Section 1.3). Although the model is almost 30 years old, it is still valid. Nolan's model is selected for this work as it is the only model which is a product-based (Underwood, 2005: 2) and allows for employees to evaluate their functions and question contribution of IT to their work.

The escalation of computer budget that seems to be out of control can best be explained using this model. Gates (1999a) observed that most companies are using digital tools to monitor their basic operations, run production systems, generate customer invoices, handle accounting, do their tax work. "*But these are just automated old processes" (Gates, 1999a: xiv)*. However, there is a need to re-validate the model benchmark as computer use has now gone beyond data processing. The numerical values of the benchmark as shown in Figure 4.8 need to be updated.

To use Nolan's model, the numerical values of contribution of information technology needs to be determined. To do this, the primary functions of employees at various management levels are identified (See Figure 4.8). Employees are then requested to provide an estimate of information technology contribution to each function in numeric form. Based on these values, determined at operational, managerial and strategic levels, maturity level stage can then be determined by interpolating the values in Figure 4.9.

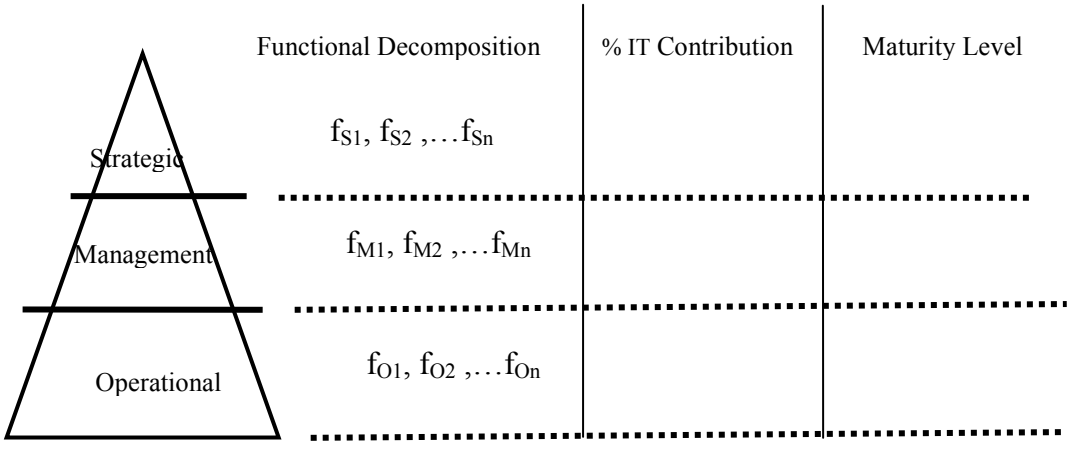


Figure 4.8 Determining Maturity Level Based on Nolan's Bench Mark. Adapted from (Nolan, 1979: 122).

Once maturity level has been determined, the next step is to identify the next level. To move to the next level, there is a need to determine the limiting factors. For each variable its limiting factors will be determined. Limiting factors are all those barriers which the department must over come to successfully move to the next level. This might be in all of the variables.

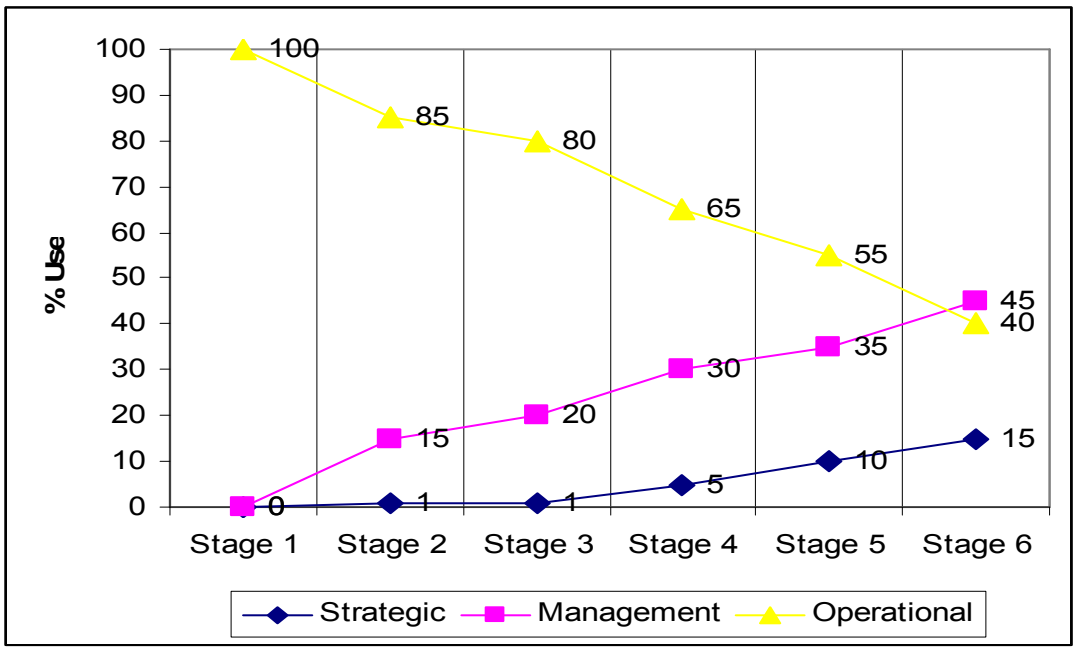


Figure 4.9 Nolan Maturity Level Benchmarks

The maturity level of an organisation can also be determined by using Urwiler and Frolick (Urwiler and Frolick, 2008) IT Value hierarchy. This was introduced in Section 2.4.4. This model was developed recently and its main advantage is that it incorporates latest developments in IT which were not available during the time when Nolan's model was developed. To determine the maturity level, an organisation evaluates itself against pre-set of descriptors which describe IT function at each level. Once maturity level has been established, an organisation can then use the model to decide where it wants to be, bearing in mind that this is an incremental development stage, hence to achieve a higher maturity level, all the previous levels must be satisfied first.

The maturity levels and associated descriptors at each level based on IT value hierarchy are as shown in Figure 4.10

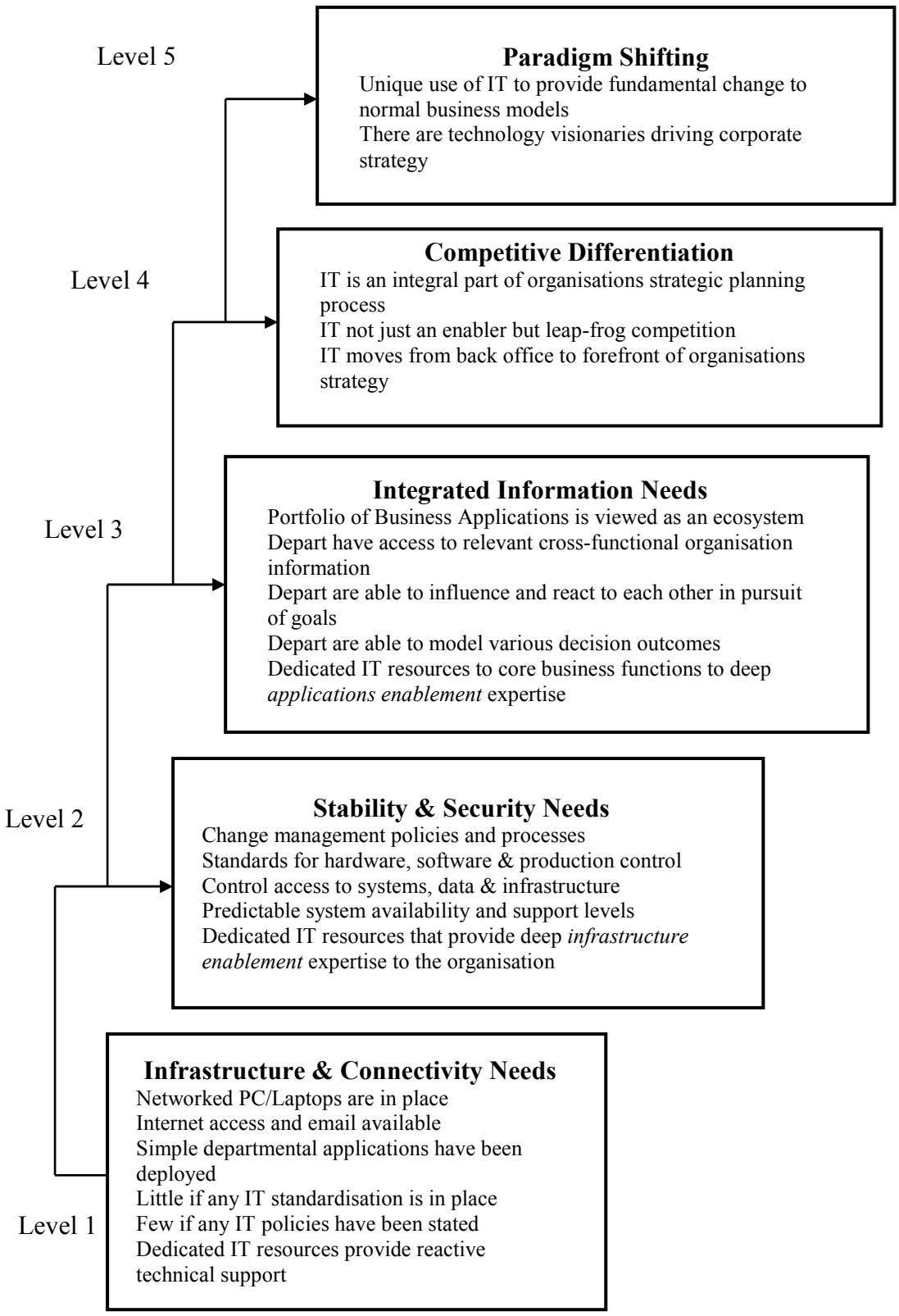


Figure 4.10 Descriptors for Maturity Level using IT Value Hierarchy. Source (Urwiler and Frolick, 2008: 85-87)

4.6.2.2 Psychological Contract

The concept of psychological contract is an area within the human resource field as discussed by Guest and Conway (1998). As use of information technology is meant to support organisation effectiveness, it is important to understand it within the information system context. The Institute of Personnel Development (IPD) now called The Chartered Institute of Personnel and Development (CIPD) has been tracking the state of psychological contract in UK since 1995 according to Guest and Conway (1998: ix).

The role of employees in an organisation is still important. Ives (1994) highlighted this when calling information technology professionals to contribute meaningfully to the information technology paradox debate. For the US, Ives (1994: xxiii) stated that low performance in the US economy in the 1980s should also be linked to failure of the education system and inadequate funding for employees training.

It is important to understand psychological issues that form barriers to utilisation of ICT. In some developed countries, for example in Finland, it has been shown that lack of ICT technical infrastructure is no longer a major issue as the country has high degree of internet connectivity and large bandwidth which can allow for retrieval of large computer aided drawing files. The main barrier in Finland for full utilisation of ICT is psychological resistance to use ICT in the construction industry by key stakeholders (Bäckblom et al., 2003: 372).

The psychological contract is included in this research as within the last 10 years, there have been labour disputes in Botswana. These ranged from unskilled workers all the way up to professionals. Even members of parliament have complained about their remuneration. The areas to be covered in the psychological contract are

- Fairness treatment
- Employee participation
- Trust and fairness
- Commitment to the department
- Employee relations
- Motivation and effort
- Obligation to the department

The above have been documented very well in the Guest and Conway (1998: 1) study of the psychological contract in UK, hence comparison can be made. To

keep terminology simple during data collection, the psychological contract was referred to as employee relations.

4.6.2.3 Customer Satisfaction

The recipients of government services are members of the public. It is the desire of the government for the public to be offered the best possible services. This is why the government of Botswana has acknowledged that unsatisfactory performance by civil servants must be addressed. A number of initiatives that the government took (see Chapter 1) and the current efforts re-affirm government commitment to addressing the problem. Information and communications technology has been introduced to try to improve employees' efficiency in government departments as observed by Venson (2005a: iii) However there continues to be an outcry on service not being good enough. This was alluded by Chakalisa (2006) who stated

> *"the entire public service received low ratings and the general areas of concern were those that related to staff, handling of complaints and quality of products and services offered by ministries".*

Assessment of quality of service is a difficult concept. This is because in the service industry it is difficult to quantify services, hence difficult to measure. Quality of service is based on judgement by the recipient.

The concept of customer satisfaction is covered mainly in marketing science. However it has now crossed into other fields due to information and communications technology bringing customers and traders even closer. For example in web design, it is not only the technical knowledge of writing codes that is important, even the artistic appearance of a web page has an influence on its ability to attract customers. Hence web design requires both technical and artistic skills.

Anderson and Rust (1997) found out that customer satisfaction depends on the nature of the product offered. Their research showed that where the product is a commodity, there is a positive relationship between customer satisfaction and productivity. However where the product is service, the relationship is negative. Anderson and Rust (1997: 130) also showed that there has to be a need to strike a balance in both quantity and quality. This is because it is difficult to attain high productivity and customer satisfaction especially in service based industries.

The need for measuring customer satisfaction has also been highlighted by Davis and Maggard(1990) who stated that:

> *"Perhaps a better method for assessing customer reactions in a service environment might be to deal directly with customer opinions about the service level, in terms of his/her satisfaction with service" (Davis and Maggard, 1990: 326).*

Customer complaints and customer satisfaction are some of the instruments that the US government uses to evaluate its e-services (Keyes, 2005: 136).

Time in Queue

The time spent in a queue is experienced by customers in every organisation. Time in queue has also been referred to in literature as waiting time (Davis and Heineke, 1998: 64),(Davis and Vollmann, 1990: 61). Waiting time is created by a number of factors some of which are within the control of an organisation while some are external (Davis and Heineke, 1994: 21). While it is difficult to completely eliminate time spent by customers in queues, the most important point is that "customers do not like to wait" (Davis and Heineke, 1994: 21). It is for this reason that waiting time must be reduced as much as possible and also organisations must adopt effective queue management processes.

Time is a basic variable for performance although it is often not monitored to the same level as sales and costs (Stalk, 1988: 45). The use of time as a competitive advantage helped to enable the Japanese automobile industry to capture the global market in the 1980's (Stalk, 1988: 45). Japanese firms discovered that by decreasing consumption of time in almost every area of the business they were reducing costs, improving quality and meeting customer needs (Stalk, 1988: 46). The reduction of time spent in storage, known as just in time (JIT), enabled a large reduction in capital costs (Sugimori et al., 1977: 555).

4.6.2.4 User Satisfaction

Users can be defined as employees who have access to information and communications technology to support their operations. Employees by nature have undergone formal training and have experience in how the job is done. The feeling and attitude that users develop as they use technology can determine its effectiveness. The theory of computer user interface is an attempt to develop software that users will find easy to use.

Service quality (SERVQUAL) is a tool that can be used as a measurement benchmark to compare performance of information system application. It can also allow for identification of weak and strong areas of information and communications technology applications in an organisation. SERVQUAL was developed by Parasuraman et al (1988) for use in marketing. Since the role of information has gone beyond traditional

> *"design, build and install system to improve organizational performance" (Watson et al., 1998: 62)*,

Hence there is a need to adopt SERVQUAL to information systems research. SERVQUAL was adopted to measure information systems quality by Kettinger and Lee (1994). They wanted to improve on the instrument used to measure user information satisfaction (UIS) developed by Ives et al (1983).

SERVQUAL has received extensive coverage in literature regarding its suitability to use in IS. In the June 1997, three articles in MIS Quarterly were about SERVQUAL by (van Dyke et al., 1997), (Pitt et al., 1997) and (Kettinger and Lee, 1997).

SERVQUAL has been critically evaluated as an instrument to measure service quality in information systems. Van Dyke et al. (1997) argued that SERVQUAL had conceptual and empirical difficulties, however they agreed service is now part of the most important section of IS, hence needs to be determined. On the other hand Pitt et al. (1997) have shown that SERVQUAL remain the best instrument and its weaknesses are far out weighed by what it offered. This view is also shared by Kettinger and Lee (1997) who stated that

Rejecting SERVQUAL is like to

> *"..throw the baby out with the bath water until strong conceptual, empirical, and practical evidence pushes the scale markedly away from SERVQUAL" (Kettinger and Lee, 1997: 225).*

Information systems cover almost every aspect of business and social life, hence the service quality of information systems is more important than before.

Watson et al (1998) argued that information systems can lead to increase in client's productivity through the following

- Providing service dependably and accurately
- Giving service quickly and willingly
- Using knowledgeable, approachable and affable service personnel
- Having technology that is appropriate to the client's needs

- Providing individual attention to each client

Carrying out measurement is not an easy process and if carried out wrongly it is worse than no measurement as it gives incorrect data (Benbasat and Zmud, 1999: 10). Any tool that is used to carry out measurement for evaluating IS needs to be of high quality and preferably having been used intensively before.

The themes of SERVQUAL, namely reliability, responsiveness, assurance and empathy have also been shown independently to be important issues that customers want regarding a product or service by Marketing Science Institute in 1996 according to Keyes (2005: 135).

4.6.2.5 ICT Inventory

The availability and types of ICT facilities available are important in determining usage status. Where there is no such infrastructure, such areas have not been covered in this study. For the purpose of this work the definition of ICT is as discussed in section 2.2.1. The type and status of ICT has been called ICT inventory and will include the following:

- Type of computers
- Internet/email access
- Maintenance costs
- Rate of use of computers
- Types of software (operating system, application)

The various research variables on which primary data was collected are as shown in Figure 4.11

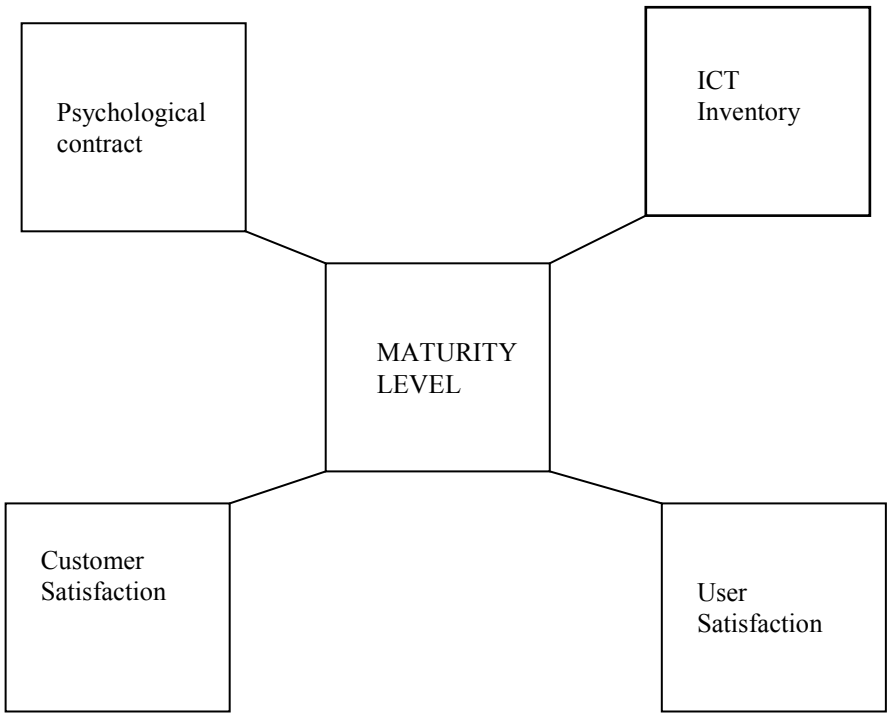


Figure 4.11 Research Variables

4.6.3 Data Generation Methods

Having identified the research strategy, this section discusses the research methods that were used to collect data. Three data generation methods used were, interviews, questionnaire and document analysis. The use of three methods is to satisfy triangulation of methods. Triangulation increases the validity and reliability of research. The use of three or more data sources of evidence provides a strong case if they all lead to the same conclusions. Triangulation, according to Yin (2003a: 82) is derived from geometric space that state that a point can be defined by the intersection of three vectors and additional vectors are redundant.

Bell (1995: 64) advised that which ever method is considered for data collection, it must be chosen carefully to determine to what degree it will be valid and reliable. Bell (1995: 64) defined reliability as the degree to which a procedure or test can produce the same results under the same conditions. For validity Bell (1995) describes this as "… *whether an item measures or describes what it is supposed to measure or describe*" (Bell, 1995: 65)

Interviews were used to get information from heads of the selected departments. Since their permission was required to administer questionnaire, it was worth while to get them involved. This is also to show that the researcher appreciates their supervisory role in the department. Semi-structured interview were used to get data on the maturity level of the department and limiting factors or barriers to exploitation of technology.

Questionnaires were used to collect quantitative data. The variables where this method was used are service quality, psychological contract, customer satisfaction, user satisfaction and limiting factors. The main advantage of a questionnaire is that large quantities of data can be collected and also it is easy for the respondents to complete. The main limitation is low response rate and loss of meaning of concepts during simplification of the questionnaire. The following have been identified to be the principal causes of error in gathering of data through survey by Belson (1986: 86):

- Respondent's failure to understand the survey question in the way intended by the question designer.
- Lack of effort or interest on the part of the respondents (that is, he just tosses off a reply).
- Unwillingness of the respondent to admit to his attitudinal (or his behaviour) situation.
- Failure of the respondent's memory and thinking process in the stressed conditions of the doorstep interview.
- Interviewer failure of various kinds, for example: changes in the wording of set of questions and instructions; visual aid delivery failures; faulty reporting of what the respondent said.

Also factual questions have been shown to elicit invalid answers, showing that respondents did not pay particular attention.

> *" If questions concerning such simple and apparently objective matters as 'age' elicit inaccurate data, one must wonder about the validity problems that might be associated with more threatening, more complex, or less well known issues" (Belson, 1986: 3).*

Document analysis was also used to collect data. This was from annual reports, progress reports and other publications available. Previous local media coverage on the issues was also examined. The particular department where documentation was sourced was the Botswana National Productivity Centre (BNPC). BNPC was set up in 1993 and its mandate was to promote culture of improved performance among workforce of Botswana (BNPC, 2005). The Office of the Ombudsman and the three departments used as case studies were also

approached for any documentation on the matter under investigation. The main disadvantage of documents as a source of data is that some of them might not be for public consumption and they may be written for a purpose that does not relate very well to the research purpose. Their publications are not subjected to review like other academic publications. Also they are not written by academics, hence their data may lack academic credibility. However documents can provide rich valuable data as they are often written for a particular problem.

4.7 Data Analysis Methods

The data collected during field work often do not resemble the structured approach that was planned for it to be collected. It may even appear chaotic and lacking order. (Blaxter et al., 2006: 195). Data analysis can be defined as making some manipulation without changing the content of data to derive meaning from such data. It is

> *"the search for explanation and understanding, in the course of which concepts and theories will likely be advanced, considered and developed" (Blaxter et al., 2006: 206)*.

It is the process of revealing any patterns in data. Patterns in data can either be due to relationship between variables or random variation (Sweet and Grace-Martin, 2003: 87).

According to (Blaxter et al., 2006: 195)

"data analysis is about moving from chaos to order and from order to chaos"

This is because data which appear to be somehow in order may turn to be chaotic as you analyse it.

Data analysis involves the following processes, according to Blaxter et al.(2006: 202):

- Managing your data, by reducing their size and scope, so that you can report upon them adequately and usefully
- Analysing your managed set of data, by abstracting from it and drawing attention to what you feel is of particular importance.

Data analysis must be a rigorous process which uses the data that has been carefully produced and managed. The most important thing is that at the end of data analysis, what the researcher produces is their own document which is meant to persuade readers to read the interpretations that have been made (Blaxter et al., 2006: 207).

The process of data analysis involves the following terms or their synonymous terms as shown in Table 4.4.

Term	Meaning
Concepts:	abstract or general ideas, which are important to how we think about particular subject or issues
Theories	suppositions which explain, or seek to explain something
Expectations	statements which seek to make something intelligible, about why things are the way they are
Understanding	Our perception of the meaning of something, in this case the subject area, the issues and/or the research questions under consideration

Table 4.4 Terminology of Data Analysis. Source: (Blaxter et al., 2006: 206)

The role of data analysis is to explain the differences or variances that the measurements display with references to some theoretical concepts of importance (Rose and Sullivan, 1993: 67).

4.7.1 Types of Research Data

Research data can be in two forms, namely numeric or non numeric. An example of numeric data can be recorded changes in thermometer reading as temperature was increased during a laboratory experiment. The data here are the numbers that represent the reading that were taken and recorded. Data which is not numeric may be taperecorded conversation during an interview. Data which is in numeric form is called quantitative data. Data which is in any other form other than numeric is called qualitative data (Blaxter et al., 2006: 199).

It must also be noted that it is not easy to exactly offer an accurate difference between quantitative and qualitative data. This is because for both types of data they represent only what an individual might have perceived as their reality. The accuracy of the facts from data is very subjective. This is so because accuracy of the data is also reduced during the research process as the researcher attempts to summarise and extract key points from vast amount of information available. The difficulty of accurate difference between quantitative and qualitative is also due to the fact that both often overlap, they both often appear to be used together. For example data collected using qualitative method like interview will lead to use of numbers during analysis for patterns. Patterns will then be stated in numeric form such as the number of patterns observed (Blaxter et al., 2006).

The most important thing about quantitative data and (data in general) is that it can only inform you if you know how it was collected and also how to interpret it (Blaxter et al., 2006). The next sections provide important information about the types of data and how it is analysed.

4.7.1.1 Quantitative Data

There are four different types of quantitative data (Blaxter et al., 2006: 217), (Oates, 2006: 247) namely nominal, ordinal, interval and ratio or NOIR (Rose and Sullivan, 1993: 18), as discussed in the following sections. Quantitative data analysis is a very specialised and complex process especially to those who have not done basic statistics. The use of software packages cannot replace the required statistical skills that are required to interpret quantitative data. The importance of this is as noted by Robson (2002: 393) who stated that

> *"It is unfortunately, a field where it is not at all difficult to carry out an analysis which is simply wrong, or inappropriate, for your data or purposes. The negative side of readily available analytic software is that it becomes much easier to generate elegantly presented rubbish" (Robson, 2002).*

This point illustrates the need for a researcher to understand what the results of test results produced by a statistical package really mean. It is important to note that irrespective of how complicated the statistical analysis is performed, the primary role in data analysis remains to be to describe and explain variation in the data (Rose and Sullivan, 1993: 70).

Nominal

Nominal data is data that is used to differentiate categories. This type of data is sometimes called categorical data (Rowntree, 2004: 29), (Saunders et al., 2003: 329). The actual number assigned to a category has no numeric value hence no mathematical operations can be done on it. The numerical value assigned is used to describe the category. For example Female = 1 and Male =2. Working out an average of these values will not have any meaning; also these numbers do not imply any order. The only analysis that can be done on nominal data is how many responses are in each category i.e. frequency.

Ordinal

In ordinal data, numbers are allocated to a qualitative scale. The data is obtained by giving order to some categories or by ranking them (Rowntree,

2004: 30), (Saunders et al., 2003: 329). An example of this type of data is exam results which can be classified as 1, 2 or 3. This represents some form of order as students who got 1 did better than one who got 2 or 3, but it does not indicate how much better. Very limited mathematical operations that relate to order are possible with ordinal data.

Interval

Interval data is like ordinal data but numbers are assigned against a quantitative scale. This type of data is sometimes called continuous data (Rowntree, 2004: 32), (Saunders et al., 2003: 329). This type of data is obtained by carrying out a form of measurement. In the quantitative scale it is possible to work out the intervals and differences. It is possible to do addition and subtraction but not multiplication or division. There is no true starting point for assigned numeric values.

Ratio

Ratio data is like interval data except here there is a true starting point. This is also called discrete data (Rowntree, 2004: 33), (Saunders et al., 2003: 329). This type of data involve a form of counting to obtain for example age, population, number of employees, number of hours worked. With ratio data, addition, subtraction, multiplication and division can be performed on the data.

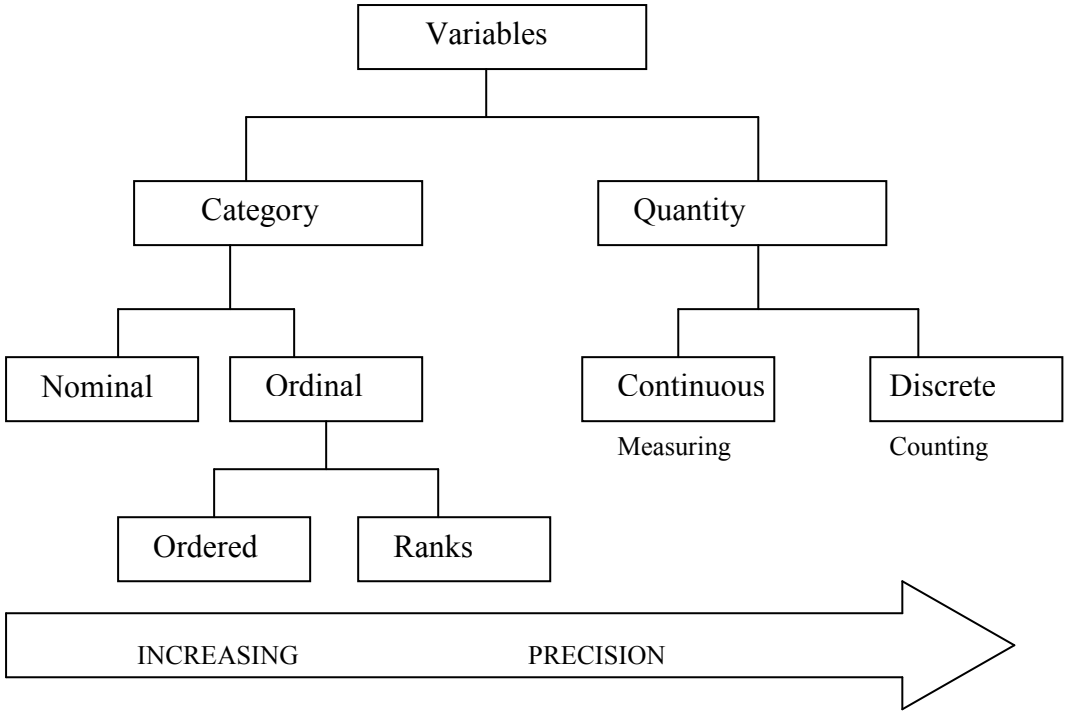


Figure 4.12 Research Variables classification (Rowntree, 2004: 33), (Saunders et al., 2003: 330).

There is some sort of order in research variable classification if the variables are taken in the order nominal, ordinal, interval and ratio. All of these provide a form of classification, but differ in order, distance and presence of absolute zero as shown in Table 4.5.

Level	**Classification**	**Order**	**Distance**	**Non-arbitrary zero**
Nominal	√	X	X	X
Ordinal	√	√	X	X
Interval	√	√	√	X
Ratio	√	√	√	√

Table 4.5 Relationship between the four types of research variables (Rose and Sullivan, 1993: 18)

For this research the data obtained was categorical data. Although this is the least precise form of measurement (see Figure 4.12), it was used for this research as the research is exploratory. Also it is a quick way of collecting data. Since the data collected was categorical data it meant that there was limited statistical analysis that could be used to analyse it. The most important analysis to do was establishing relationships between variables as well as frequency of

variables. Chi square test was used to test association or contingency between variables (Saunders et al., 2003: 357).

The coding of data for this research is as shown in Appendix E, F and G. For each area, frequency runs were generated for the various variables. Each area had numerous variables. There were 28, 24 and 27 variables for customer satisfaction, employee relations and user satisfaction respectively.

4.7.1.2 Qualitative Data

Qualitative data in this research was for variables computer use and functionality. A sample of the form use to collect this data is as shown in Appendix I.

The bulk of data collected was quantitative data. For this type of data quantitative analysis methods were used. Oates (2006) stated that to describe the central tendency of data, graphs, mean, median and mode statistical functions can be used. Also quantitative analysis can be used to determine the type of relationship that may exist between variables. The relationship will be to find out how the increase in one variable affects the other. Spearman's correlation test is used for ordinal data and Pearson's test for interval and ratio data. Relationship between variables does not mean that one variable causes the other.

To determine if any relationship is not just by chance, statistical significance tests can be used. The most commonly used test for significance level is the chi-square test. This is because the chi-square works with all kinds of data nominal, ordinal, interval and ratio (Oates, 2006: 259).

4.8 Primary Data Collection

Primary data is data that is collected specifically for research under investigation. This is the data about the variables that have been found to be worth exploring.

Data for this research was collected in Gaborone, the capital city of Botswana. Gaborone was selected because it is the capital city and location for head offices of all government departments. Also it has a population which is cosmopolitan as people from all over the country come to Gaborone looking for jobs. The population of Gaborone is therefore the best representation of people of different tribes, regions and ethnicity that make the nation of Botswana. Sampling of the population needs to be done in such a way that it resembles as far as possible the characteristics of the population. This is done in order to be able to generalise the results obtained from the sample to the population (Salkind, 2004: 104).

There are also a significant number of foreign nationals in Gaborone who are attracted by the opportunities provided by fast growing economy. The current problems in Zimbabwe have lead to a lot of Zimbabweans nationals coming to Botswana. This research did not differentiate citizens or non-citizens as they both interact with government services in one way or the other. The results of this research therefore do not reflect the views of the entire citizens of Botswana, but of the general population in Gaborone.

The second part of literature review was conducted in Botswana just before conducting field work. This focused on any publications on what has been done within the country related to ICT deployment and use. Almost simultaneously with this Botswana literature review was application for research permit as described in the next section.

4.9 Ethical Issues in Botswana

In Botswana, everyone is expected to apply for a research permit before they can conduct any research in the country. This is an ethical issue but it also benefits the research community as it stipulates that any publication resulting from the research must be deposited with the main library in the country. This provides a source of reference for other researchers. Unfortunately, a research permit was granted by only two of the three departments that were targeted.

Getting the research permit was a bureaucratic process. In the past, research permits were applied for and issued by the Office of the President. However, at the time when the applications for this research were made this had been changed and permits were now applied and issued by permanent secretaries of the relevant ministry which is subject of research. Unfortunately, follow up had to be made and it emerged that a lot of departments were not yet aware of the changes in the issuing of research permits.

4.10 Questionnaire development

A set of questionnaires were developed to capture information for some of the variables as shown on Table 4.6. Questionnaires were developed to cover all the satisfaction themes while semi-structured interview was used to cover the remaining themes of status of computing facilities and functionality. The development of the set of questionnaire was an iterative process as it involved working with supervisor to check validity of the questions. Final questions were arrived at after several iterations of feedback from supervisor. The only method of communication with supervisor was through email. Since email communication is not verbal there were times where it was clear that verbal communication remains the most effective means of communication. Also there is a time delay in sending and getting feedback which at times was lengthy.

For employee relations, the Guest and Conway (1998) instrument was used after modification to suit this research. Permission to use the questionnaire was granted by CIPD (Appendix C). For user satisfaction, SERVQUAL was used, also after modification.

Satisfaction				
Customer	**Employee**	**User**	**Computer Status**	**Computer Functionality**
Gender	Gender	Gender	Staff:Computer Ratio	Time Frame
Education	Education	Education	Cost	Computer Specification
employment	Fair Treatment	Computer Use Experience	Skill Development	Disk Space
government employees	Reward	Rate of Computer Use	Use	Internet Access
queuing	Direct Participation	Computer Training		
complain	Trust & Fairness	Computer Skills		
information technology	Commitment to Department	Computer Use		
Age	Employee Relations	Reliability		
internet	Motivation	Responsiveness		
	Citizenship Behaviour	Assurance		
	Age	Empathy		
		Age		
		Home Computer		
		Home Internet connection		
		Low home internet connection		

Table 4.6 Research Themes and Variables for Data Collection

4.11 Questionnaire Administration

Questionnaires were administered in two main areas. For customer satisfaction the questionnaires were administered to selected areas of Gaborone. For employee and user satisfaction the questionnaires were administered to the head office of two government departments based in Gaborone from whom permission has been granted (See Appendix B).

4.11.1 Customer Satisfaction

The administration of the questionnaire took place at 90 different locations, among members of the public living in Gaborone. Only people who were 16 years or older were included in the study. This is because the legal maturity age in Botswana is 16 years. Gaborone has an estimated population of 186007. The population is also fairly balanced in terms of gender with male being 91,823 and female being 94,184. according to (CSO, 2001). Gaborone was selected as a case study because it has the best information technology infrastructure in the whole country, a phenomenon which is common in many African countries (Petrazzini and Kibati, 1999:36). A sample of the population of Gaborone was selected based on the localities of the town as were defined by the last

population and housing census. The areas which were excluded were military locations, locations with less than 100 people and those outside the greater Gaborone area for example Phakalane suburb. This resulted in 90 localities to be covered. Using (Genesee, 2006) the sample size of the population at 95% confidence level and marginal error of ±3 was calculated to be 892. Using this sample size, the sample size for each of the 90 localities was determined to be 10. This means that in each locality only 10 people were asked to complete the questionnaire.

To cover the various localities of Gaborone in order to get the required sample size of 892, two research assistants were employed. The research assistant went on a two day training session to gain an understanding of what the survey was about as well as how to approach any difficulty they may meet during the house to house collection of data. The most important point that was emphasised to the research assistants was to respect participants and their property and that participants have the right to refuse to take part. The research assistants had to negotiate access and sell the idea of the survey.

A field training exercise was arranged where the research assistants observed how the principal researcher conducted the survey. Each participant was also given the chance to practice. Corrections were made on the spot to help the research assistant. It also emerged during the practical exercise that the employment variable options did not cater for students. Gaborone has a fairly large number of students at tertiary institutions staying in private accommodation. As the questionnaires had already been copied, it was decided to request those who indicate to be student to write so under employment. This also had similar effects on internets access as where a respondent was a student their internet access was mainly at college. Place to indicate that a respondent had no internet access was also missing. This was solved by requesting respondents to write these down. From the results of practical exercise it was apparent that the maximum number of people to be covered in a day was 40. This figure was arrived at by discussing it with the research assistants, based on their experience during the practical day. This was also to allow for movement from one location to another. Where geographical areas were a distance apart, the principal researcher transported the research assistants to reduce travelling time. Research assistants worked weekdays

Monday to Friday for a total of 10 days and had a fixed pay rate of P55 (about £5) per day. This rate was provided by the University of Botswana which funded the data collection exercise.

To monitor progress and detect any errors, brief meetings were held at the beginning of each day to plan for the work of the day and also discuss problems encountered and how to tackle them. At the end of each working day the principal researcher collected responses for that day and quickly looked through the collected data to detect any immediate problems. Also random visits to the researchers were made to check their progress. Through this arrangement the principal researcher was able to monitor progress and maintain a certain degree of control. The biggest problem with the use of research assistants is that their involvement is for a short period of time and they are not accountable to the whole project. This was borne in mind when choosing research assistants to employ. The selection was based on references received from their last place of employment.

4.11.2 Employee and User Satisfaction

For the employee and user satisfaction survey, although initially the plan was to choose three departments as case studies, research approval was only granted from two departments. The two departments which issued research permits were the Department of Road, Transport and Safety (DRTS) and the Department of Civil and National Registration (DCNR). Employee satisfaction covered all the employees in a department while user satisfaction involved only those who use computers. As almost every employee has access to a computer, the majority of employees were to complete both. However there were still some who do not use computers at all, for example registry sections. To reduce time spent completing the questionnaire by the employees, the two survey forms were issued on different dates.

Department of Road, Transport and Safety (DRTS) is under the Ministry of Works and Transport. It is responsible for registration and licensing of vehicles, issuing of drivers licences as well as safety and other transport related services. According to DRTS (2007), in May 2007 there were 275 818 vehicles registered in Botswana. With a population of about 1.8million, this gives Botswana a per capita of one vehicle for every six people. This far exceeds the figure for developing countries of 1 vehicle to 700 and is similar to that of developed

countries (Swira, 2006: 1). The high number of vehicles poses a lot of administration challenges and this lead to the development of the computer based information system. The department uses a computer based system called Vehicle Licensing and Registration system. This system has been in use for sometime and covers the entire country. The department has 25 offices and 4 agencies with postal services offices across the country. The department has its own website which is probably among the best of Botswana government departmental websites. DRTS website goes beyond providing vital information and other descriptive statement of the department. It is possible to generate statistics from the website as well as download some information from it. For example it provides the latest transport cost and routes for majority of areas in the whole country. The website is almost capable of providing forms to download or complete online. Why this is not done is mainly due to political and administrative reasons and not for lack of technical expertise.

DRTS has about 269 computers installed among the 25 offices across the whole country. The head office in Gaborone has about 70 of the 269 computers. Each of the 25 offices has internet access and email facilities. All the computers can be remotely accessed from the head office in Gaborone for system maintenance and user support. Email is used as the main form of inter-departmental communication. The total number of employees in the whole country is about 450. Of this figure about 120 work at the head office in Gaborone and the nearby three stations located within the Gaborone area to reduce congestion at head office.

The Department of Civil and National Registration (DCNR) is under the Ministry of Labour and Home Affairs. The department is responsible for, among other things, registering all Botswana citizens aged 16 years and above. Registration of citizens uses a computer system called the National Registration System (Omang). This system has been in operation since 1998. The department also registers births and deaths and produce birth and death certificates. This also uses a computer based system. Currently the department does not have its own website as compared to DRTS.

DCNR has 90 offices covering the whole country. There are about 200 computers distributed among the 90 offices. Head office in Gaborone has a total of 60 computers. The 60 computers at head office are distributed in such a way

that 30 computers are in offices and the remaining 30 are in two data entry computer laboratories.

The two departments were selected as cases because they have had computer systems in place for a fairly long time. This offers the opportunity to find out their employees perceptions and views on the effect of such systems in their working lives. Other government departments are gradually implementing computer based systems as can be observed from tender jobs being advertised on the Botswana government website (Botswana, 2007b).

Questionnaire administration in the two departments was done using two approaches, namely, complete on the spot and deliver/collect later. Questionnaire administration in the two departments was done by the principal researcher as this required extra care and also the population of the sample was not very large.

For DRTS the method of complete on the spot was used. This approach had two major advantages. It offered the opportunity to check for incomplete sections. It also enabled face to face communication where the researcher was able to negotiate for time to be spent in completing the questionnaire. The main disadvantage with this approach is that it takes time, moving from office to office and also people feel pressurised to complete the questionnaire.

The second approach of deliver and then collect questionnaire later was used in DCNR. The main advantage with this method is that it gives participants time to think over their responses. However its main disadvantage is that very few people will have completed the questionnaire by the collection date. In most cases questionnaires were displaced or people were not in the office at the collection date. Spare questionnaires were always made handy during collection time so that any misplaced ones could be replaced. Few questionnaires were completed on the completion date; hence the method does not have a very good response rate.

4.11.3 Computer Information

Data was also collected regarding the use of computers. With almost every employee able to access at least one computer it is important to find out the rate of use of computers. The capacity of hard disk of a computer and how

much of it was used was one of the variables on which data was collected. See Appendix H for a sample of forms used to collect computer information.

4.12 Results of Data Collection

The response rate for the various questionnaires differs as shown in Table 4.7. Customer satisfaction was the best, as it was possible to get the required number of the sample size. A system of forced sample size was used where a specific figure had to be achieved per location. Under this approach a researcher approaches participants to reach a particular target number, in this case 10 completed questionnaires per location. By nature, the people of Botswana are open and cooperative, it is considered rude to turn someone away from your house without talking to them. This cultural value facilitated access to private homes to have questionnaires completed. Each questionnaire was completed on the spot to avoid a return journey. Also people had time to respond to questionnaire as they were under a free environment that they can control as compared to work. Another major factor is that English is an official language and is taught from primary school level; hence the majority of the population can read and write in English. This has a significant factor as there was no need to translate the questionnaire to native language, as meaning can be lost in translation. The problems associated with translation of survey questionnaires has also been observed by Behling and Law (2000: v). Botswana's literacy rate of about 81% according to (WORLDBANK, 2007b) , was illustrated by the majority of participants being able to complete the questionnaire by themselves.

		No. of Responses			
		Employee Satisfaction		**User Satisfaction**	
Department	**No. of Employees**	No	Response Rate %	No	Response Rate %
DTRS	120	40	33	56	47
DCNR	70	24	34	25	36

Table 4.7 Response Rate for Employee and User Satisfaction

An open ended question was given to a sample of employees at various levels of management for each department. This targeted 5, 10 and 25 people at senior, middle and below respectively. These figures were determined arbitrarily based on small population in each department of not more than 120 and also on the fact that it forms the pyramid structure of a typical government department.

The responses for these were very low compared to the survey responses; they were 7 and 9 for DRTS and DCNR respectively.

The responses for these were low probably because this required participants to think instead of choosing and ticking boxes as in the survey, which can take time. Low response rate was particularly experienced from senior management. This low response rate from senior management was also reported by Kgakge(2002) where only 3 responses were received from expected 29 senior management. Senior management are always involved in "*meetings, which run almost everyday*" (Kgakge, 2002: 12).

4.13 Problems Encountered During Data Collection

There were problems encountered during data collection. It is worth reporting these problems as they have an input on the quality of data that was collected. This is not a very interesting thing to write and often research reports do not report

> *"… difficulties, choices and compromises, since researchers want their work to appear as flawless and well-reasoned as possible" (Attewell and Rule, 1991: 299).*

It is however important to report on these unexpected realities so that future researchers will avoid them. Also these give any potential users a picture of how best to rely on the results obtained. On research like this which may influence policy changes, it is worth knowing any difficulties and measures taken to address them during data collection.

Initially the plan was to have three departments used as case studies. However research permit was only obtained from two. To try and win support of each department, a visit was arranged to meet relevant authorities. However the main contact person in every government department is permanent secretary, as a person at that level is in charge of all activities within a department. It is only when a permanent secretary has given a go ahead that a department can be approached. It was not possible to meet any of the three permanent secretaries, but I asked to submit my application for research permit. There is a very slow progress to respond to correspondence. After numerous further follow ups, the two approvals were granted. Attewell and Rule (1991) observed some studies where over 80% response rate was achieved, but at a cost of 40 hours per week of research assistant time for more than 12 months. Even in the

department where approval was not given, it was more of lack of who should act on the request rather than rejection. It became clear while I was following this issue up with the department that no one took it as their responsibility to act on this. Although I could have appealed about lack of action by this department, it was best not to complain so that I did not upset the very people from whom I needed information. Also this would have pressurised them to act, which is what I did not want as I wanted information to be given freely and honestly.

4.14 Secondary Data

Secondary data refers to data obtained from literature. This was obtained from international organisations such as UNDP, World Bank, World Economic Forum etc. Secondary data obtained from these sources was that which was found to be related to the topic under investigation. Secondary data is useful as it was not economically possible to collect primary data from all the possible sources during the period of this research. Secondary data was collected from the various sources and used to compare Botswana with other countries as described in Section 3.7

4.15 Summary

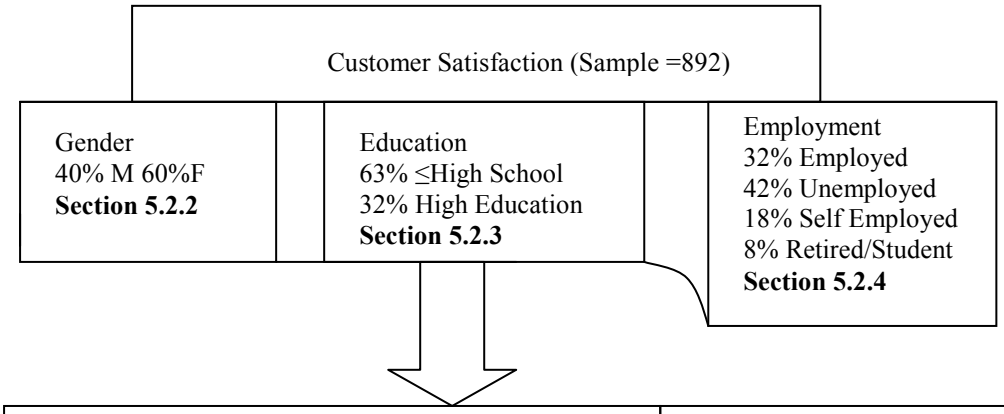
This chapter has described the concept of research methodology in general. It then went to explain the various research methods, their advantages, disadvantages as well as when each method can be applied. This lead to justification of research methodology adopted for this research. The overall research methodology for this research has also been developed. The various research variables that the research investigated have also been identified. Successful ICT utilisation and criteria were developed from literature covered in previous chapters. The many and varied instruments that were used to collect primary data for this research have been described in detail. The way primary data was collected during field work in Botswana and the problems experienced have also been covered in this chapter.

The next chapter discusses the results of the variables on which quantitative data was collected namely customer satisfaction, employee relations and user satisfaction. It is a summary of descriptive statistics that has been used to analyse and summarise the results.

CHAPTER 5: DATA ANALYSIS

5.1 Introduction

In this chapter, analysis of primary data that was collected for this research is presented. The bulk of the data is quantitative data and would be analysed using SPSS version 15 which was installed on the University of Salford network. Descriptive analysis is used due to the fact that collected data was categorical in nature



Chapter Section & Variable		Status	
		Satisfied	Dissatisfied
5.2.5 Quality of service		√	
5.2.6 Helpful & friendly		√	
5.2.7 Employee knowledgeable		√	
5.2.8 Quality of advice		√	
5.2.9 Amount of attention		√	
5.2.10 Efficiency of processing		√	
5.2.11 Queue frequency			√
5.2.12 Time in queue			√ ≈ 1 hour
5.2.13 & 5.2.14 Queue management			√
Complaint	**5.2.18** Acknowledgement	√	
	5.2.19 Response	√	
	5.2.20 Time taken		√
	5.2.21 Resolution	balanced	
Computer	**5.2.23** Availability in Government	Yes	
	5.2.23 Used to serve you	Yes	
	5.2.24 Contribution to service	Improve	
	5.2.26 At home	Low 28%	
Internet	**5.2.25** Access	Cafes and college	
	5.2.26 Reason for low internet access	Cost	

Figure 5.1.1 Customer satisfaction results overview

5.2 Customer Satisfaction

5.2.1 Introduction

Demographic profile of customers that was captured in the questionnaire were gender, education level and employment status (Appendix E). These demographic variables will be cross tabulated with the non-demographic variables to establish any relationship between them.

5.2.2 Gender

Customers were slightly unbalanced with 40% and 60% for male and female respectively as shown in Figure 5.2.1. This is despite the almost gender balanced nature of the Gaborone population of 49% and 51% male and female respectively according to the 2001 population and housing census (CSO, 2001). It must be noted that the latest population census took place almost six years prior to the survey for this research. Hence there have been changes in the dynamics of population since that time. Also census figures include head count i.e. every human being is included irrespective of their age while for this research only included people who are above or equal to the legal age of 16 years.

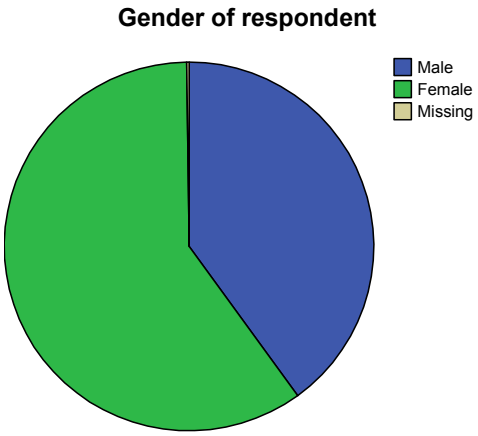


Figure 5.2.1 Gender of respondents

5.2.3 Education Level

Botswana has invested significant financial resources in providing education since independence. Currently the Ministry of Education is allocated 8% of the national budget (Gaolathe, 2007: 25). There have been only two national literacy rate survey undertaken in the country. The first was in 1993 and was followed by the 2003 survey. These two studies showed about 12% increase in national literacy rate from 68.9% in 1993 to 81% in 2003 (CSO, 2004). Of the people sampled in this research about 37% had attained at least certificate level education or above and only about 8% were below the lowest education level of primary education as shown in Figure 5.2.2.

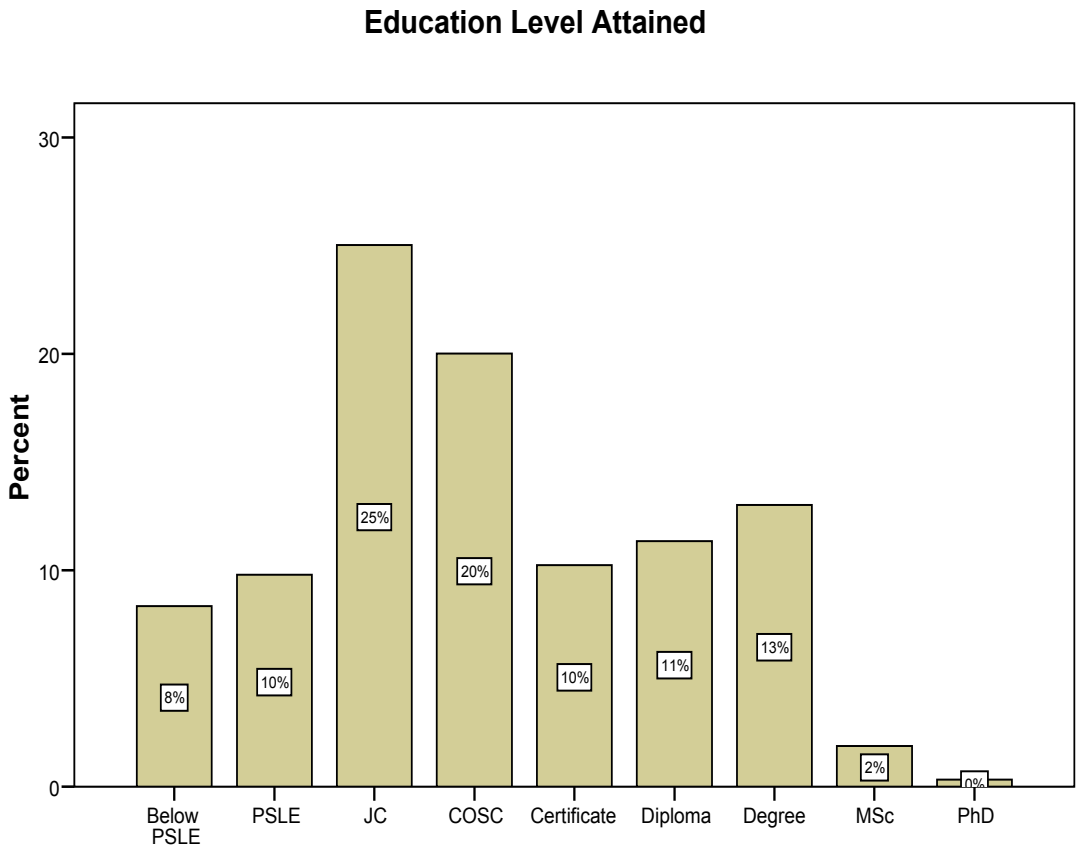


Figure 5.2.2 Education level of respondents

5.2.4 Employment Status

Employment status was included in this research as employment is a way of earning a living, hence high unemployment may manifest itself in a number of ways such as social insecurity, crime etc. Therefore customer dissatisfaction

might be used to indicate frustration with lack of employment opportunities. There are not many employment opportunities in Botswana. The country does not have a large industrial base. This is despite the fact that it has a small population which has been and continues to be educated. According to the latest estimate of formal employment in Botswana, the government is the second largest employer employing about 37.9% of the workforce (CSO, 2008: 1). Although the private sector is estimated to be the highest employer, considering that the private sector employment is not as secure and also salaries are fairly low, this makes the government the largest employer in terms of secure job and better wages. Employment in the private sector is dominated by the wholesale and retail industry which is one of the lowest paying industries according to CSO (2008: 6)

There have been efforts to promote self employment, but this is often at small micro-enterprise level. Figure 5.2.3 shows employment status of respondents. For the sample of this research, unemployment is very high at 42% with about 32% indicating that they are employed. For the whole country unemployment is currently estimated to be about 31.6% (CSO, 2008: 8). Self employment accounted for about 18%. These are the people who may seek service and information from government institutions as part of their business operations.

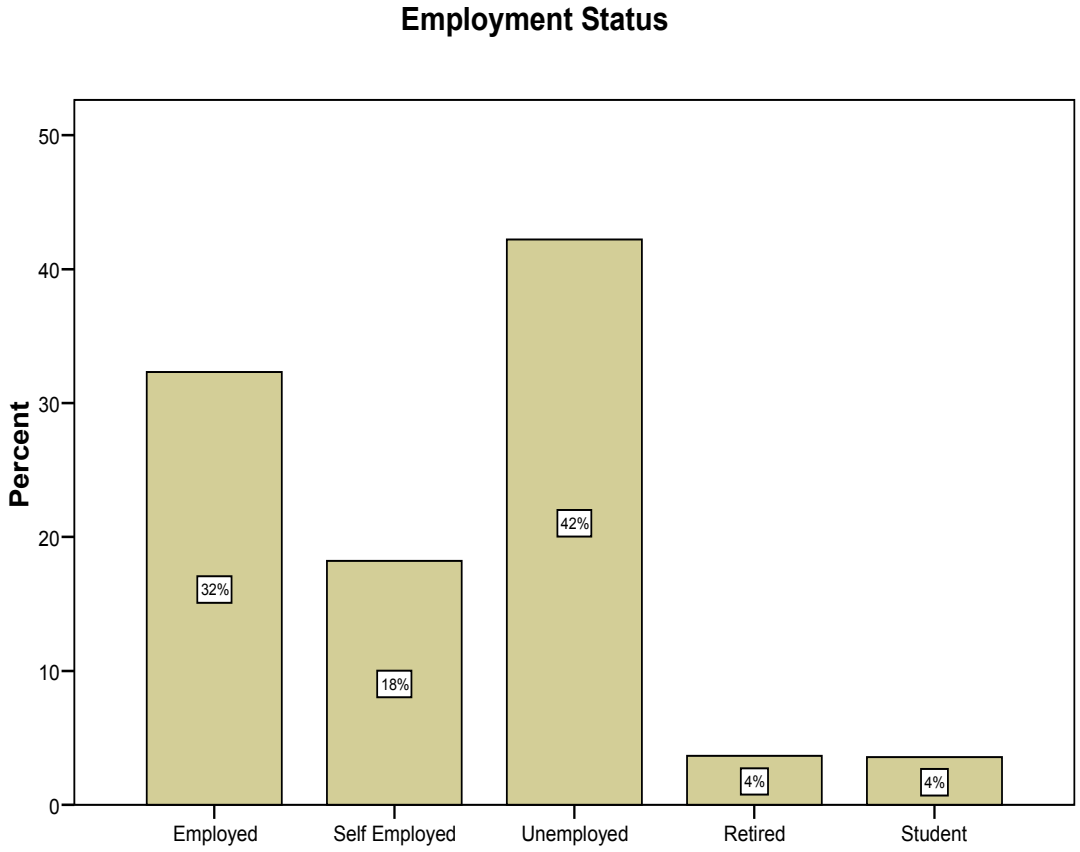


Figure 5.2.3 Employment status of respondents

The difference between the national estimate of unemployment rate and the results of this research might be due to the fact that the sample for the national survey covered the whole country while this survey only included residents of Gaborone, the capital city. The capital city attracts a lot of job seekers, hence there are likely to be more unemployed people in cities than in rural areas.

5.2.5 Overall Quality of Service

This question was asked to establish the overall perception of quality of service among respondents. Specific attributes about quality of service are discussed in the subsequent sections to this.

Figure 5.2.4 shows the results for each category which establish the level of satisfaction or dissatisfaction. From the results about 60% of respondents showed that they were satisfied. However the largest portion of the sample was on the fairly satisfied scale. While this is better than dissatisfied, it still indicates

that respondents were not extremely satisfied, which is the level government is aiming for (BOPA, 2006a).

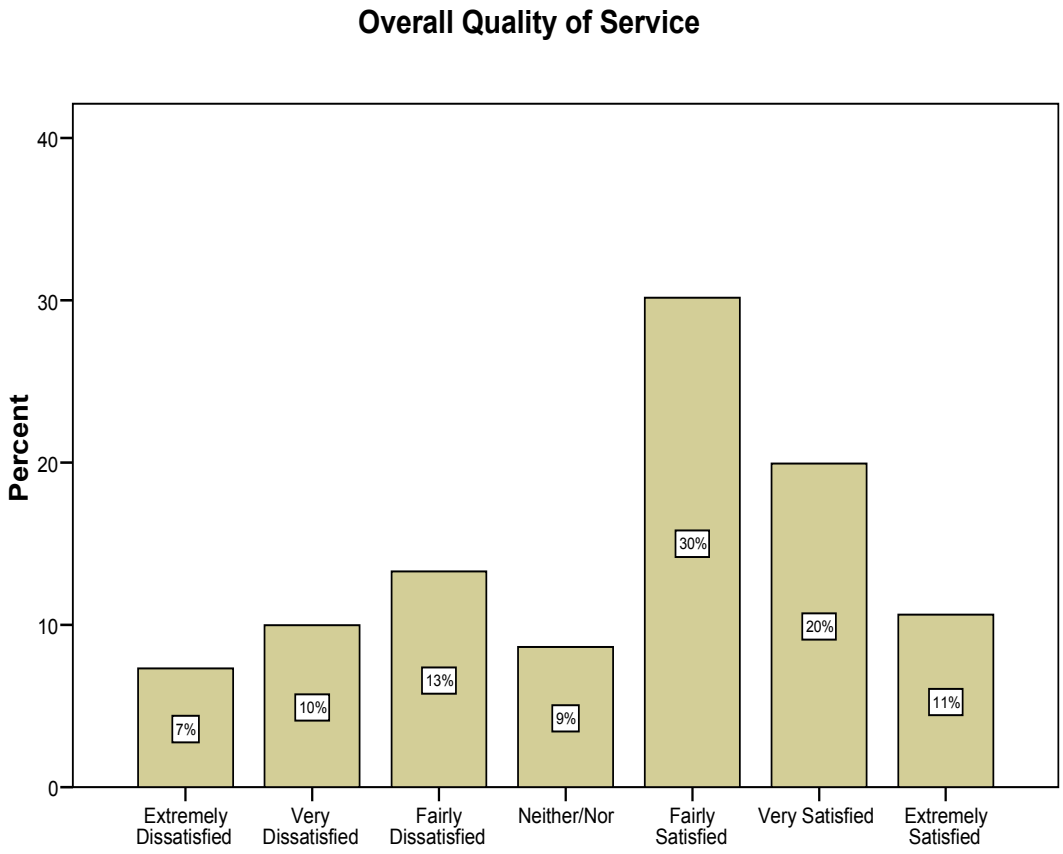


Figure 5.2.4 Satisfaction level with quality of service

5.2.6 Helpful and Friendly

Members of the public go to government departments to seek service that is meant for them. While receiving this service, they develop perceptions about how helpful and friendly the government employees serving them were. This is a common thing that people do when they interact; they develop certain beliefs about those they interact with. This is purely subjective as it is difficult to know the key factors that individual base their judgements on. However the numeric strength of reports of being unhelpful or unfriendly can indicate that there is a problem. Hence quantitative data was collected from customers to estimate the level of satisfaction with this phenomenon. The results on the level of satisfaction regarding government employees being helpful and friendly are

shown in Figure 5.2.5. It is clear from the figure that the majority are happy with this aspect. However the level of satisfaction is highest for being fairly satisfied at 29%.

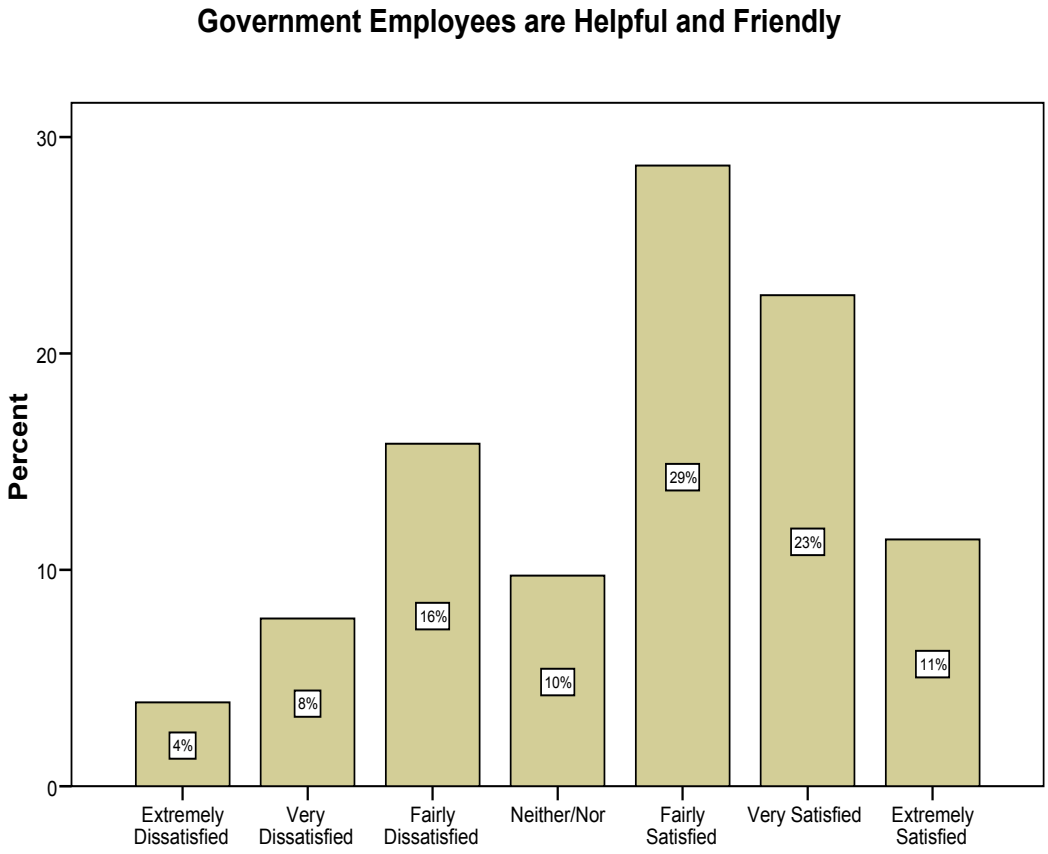


Figure 5.2.5 Customer Satisfaction with Employees being Helpful and Friendly

It is important to understand how employees are being perceived by customers. This is because this is more of an attitude behaviour which ICT may not help to solve. However, by understanding that this problem exists, possible intervention measures can be developed to address it. In the private sector, the existence of such a problem may lead to financial loss to an organisation when customers move to the competitor for the same service or product.

5.2.7 Employees Knowledgeable

Quality of service is also related to how a customer perceives the status of knowledge of the person providing the service. Where an employee is less knowledgeable or does not have control, customers can detect this. Figure

5.2.6 shows the results of establishing level of satisfaction of respondents on employees display or action that show how knowledgeable they are. The majority of respondents, about 66% expressed being satisfied with level of knowledge displayed by employees. The highest category is those who felt very satisfied with almost 28%.

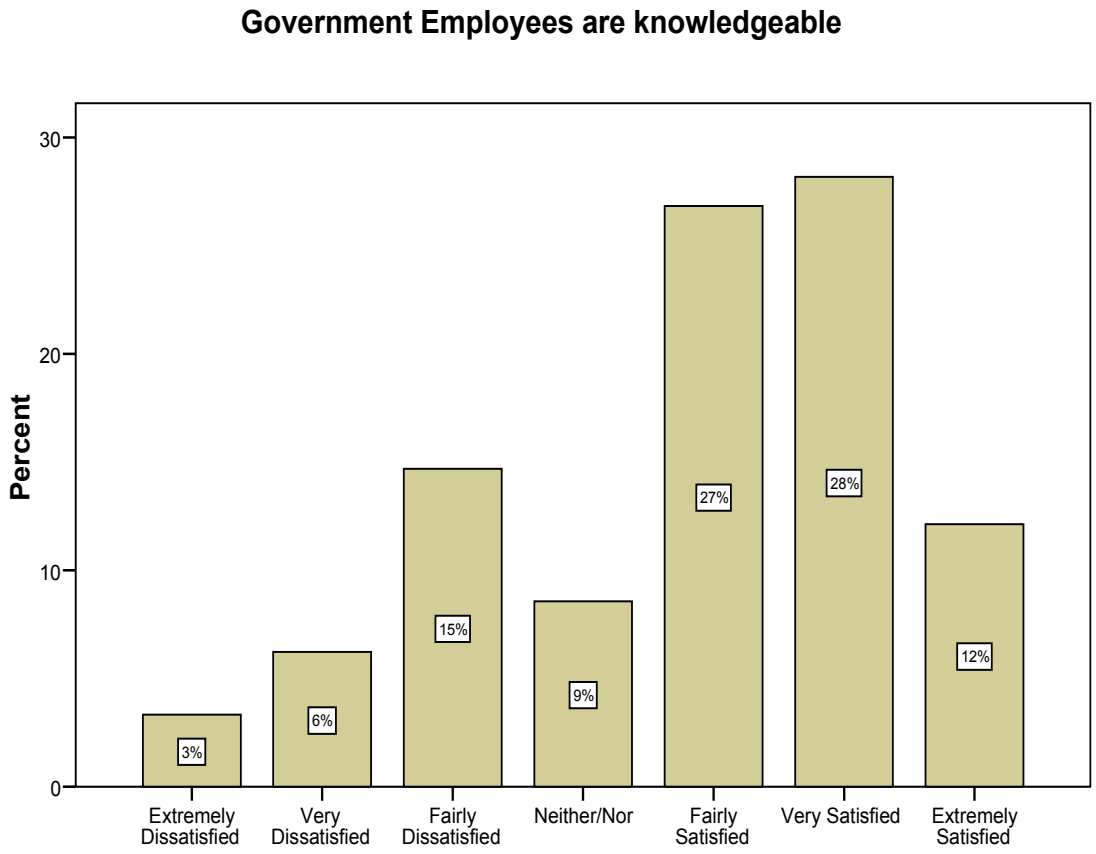


Figure 5.2.6 Satisfaction with knowledge of employees

5.2.8 Quality of Advice Given

One of the roles of employees of Botswana government is to offer advice to customers. This might range from directing them to another department/ministry or giving them advice on the best way for them to get the information they require. The majority of respondents reported being satisfied with advice given at about 61%. Very satisfied category recorded about 25% of respondents and was the category with highest value, fairly satisfied follows, with about 24%.

Quality of advice has a link with ICT applications. ICT applications have the potential to allow employees to compile information and respond appropriately to meet customer requests without having to go through paper files.

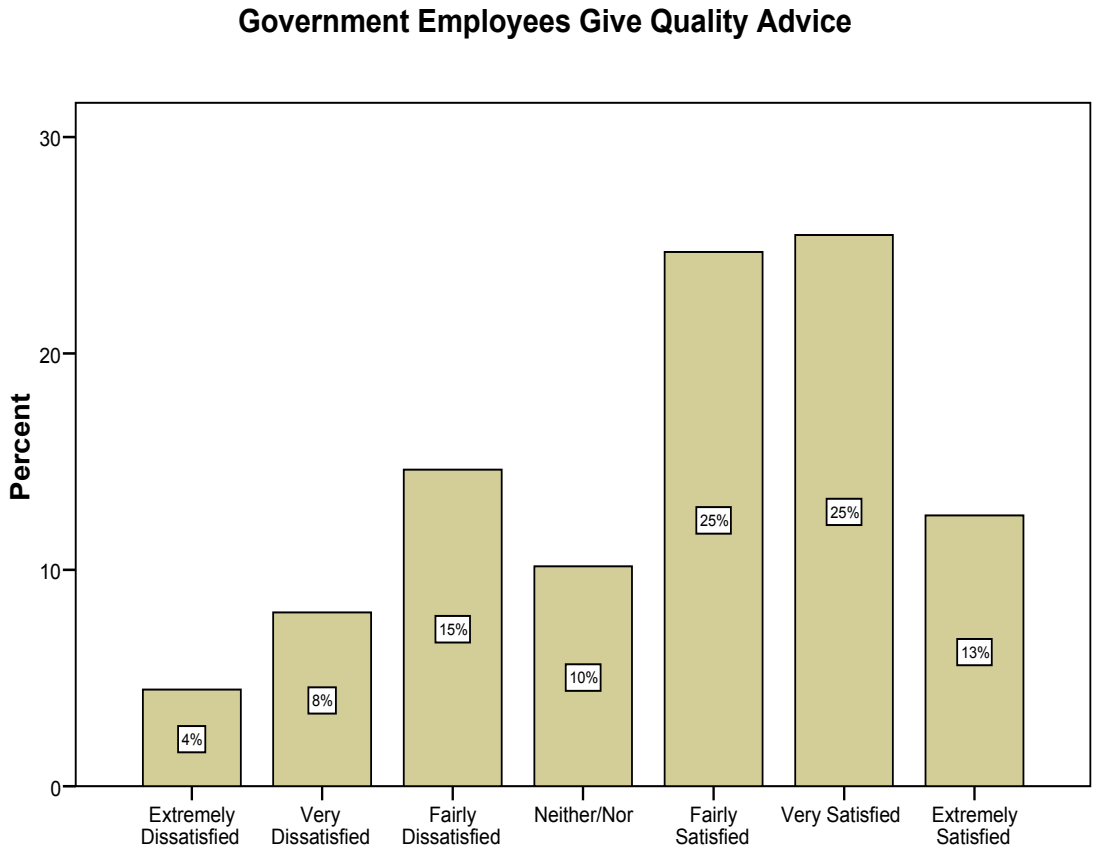


Figure 5.2.7 Satisfaction with quality of advice given

5.2.9 Perception of Amount of Attention

Customers develop perceptions about the amount of attention they are given when facing an employee. There are a number of factors that may relate to this. However to a customer, it is most noticeable when attention to their request is interrupted by other things such as the employee attending to a phone call without due regard to the customer. On this question, about 47% of respondents expressed satisfaction compared to about 42% who reported dissatisfaction. On individual categories of satisfaction level, highest responses were in fairly satisfied with about 22% and fairly dissatisfied with about 21%. Figure 5.2.8 shows responses to this question.

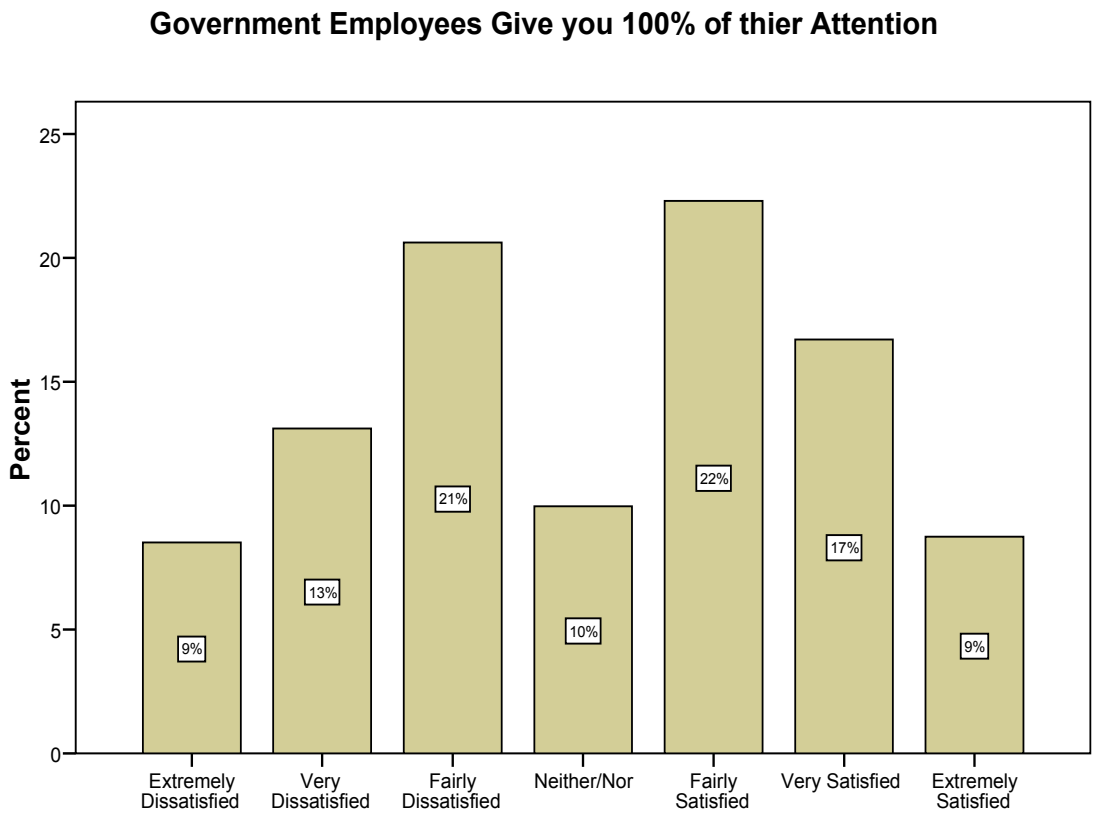


Figure 5.2.8 Satisfaction with attention given

The results of this question shows an almost normal distribution of responses if neither/nor is ignored. This shows that it was not easy for respondents to state clearly whether they are dissatisfied or satisfied. For the previous questions responses were clear as they were skewed to one of the sides.

5.2.10 Efficiency of processing requests

This question was aimed at determining the level of satisfaction that respondents perceive towards the way their requests are processed. Since the majority of employees posses higher education qualifications (see Section 5.3.3), theoretically there must be higher efficiency in addressing customer requests. From the sample, about 55% of respondents expressed satisfaction with efficiency of providing service. The category with the highest score is fairly satisfied with about 25% of respondents. The least category is extremely dissatisfied with about 7% of respondents as shown in Figure 5.2.9.

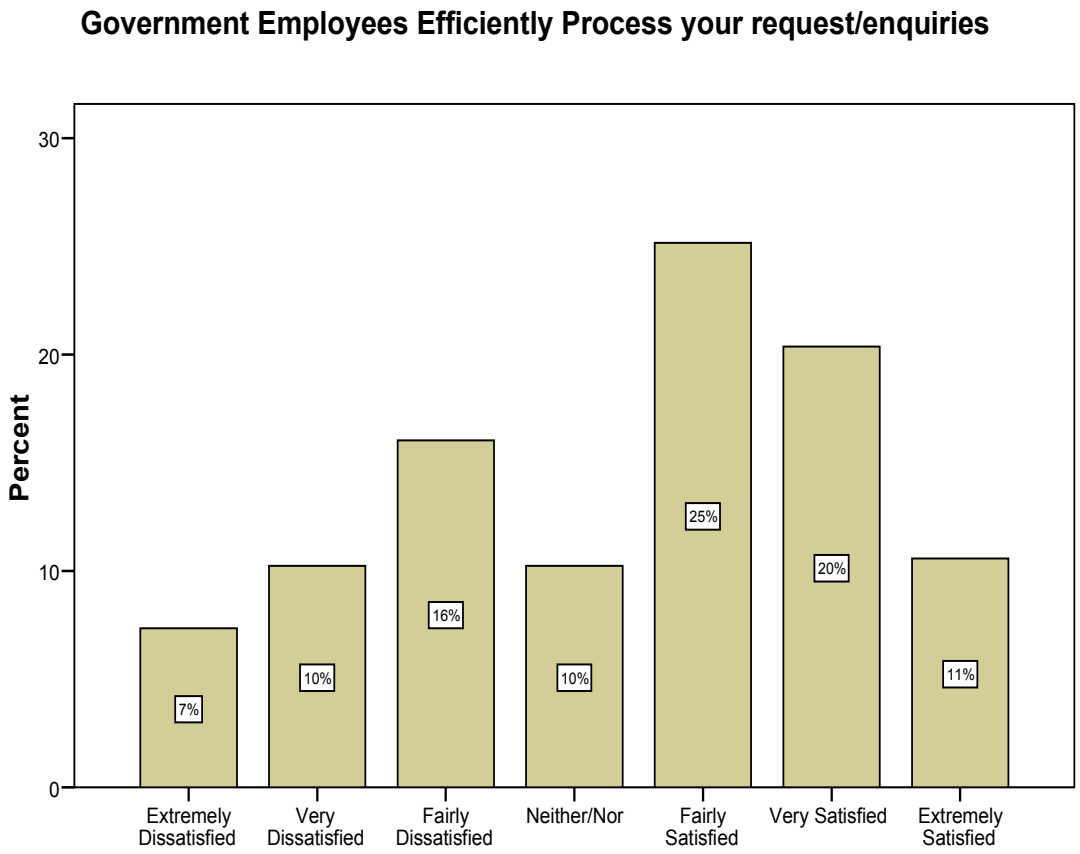


Figure 5.2.9 Satisfaction with efficiency of processing requests

5.2.11 Satisfaction with queue frequency

Forming a queue when seeking a service is an acceptable, fair system that ensures that those who make an effort to come early get the benefit of doing so, hence the expression, first come first served. However customers do not like queuing (Davis and Heineke, 1994: 21). The results of this research also confirm this as about 58% of respondents indicated that they were dissatisfied with having to queue. Infect being very dissatisfied alone accounted for about 22% of respondents, when looking at all categories as shown in Figure 5.2.10

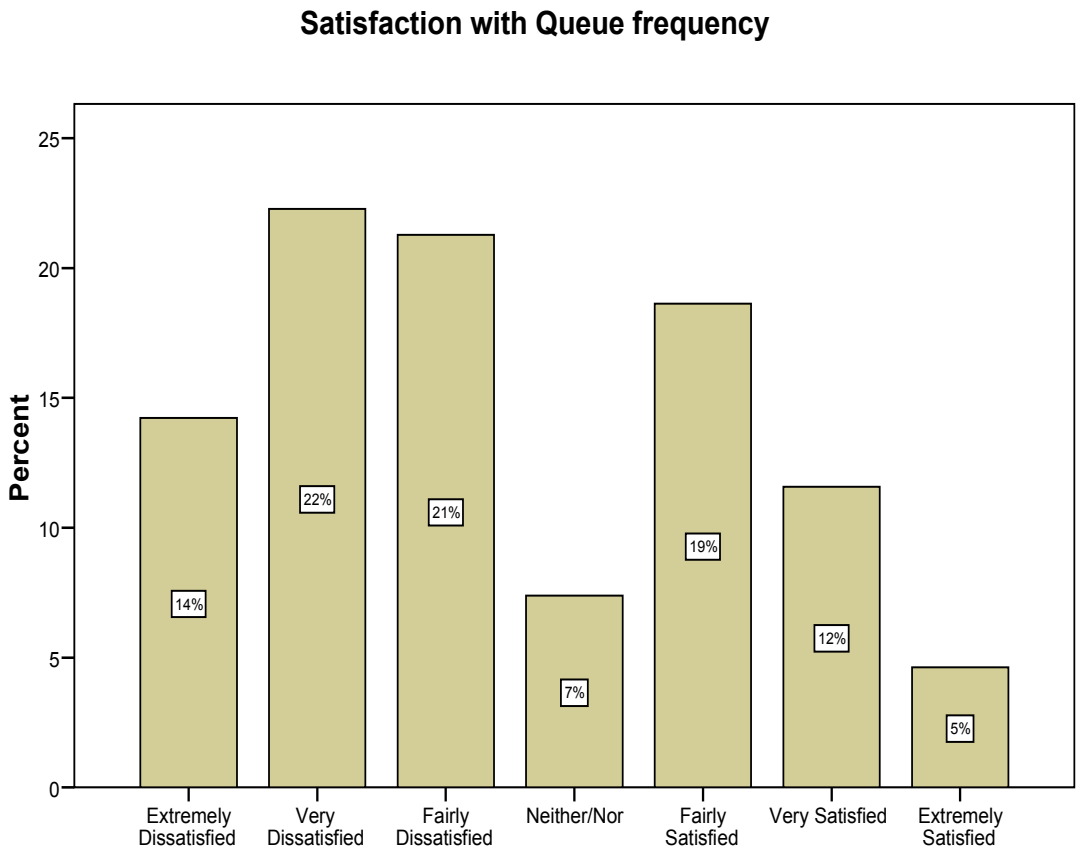


Figure 5.2.10 Satisfaction with queue frequency

It is clear from the results of this question that customers do not like to frequently have to queue for services.

5.2.12 Satisfaction with time in queue

The length of time spent in a queue can affect customer satisfaction. Customers accept that they have to queue, but are not happy when the waiting is long. There is some time limit within which customers are prepared to wait (Davis and Heineke, 1994: 23), (Davis and Vollmann, 1990: 63). In the private sector there can be cost associated with customer waiting time. This cost can come from any or combination of the following factors according, to Davis and Maggard(1990: 325) customers:

- leaving the line and going to competitor
- deciding not to come again to the organisation
- telling others about the poor service

In this research about 66% of respondents expressed dissatisfaction with the time they spent on the queue. According to categories, very dissatisfied had the highest response of about 25% as shown in Figure 5.2.11. Use of ICT has the potential to reduce time spent on queue and hence increase customer satisfaction.

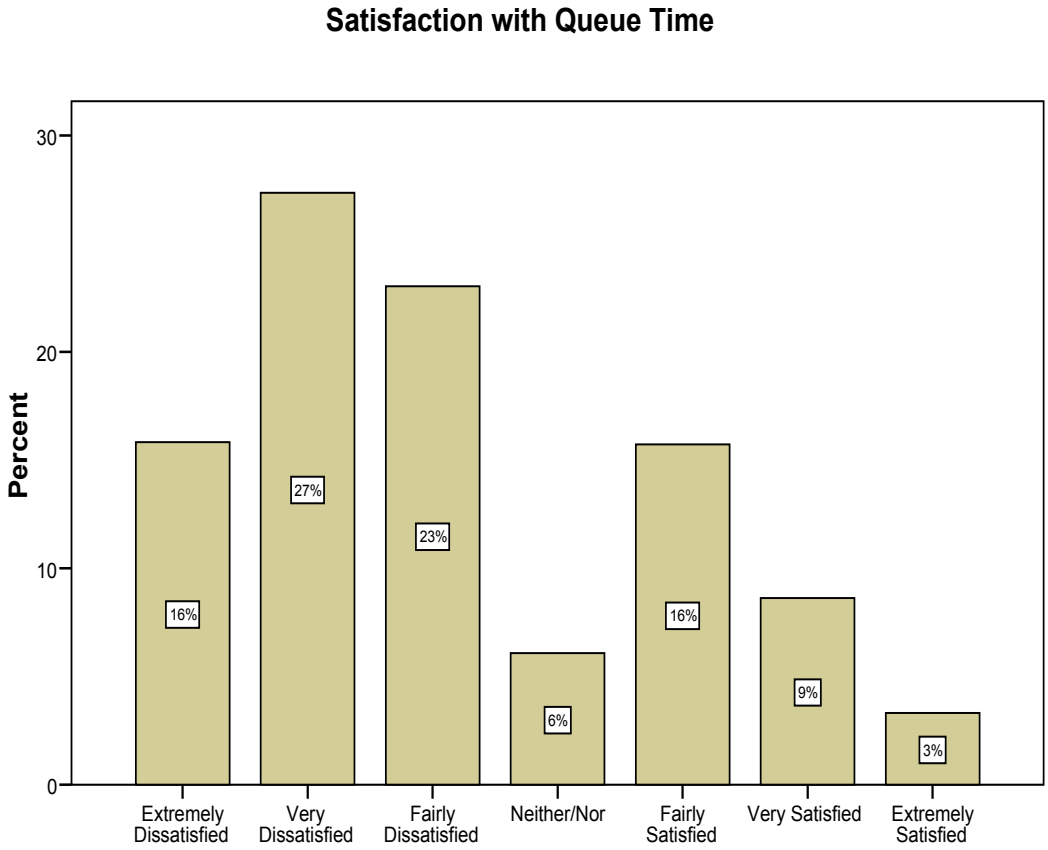


Figure 5.2.11 Satisfaction with queuing time

The results show that the responses were more on the dissatisfaction side than satisfaction side. Fairly satisfied got the highest value for satisfaction categories at 16%, but this value is the minimum value for dissatisfaction categories.

5.2.13 Effort to reduce queue

While it is almost impossible to completely eliminate queues, customers can still be satisfied if they can see that efforts are being made to reduce it. It is when there are no apparent efforts to deal with the queue that customers will be

dissatisfied regardless of the duration of the queue. About 60% of respondents indicated that they were dissatisfied with efforts made to deal with queue. Very dissatisfied accounted for about 25%, which was the highest among all the categories as shown in Figure 5.2.12.

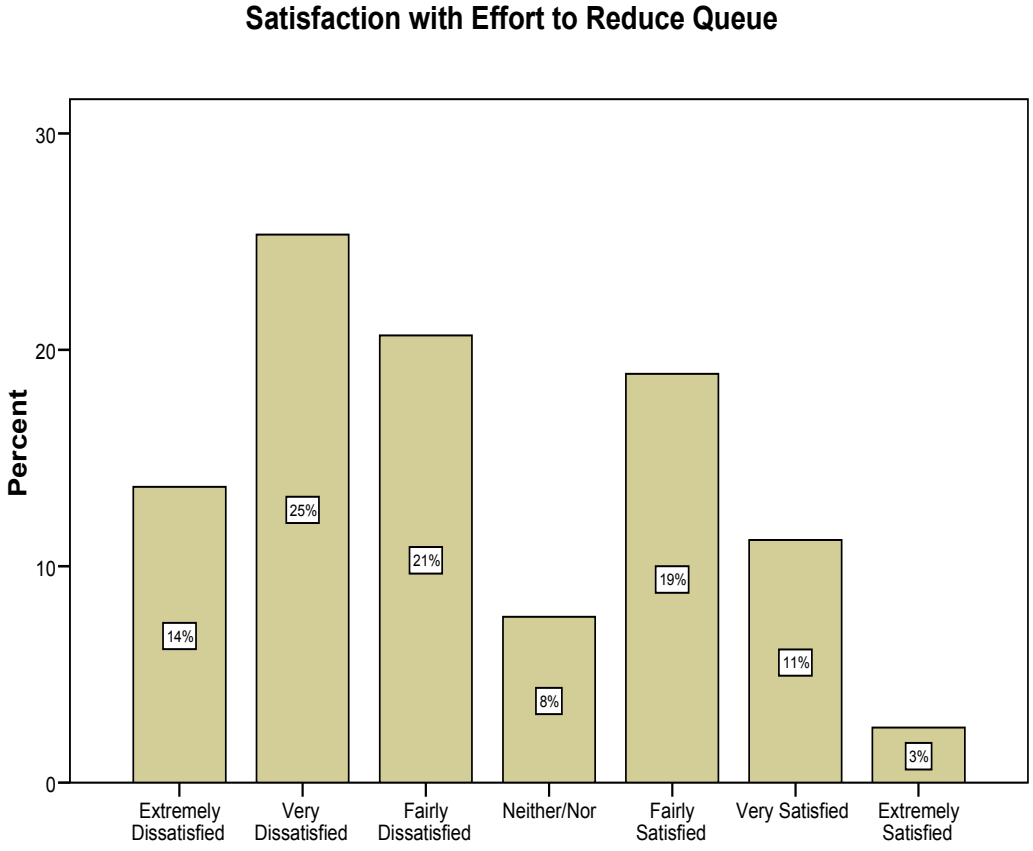


Figure 5.2.12 Satisfaction with efforts to reduce queuing

The results show a strong biased towards being dissatisfied. This indicates that not enough is being done to manage queues in government departments.

5.2.14 Apology to customers for queuing

One of the methods that can be used to address customers on a queue is for those providing service to apologise. An apology may include why there is a queue and what is being done to address the problem. Where no apology is given, customers may think it is acceptable for them to be queuing. About 66% of respondents expressed dissatisfaction with apology for queuing. In fact about 25% actually expressed extremely dissatisfied, the highest category as shown

in Figure 5.2.13. This is surprising especially given that the majority of employees have higher education level where customer care is most likely to be covered in their training. However, as this is a government sector, customers have no choice, unlike the private sector where customers could move to a competitor in the same business.

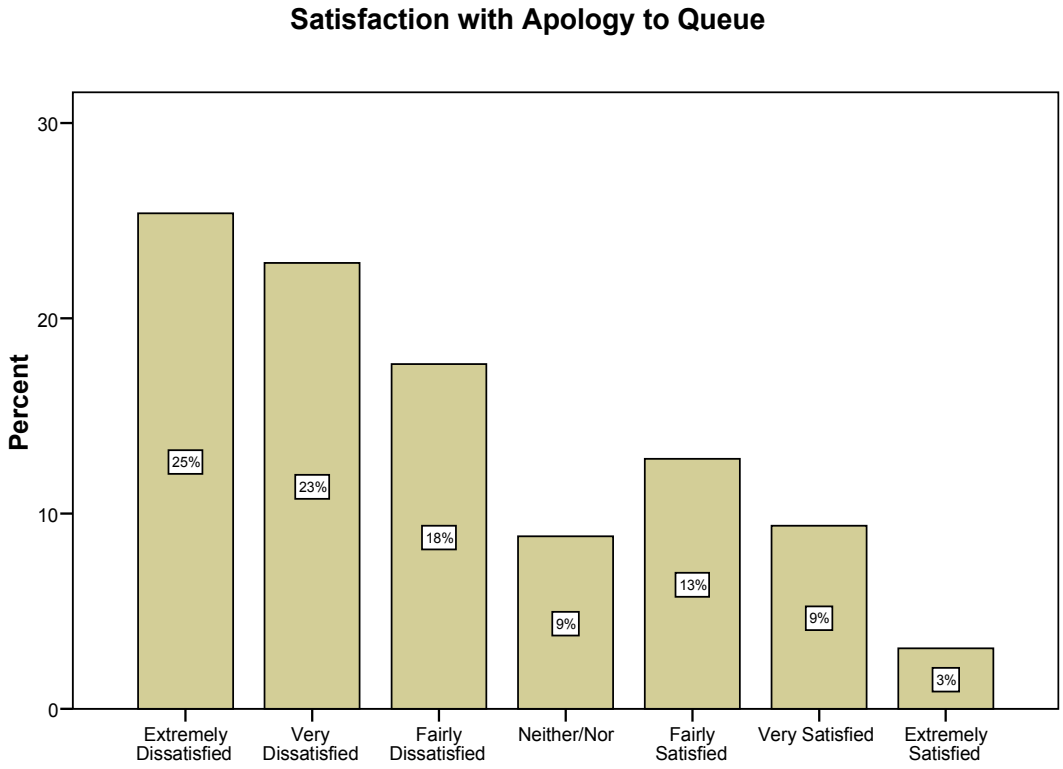


Figure 5.2.13 Satisfaction with apology given for queuing.

The results show clearly a dissatisfaction of customers. There is a general trend of decrease in responses from dissatisfaction to satisfaction if neither/nor is excluded. The highest response is for extremely dissatisfied with 25% and the figure drops down to 3% for extremely satisfied.

Queue management appears to be a big problem in central government. Figure 5.2.14 shows comparison of three aspects of satisfaction with queue management. It is clear from this that generally customers are not satisfied with issues relating to managing queuing.

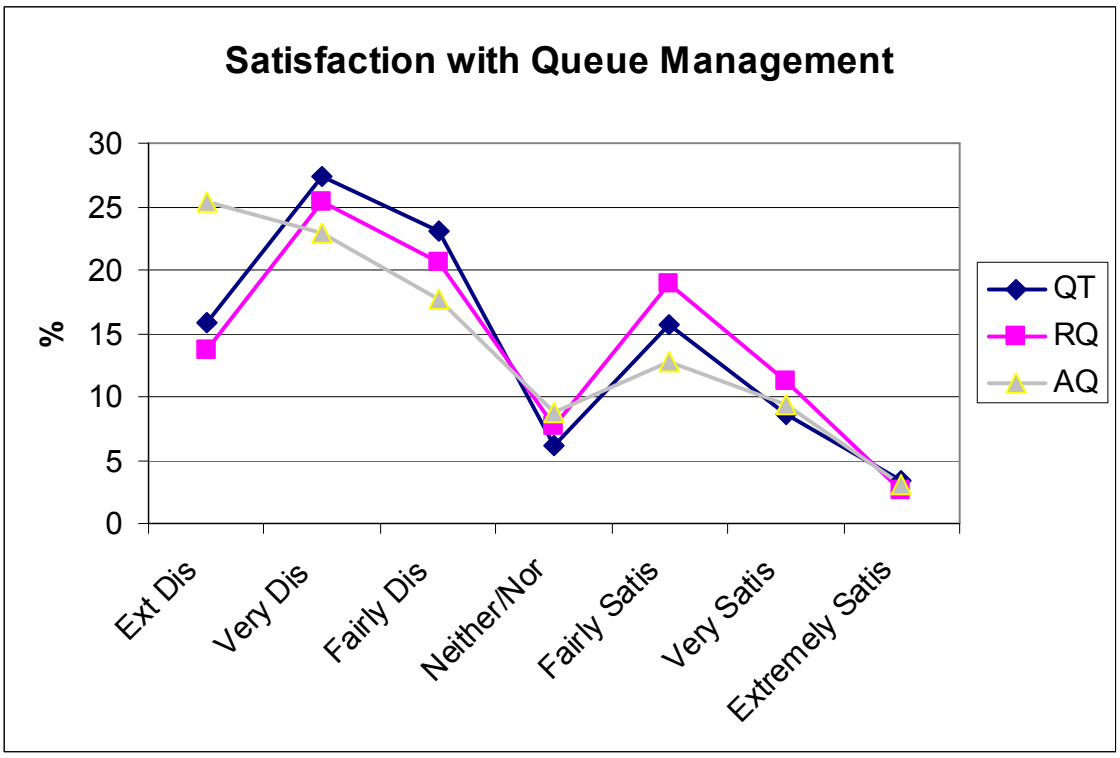


Figure 5.2.14 Comparison of satisfaction level of queuing time (QT), effort to reduce queue (RQ) and apology for queuing (AQ).

5.2.15 Estimation of time spent on a queue

The previous sections discussed results of satisfaction with various methods of managing queues. In order to gain insight on time spent queuing, respondents were asked to estimate the amount of time they normally spent in a queue. While about 30% of respondents indicated that they spent less than an hour, an approximately similar figure of 31% indicated that they spent between 1 and 2 hours. This is a measure issue especially since the working hour per day is 8 hours, hence spending more than an hour indicates a serious problem. About 70% respondents expressed that they have waited for more than an hour. Figure 5.2.15 show time spent in queue by respondents.

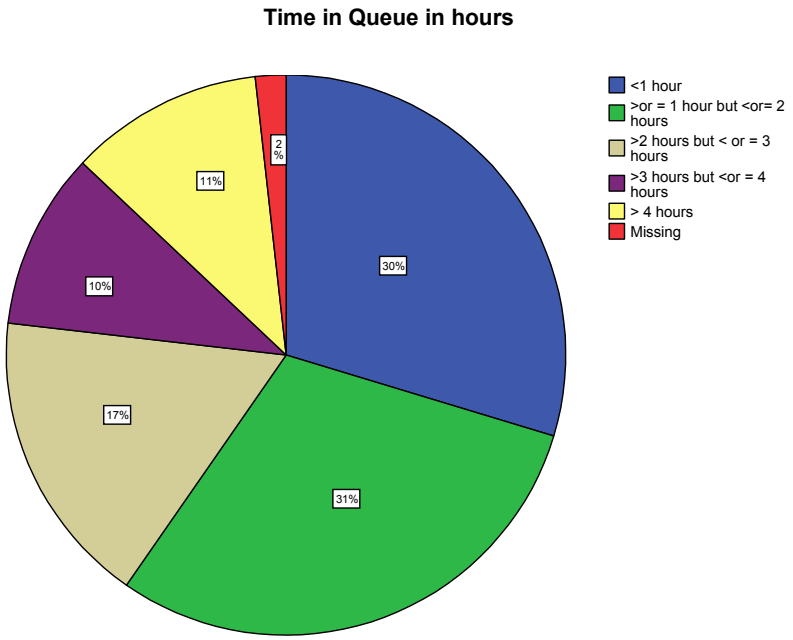


Figure 5.2.15 Estimation of waiting time

The results of this question show that customers wait for a long time. This might be the possible explanation for high level of dissatisfaction that was revealed by results of previous sections. The next section is also related to waiting as it looks at frequency of customer not being able to get service the first time.

5.2.16 Getting service first time

One of the indication of how efficient service delivery is involves finding out how often customer are attended to first time. Where customer's needs have not been met, a repeat journey may be required. The frequency of repeat journeys was solicited from customers to determine the state of the problem. About 28% of respondents reported that they are rarely asked to come again; however, about 37% indicated that they are sometimes required to make a repeat journey to get a service. Figure 5.2.16 show the responses for all categories. With availability and proper exploitation of ICT, it should be possible for this to be kept to a minimum.

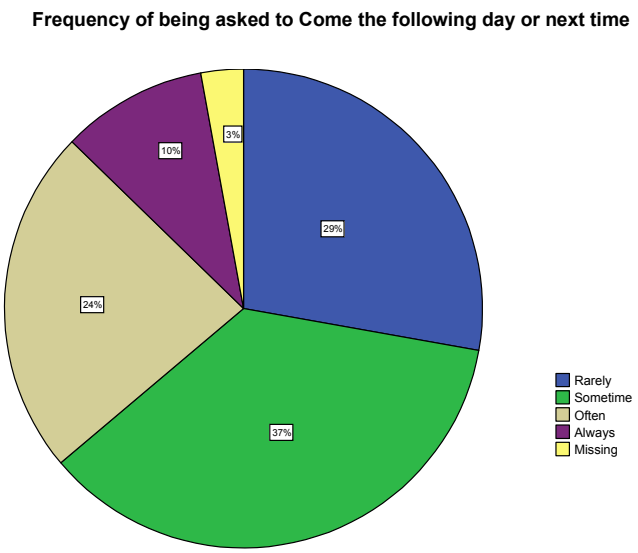


Figure 5.2.16 Customers estimation of not getting service first time

The problem of customers' not getting service first time has particularly bad effect on people in rural areas, as they have to meet travel cost to where services are offered. This was expressed by Gweta residents when former president Mogae visited them to bid them farewell before his term in office finished. The former president acknowledged that the problem was widespread across the country, even in the capital city Gaborone (Raditsela, 2008).

5.2.17 Customer complaints

Since it is not easy for an organisation to know whether it is delivering service to the expectations of customers, customers are often encouraged to complain. The importance of allowing customers to complain to an organisation is highlighted by the following observation made by a CEO of a company

> *"Asked if customer complaints are a burden, his unhesitating response was: 'Complaints tell us what we're doing wrong. If we didn't get any, would solicit them" (Davidson, 1978: 16)*.

However in majority of organisations the process of raising a complaint is regarded as a customer right. Despite this, the whole process of raising a complaint is a very long and bureaucratic process. It is expected to follow a line of command up the ladder, often starting with seeking permission from the same person a customer wishes to complain about. The majority of respondents, about 54% indicated that they do not complain when they are not being attended to. Results are as shown in Figure 5.2.17. This is against 46% who indicated that they do complain.

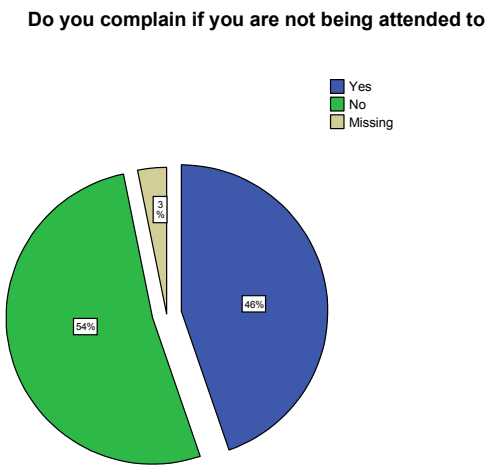


Figure 5.2.17 Customers complaint status

This is a high customer complaint level when compared with detailed research in US that has shown that only 4% of customers do complain, the remaining 96% will walk away instead of complaining (McNealy, 1994: 38). However the greatest threat to an organisation are those who do not complain as It has also been shown that although they do not complain, they tell others about the poor service they have received, which can influence potential customers to the organisation (McNealy, 1994: 42).

The next section discusses the results of customer satisfaction with management of complaints.

5.2.18 Complaint acknowledgement

An attempt was made to try and establish the level of satisfaction regarding the process of raising a complaint. Only respondents who have indicated that they complain were expected to respond to questions about complaints. However, about 70 respondents answered these questions despite the instructions (see Section 5.2.17 and Appendix E). This can be used as an indication of respondent's ability to follow the instructions. The instruction was that only those who complain should answer these questions. Only about 70 respondents

out of total of 474 answered these questions despite the instructions stating otherwise. This is an indication that the majority of respondents followed instructions.

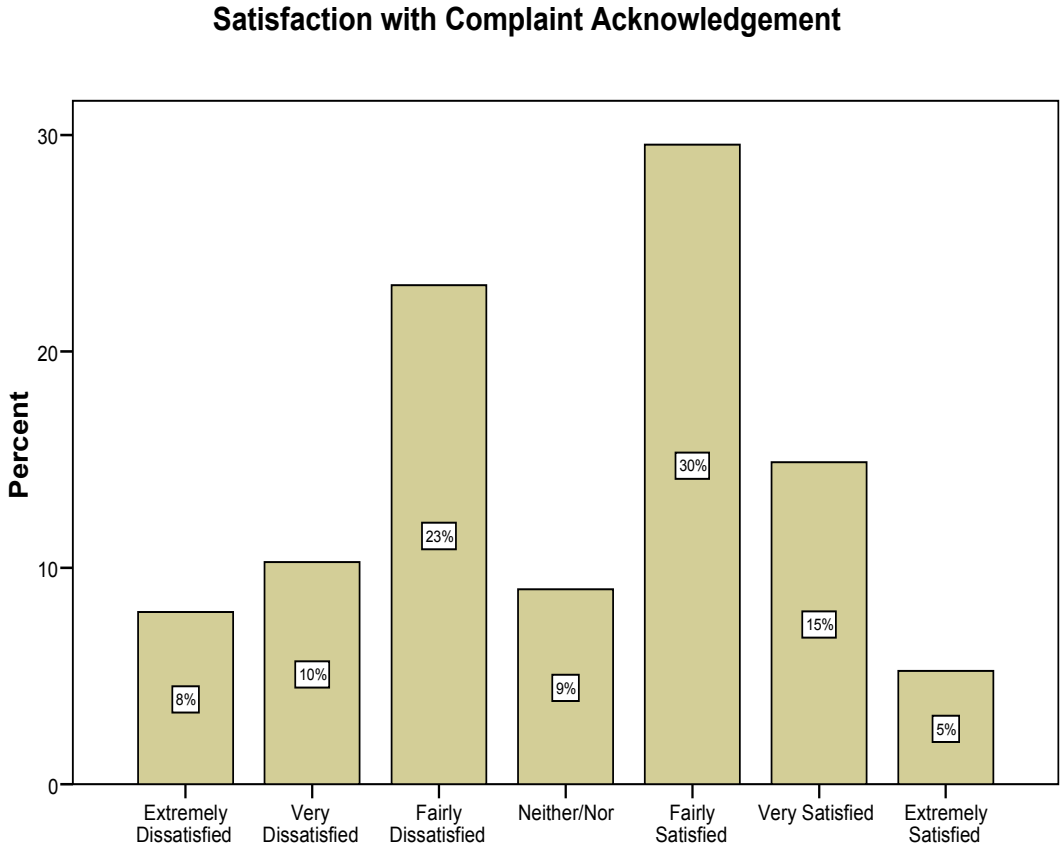


Figure 5.2.18 Satisfaction with complaint acknowledgement.

The majority of respondents indicated satisfaction with the way the complaint was acknowledged, at about 51%, and dissatisfaction was about 41%. About 9% of respondents indicated neither/nor. The classification category with highest response was fairly satisfied with about 30% as shown in Figure 5.2.18

5.2.19 Response to complaint

Having raised the complaint, respondents were asked to indicate their level of satisfaction with the response to it. This was a way of finding out if employees have satisfactory measures in place to respond to complaints. About 47% of respondents indicated that they were satisfied, while about 41% indicated dissatisfaction and remainder were in neither/nor category. Fairly satisfied had

the largest response with about 28% as compared to other categories as shown in Figure 5.2.19.

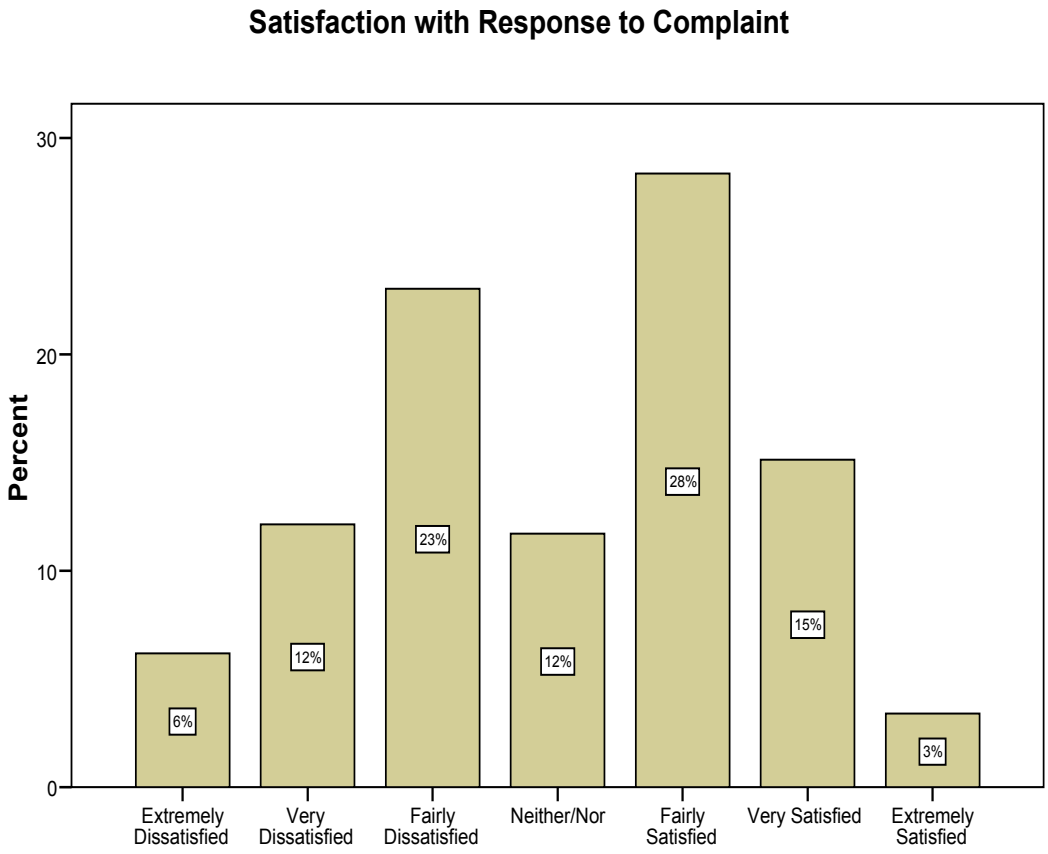


Figure 5.2.19 Satisfaction with response to complaint

5.2.20 Time taken to address the complaint

The number of respondents who were satisfied with time taken to address their complaint was about 52%. Slightly fewer indicated dissatisfaction, about 48% of respondents. Similarly, for the highest category fairly satisfied had the highest response of about 25%, followed by fairly dissatisfied at about 23%. Results for all categories are as shown in Figure 5.2.20

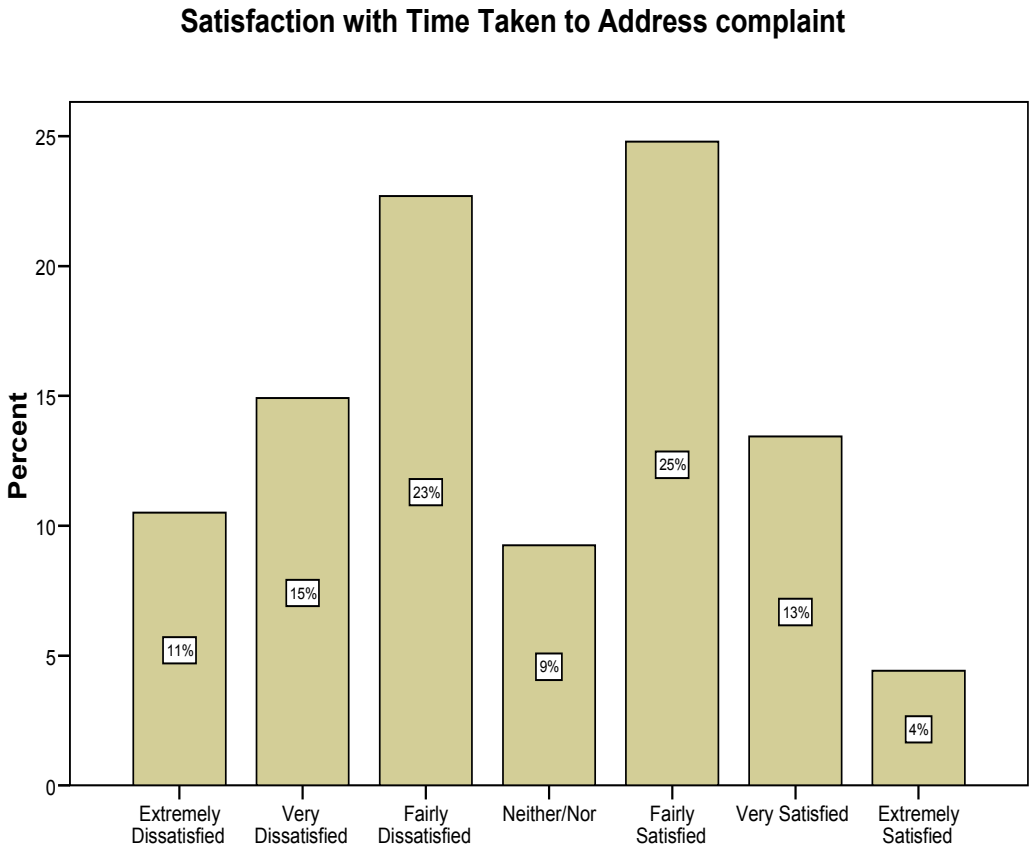


Figure 5.2.20 Satisfaction with time taken to address complaint

5.2.21 Satisfaction with complaint resolution

When a customer raises a complaint, there is expectation from the customer that it will be addressed. It is the responsibility of an organisation to respond to customer complaints as a way of retaining them and avoiding loosing them. However for government services, where the government is the sole provider of such a service, often there is no threat of customers moving somewhere else. However there is still a potential effect, as customers may loose confidence in the current government and may vote for a different political party in a democratic state.

The numbers of respondents who are satisfied and dissatisfied were almost the same at about 45% for satisfaction and 44% for dissatisfaction. However according to categories, fairly satisfied had the highest response at about 26% followed by fairly dissatisfied at about 21% as shown in Figure 5.2.21.

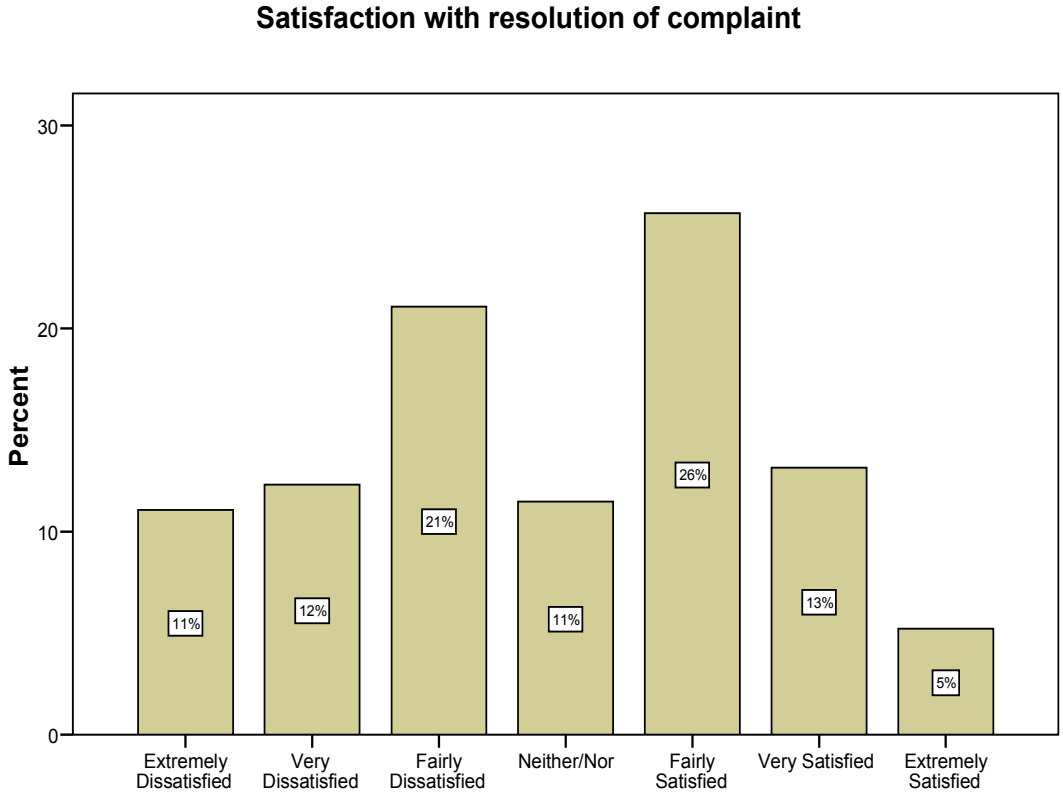


Figure 5.2.21 Satisfaction with resolution of complaint

5.2.22 ICT availability

The previous sections were looking at results about satisfaction as perceived by customers. In this section, the presence and contribution of computers is discussed as well as internet penetration. The availability and effective use of computers in an organisation should in theory lead to satisfaction levels being raised to very or extremely satisfied. However from the previous sections satisfaction level was mainly at the lowest level of the scale.

5.2.23 Computer presence

The majority of respondents, about 78%, indicated that they have seen computers, against 22% who indicated the opposite (Figure 5.2.22). This confirms the view that Botswana government has made computer facilities available to most government departments (Venson, 2005a: iii).

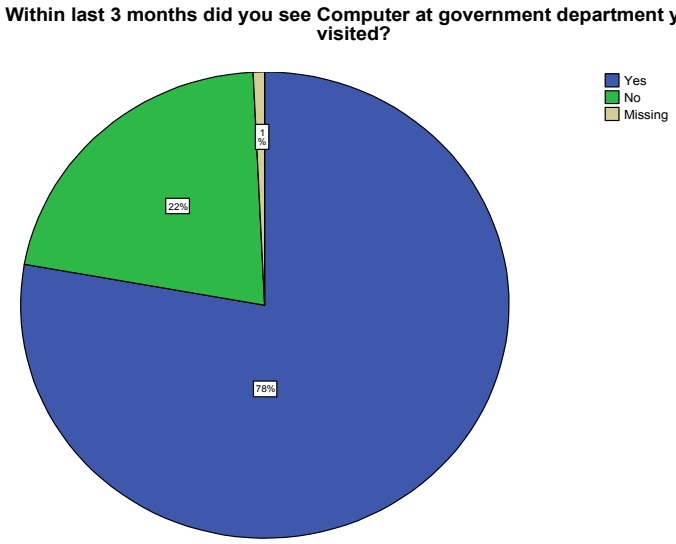


Figure 5.2.22 Computer visibilities in government departments

Unfortunately when asked about whether computers were used to deal with their request, only about 55% of respondents indicated so as shown in Figure 5.2.23. This is a drop from 78% of computer visibility. This implies that although they are available, there are cases where they are not used to address customer needs.

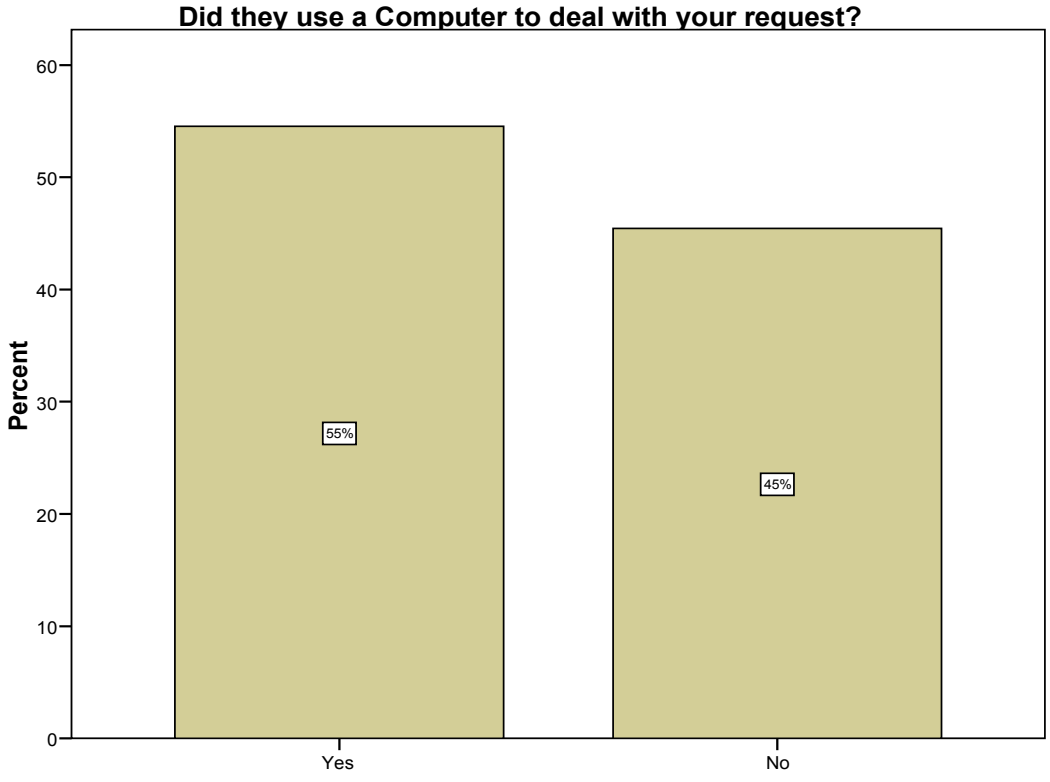


Figure 5.2.23 Customers served using a computer

5.2.24 Computer contribution to service

Customers were asked to indicate what they feel the contribution of computers is towards the service they receive. About 66% of respondents indicated that computers contribute to improved service delivery as shown in Figure 5.2.24. This shows that customers have high expectations in use of computers, hence if not used this may affect their satisfaction perception.

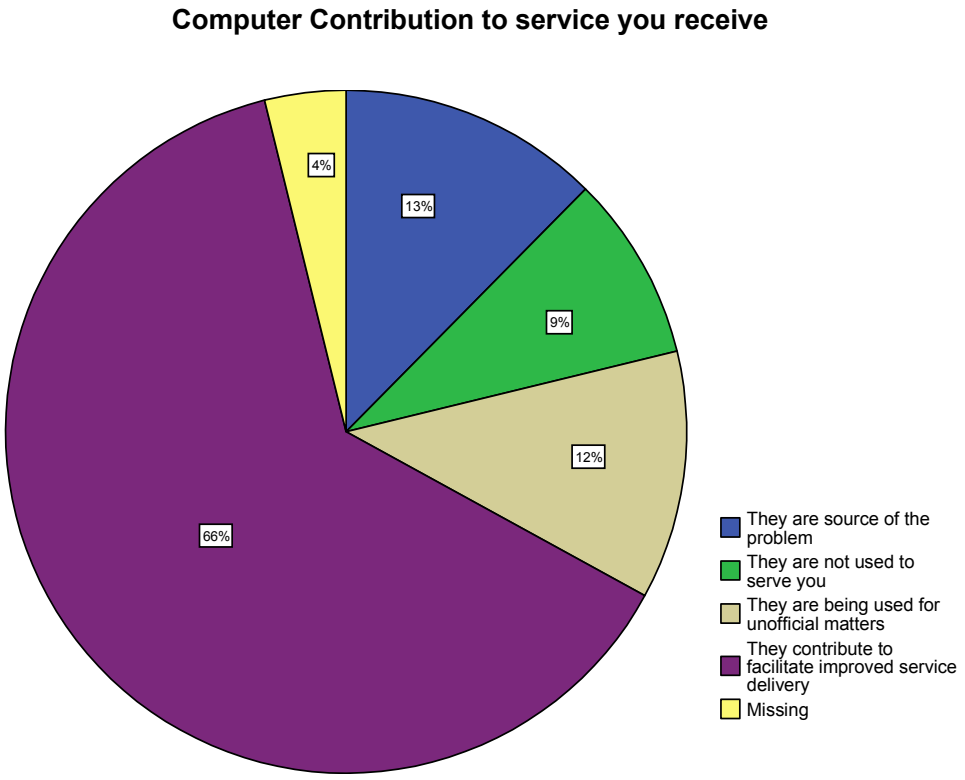


Figure 5.2.24 Customers views on computer contribution

5.2.25 Internet access

Internet access at home is one of the global indicators used to determine global trends in ICT diffusion (UNDP, 2007). In Finland internet access has been monitored annually from 2000 when there were about 50% internet users in the country. By 2007 the figure has reached 79% internet users (Finland, 2007). It is often expressed as a percentage (Ray, 2007) or per 1000 people (WORLDBANK, 2007d). Unfortunately there has not been a detailed study to determine internet access per population in Botswana. Almost all major

international organisations quote the figure as 34 per 1000 (3.4%) (UNDP, 2007), (WORLDBANK, 2007d).

Respondents were asked to indicate a place where they access the internet most.

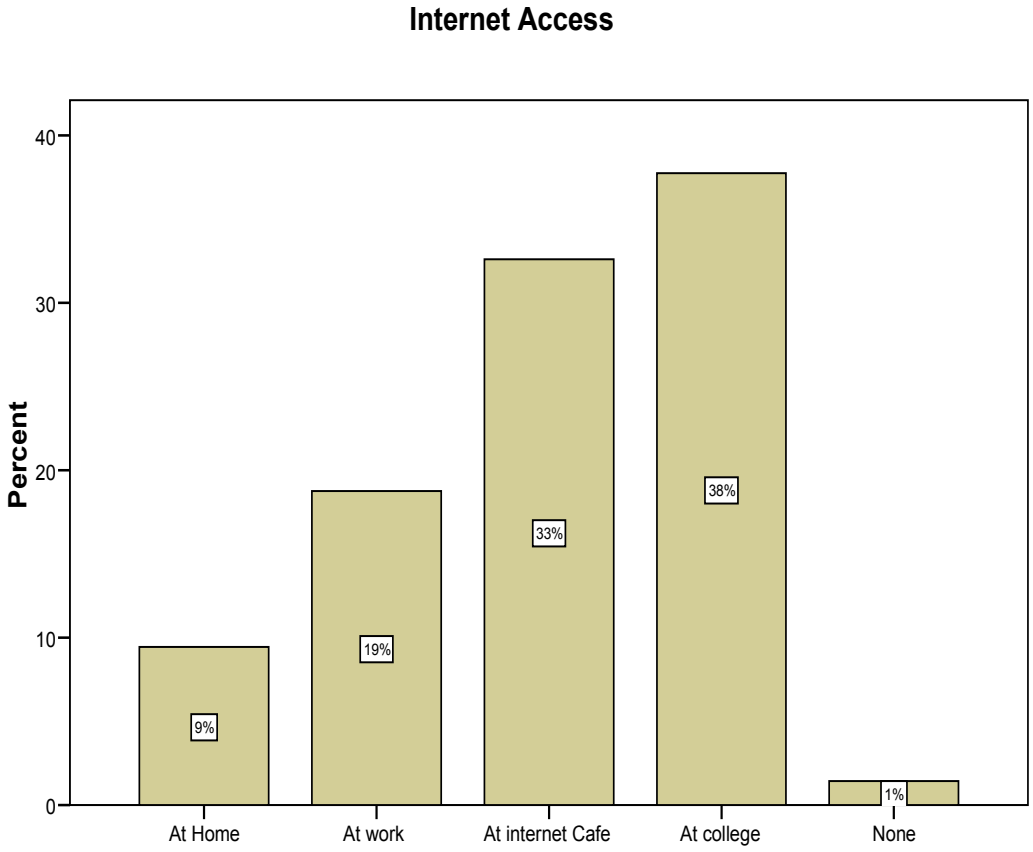


Figure 5.2.25 Internet access among 4 locations

According to the results of this research, only about 9% of respondents had internet access at home. A significant portion however, access internet at internet cafes. Figure 5.2.25 show internet access at various locations.

5.2.26 Computers at home

Regarding computer ownership, only about 28% of respondents indicated that they have a computer at home. This low computer ownership also support low internet access at home which is about 9%. It must be pointed out that the question about internet connection had only about 330 respondents; only 36%

of respondents answered this question. This may indicate low level of internet impact and interest among the general public.

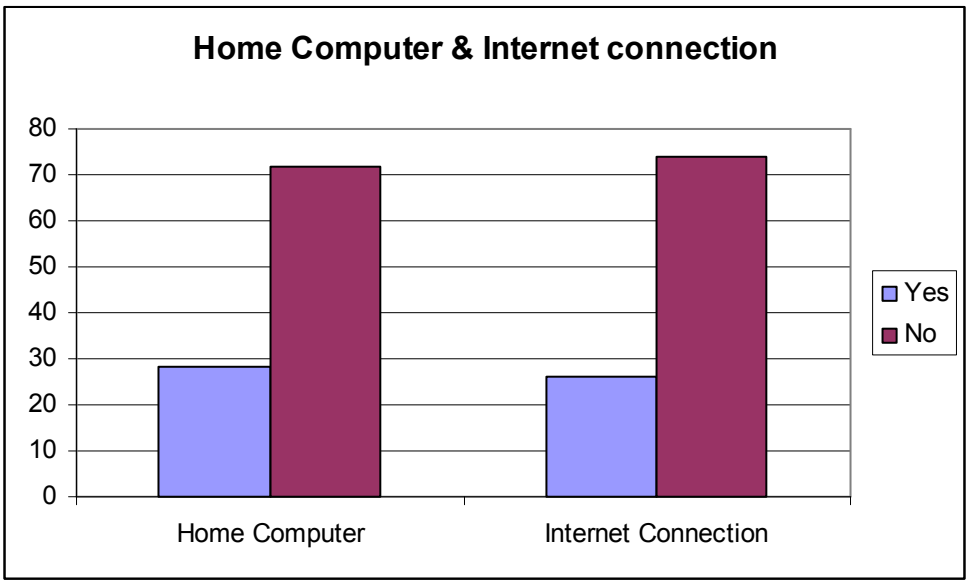


Figure 5.2.26 Home computer and internet connection

It is clear from Figure 5.2.26 that those who have computers at home are more likely to also have it connected to the internet. This indicates high level of awareness about the internet among respondents who have computers at home. The results of this survey show that computer ownership in homes for Gaborone is about 28% and internet connection to homes is about 26%. Considering that Gaborone as the capital city has more opportunities that can facilitate computer ownership and internet connection such as employment and electricity, the national values for both computer ownership and internet connection at homes is likely to be lower. Major international organisations such as the World Bank and World Economic Forum quote different values for home ownership and internet penetration in Botswana. The World Bank quote the figure to be 3.4% (WORLDBANK, 2007c). This figure has been the same for the World Bank since 2002. The World Economic Forum quote 3.5%, 2.27% and 3.4% for 2002 (Dutta and Lopez-Claros, 2005: 117), 2003 (Dutta et al., 2006: 152) and 2005 (Dutta and Mia, 2007: 153) respectively.

The methodology used by the World Economic Forum is by analysing responses to a questionnaire that is sent to executive officers in a country; hence figures are not determined from primary data. This research has

attempted to get a better estimate by applying sampling to cover as much as possible all the residential areas in Gaborone.

Respondents were also asked to indicate the most important reason to explain why there is low internet use at homes. About 53% of respondents indicated that cost associated with providing internet as the most important reason, as shown in Figure 5.2.27. Lack of skill was the next popular with about 32%. This indicates that people generally have the skills, as shown by the fairly significant portion of respondents who use internet cafes. Also high unemployment among respondents (Section 5.2.4) may explain lack of disposable income to acquire ICT technologies for home use.

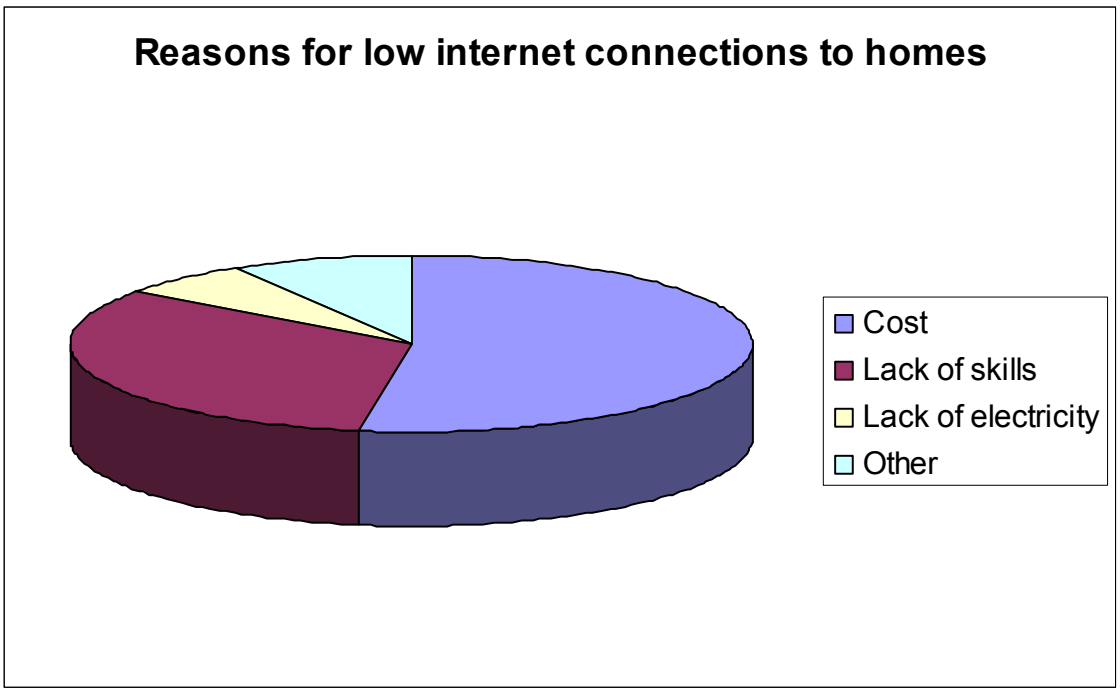


Figure 5.2.27 Low internet access to homes

5.2.26.1 Cross tabulation of results

The previous sections used descriptive statistics to find out the spread of responses received. This provided summary data about the most occurring variables through use of frequency tables and graphs. In this section, results are cross tabulated in order to find out if there are any associations between variables.

5.2.26.2 Computer Ownership and employment

There is need to determine if there is any association between computer ownership and employment status. This is because it costs money to acquire a computer; hence employment might have strong association with computer ownership.

In Botswana the estimated cost of a low specification computer in 2007 was about P5000 (approximately £500). The currency of Botswana is called Pula (P) and P10 is equivalent to one British pound. The price is above monthly salary of most of those employed; hence even among the employed, ownership is related to amount of income. Latest estimates on salaries of all sectors in Botswana show that an average monthly salary for a citizen is about P3275 (CSO, 2008: 6). The national monthly average salary is low because the majority of people are employed in the wholesale and retail industry which has one of the lowest pay rates in the country. This industry does not employ people with high qualifications. This research has also confirmed that computer ownership is related to employment status. About 40% of respondents who owned computers were also employed and 45% of the unemployed had no computer.

In order to determine if this relationship between computer ownership was not just due to chance or random variation, Chi-square test was used. Chi-square *"allows you to determine if what you observe in a distribution of frequencies would be what you would expect to occur by chance" (Salkind, 2004: 262)*. The null hypothesis is that computer ownership is evenly distributed among the population. In other words there is no relationship between employment status and computer ownership.

Employment Status * Home Computer Cross tabulation

			Home Computer		Total
			Yes	No	Yes
Employment Status	Employed	Count	94	187	281
		% within Employment Status	33.5%	66.5%	100.0%
	Self Employed	Count	47	116	163
		% within Employment Status	28.8%	71.2%	100.0%
	Unemployed	Count	84	283	367
		% within Employment Status	22.9%	77.1%	100.0%
	Retired	Count	9	24	33
		% within Employment Status	27.3%	72.7%	100.0%
	Student	Count	14	17	31
		% within Employment Status	45.2%	54.8%	100.0%
Total		Count	248	627	875
		% within Employment Status	28.3%	71.7%	100.0%

Table 5.2.1 Employment status and computer ownership

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.343(a)	4	.010
Likelihood Ratio	13.094	4	.011
Linear-by-Linear Association	1.877	1	.171
N of Valid Cases	875		

a 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.79.

Table 5.2.1a Chi-square values for Table 5.2.1

The results of Chi-square test show that employment status and computer ownership are not independent, therefore there is an association between employment status and computer ownership. This relationship is highly significant as the significance of relationship is almost 0. This is not surprising as it cost money to own a computer.

5.2.26.3 Gender and IT

Gender has been an important factor influencing how technologies are adapted and used in homes. Previous research has shown gender bias in computer use (Broos, 2005: 21). Gender bias in ICT is also experienced in the workplace

(Griffiths et al., 2007: 338), a phenomenon which is common among engineering fields where for a long time it has remained male dominated area. There was a lot of bias towards males playing a leading role in adopting and using such technologies (Dholakia, 2006: 231). In computing, the birth of computer programming is attributed to a female mathematician lady Ada who was encouraged by her mother to explore her mathematical abilities (Zoonen, 2002: 8). This shows that given the opportunity, females can also contribute to information technology development.

Adoption and use of internet also show gender bias towards males globally (Dholakia, 2006: 232). However in USA, computer and internet access figures among 25-49 year olds show that in 1997 males accounted for about 29.3% and females 25.1%, by 2001 females had outnumbered males to reach 66% while males were 61.8% (Dholakia, 2006: 233).

From the results of this research, there is gender bias towards males when it comes to internet access, as there are more males accessing internet than females. It is only at college that there are more females, about 44.4%, against males 28.5%. But there were almost twice the number of females in college than males; hence this may explain the high portion of females. There are very few people who have Internet access at home. In this sample the number of males and females with internet access at home was 33 and 46 respectively. Although these are small figures when looking at the whole sample, they reveal a gender imbalance regarding internet access at home. Literature has shown that gender gap in internet access at home was narrowing in some countries like the USA (Rainie, 2002).

Table 5.3.2 shows the results by gender of internet access at various locations. While in the survey for this research there were more females than males, male's internet access at the various locations is more than that of females. This has been observed in literature as discussed earlier. The Botswana government is promoting gender equality across all fields as part of meeting the UN millennium development goals (MDG). The ICT sector in Botswana is missing out on the potential contribution that females can make to the industry. Hopefully the gender gap in ICT will narrow as times goes on. But this will also require cultural shift and change in mindset that technological artefacts are for the exclusive use of males.

			Internet Access At					Total
			Home	Work	internet Cafe	College	None	
Gender	Male	Count	33	84	121	98	8	344
		%	9.6	24.4	35.2	28.5	2.3	100.0
	Female	Count	46	73	150	218	4	491
		%	9.4	14.9	30.5	44.4	0.8	100.0
Total		Count	79	157	271	316	12	835
		%	9.5	18.8	32.5	37.8	1.4	100.0

Table 5.2.2 Gender and Internet Access of Respondents

There are numerous factors that may explain gender biased access and use of internet towards males. Dholakia(2006: 237) has identified the following:

- Gender production of technology
- User related variables such as income disparity
- Task/Time discretion

Females can influence social acceptance of the internet by increasing its use for social purpose. This is shown by e-commerce interest in female participation (Zoonen, 2002: 10). The telephone was initially under the control of and dominated by males who thought of it as a tool for business only. However, the female had a different view about the telephone and saw it as a medium to be used for social purposes like communications with friends and relatives (Zoonen, 2002).

The ICT sector has been and continues to be dominated by males. When Naughton(1999) looked at the history of development of the internet, male domination was evident. Nicolla Pellow, a female technical student from Leicester Polytechnic was involved in the development of HTML in the late 1980s to early 1990s (Naughton, 1999: 235). Males dominate in ICT research and development, hence ICT based products turned to be male focused. The image of the ICT sector has been observed to be not accommodative to females, for example females associate IT with extended working hours, dominated by males who are not sociable (Zoonen, 2002: 11).

Gender imbalance in ICT use has the potential to exclude females from fully participating and benefiting from exploitation of ICT. Unlike other engineering related professions, ICT has the potential to be gender neutral, as it can allow

for flexible and remote working environment which may suite females, who at times have to work from home as they also have family roles to play.

5.2.26.4 Education level and internet access

The use of the internet requires both the ability to read as well as technical skills to be able to operate a computer. As the technical skills have become more and more user friendly, many people are now using the internet. In this question, the aim was to find if there is any relationship between education level and accessing the internet among respondents.

During data collection, classification was based on Botswana education level certification system. The education level has been recoded into four basic distinct education levels namely, primary, high school, higher education and postgraduate. This was done to reduce the number of categories for education level. The results are as shown in Table 5.2.3

			Internet Access					Total
			At Home	At work	At internet Cafe	At college	None	
Education Summary	Primary School	Count	7	6	19	119	0	151
		%	4.6	4.0	12.6	78.8	.0	100.0
	High School	Count	25	33	141	155	8	362
		%	6.9	9.1	39.0	42.8	2.2	100.0
	Higher Education	Count	34	111	107	39	4	295
		%	11.5	37.6	36.3	13.2	1.4	100.0
	Post Graduate	Count	11	5	4	0	0	20
		%	55.0	25.0	20.0	.0	.0	100.0
Total		Count	77	155	271	313	12	828
		%	9.3	18.7	32.7	37.8	1.4	100.0

Table 5.2.3 Education level and Internet Access

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	297.743(a)	12	.000
Likelihood Ratio	289.395	12	.000
Linear-by-Linear Association	175.665	1	.000
N of Valid Cases	828		

a 5 cells (25.0%) have expected count less than 5. The minimum expected count is .29.

Table 5.2.3a Chi-square values for Table 5.2.3

The results show that for those with primary and high school education level their most common internet access is college. This might be due to the fact that they are still attending college. For those with higher education, majority about 38% access internet at work. For those with post graduate qualification internet access is mainly at home. People with higher education level are also more likely to be employed and earning much more than those with lower qualifications, hence they can afford internet access at home.

5.2.26.5 Age and internet access

The question of whether age is related to internet access is investigated here. Age has been shown to have an impact on e-commerce where younger people of age 16-18 years took on average, about 15 months to make their first online

purchase, as compared to over 55 year olds who can take over two years (UCLA, 2001 as cited in (Sakkthivel, 2006)). Internet access and usage seems to capture the youth more than the older generation.

			Internet Access					Total
			At Home	At work	At internet Cafe	At college	None	
Age	<21 years	Count	12	7	64	37	5	125
		%	9.6	5.6	51.2	29.6	4.0	100.0
	21 - 30 years	Count	25	39	133	93	7	297
		%	8.4	13.1	44.8	31.3	2.4	100.0
	31 - 40 years	Count	20	73	48	72	0	213
		%	9.4	34.3	22.5	33.8	.0	100.0
	41 - 50 years	Count	11	21	15	47	0	94
		%	11.7	22.3	16.0	50.0	.0	100.0
	51 - 60 years	Count	5	13	5	39	0	62
		%	8.1	21.0	8.1	62.9	.0	100.0
	> 60 years	Count	4	2	3	25	0	34
			11.8	5.9	8.8	73.5	.0	100.0
Total		Count	77	155	268	313	12	825
		%	9.3	18.8	32.5	37.9	1.5	100.0

Table 5.2.4 Age of respondent and Internet Access

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	152.638(a)	20	.000
Likelihood Ratio	159.567	20	.000
Linear-by-Linear Association	1.085	1	.298
N of Valid Cases	825		

Table 5.2.4a Chi-square values for Table 5.2.4

Places of internet access vary with age as shown in Table 5.2.4. For those under 21 years, internet café's are the most popular with about 51%, followed by college with 30%. This pattern is also similar for the age group 21 – 30 years with about 45% and 31% for internet access at cafes and college respectively. This might reflect the popularity of using and accessing the internet among the youths, who despite being more likely to be unemployed are still willing to spend money to access internet at café's. The unemployment rate among this group

was the highest at 43% apart from those who are still students (See Appendix J). The cost of internet access at cafes in Gaborone is about P30 per hour. Internet access at homes is through dialup which cost about P500 to set up. It also has rental cost of about P100 per month as well as cost of national call which is currently P0.65 per minute for post-paid) or P0.85 per minute for pre-paid (BTC, 2007). The monthly cost of internet access is about 3% of monthly salary of an employee in Botswana (See section 5.3.26.2 for monthly wages). (P10 = £1)

Accessing internet at work and college is free to employees in the majority of organisations. Hence those who are employed are more likely to have free internet access at their work place. This further marginalises those who are unemployed as their only access point remains internet café's, which has costs attached. The unemployed are more likely to be unable to meet such costs as they are unemployed.

For the age group 31 – 40 years internet access is mainly at work or college, both accounting for 34%. This age group has the highest employment rate of about 37% (See Appendix J). For those over 40 years accessing internet was mainly at college. This is similar for the age group 51-60 years and the over 60 year olds. This might reflect that the majority of these people have undergone some form of training where they were exposed to the internet. This exposure to internet across all ages is good as it shows the huge potential for exploitation of internet based facilities if they were made available. On the whole internet cafes are the most popular access points for using the internet in Gaborone. This is likely to be true for the other cities and villages which have internet cafes as Botswana has lowest computer penetration in homes. For this survey only about 28% of respondents had a computer at home (See Section 5.2.26).

5.3 Employee Relations

5.3.1 Introduction

The issue of employee relations is important in understanding performance of employees. This is because it is the employees who do the work. Each organisation has a human resource section whose responsibility is to make sure that the needs of both the employer and employee are met. This is often through a form of contract of employment, which is a legally binding document. A number of interventions that Botswana government has taken to address concern about unsatisfactory service delivery by employees, such as further training of employees, have been mainly focused at addressing issues that are contractual. Understanding of status of employee relations relating to non-contractual matters is important for this research since previous interventions concentrated on contractual matters. If there is a problem due to non-contractual employee relations, unfortunately making IT available may not solve that problem.

It has been argued that contractual obligations may not necessarily help employees as there are other expectations which are not in contract that play a role in human performance. This is what (Koh et al., 2004) refer to as the psychological contract which was discussed in section 2.8.1. The instrument developed by Guest and Conway(1998) to measure the state of this contract was adopted for use in this study. This section discusses the results of that instrument. To make it easy for participants to understand the questions in the questionnaire, the psychological contract was referred to as employee relations.

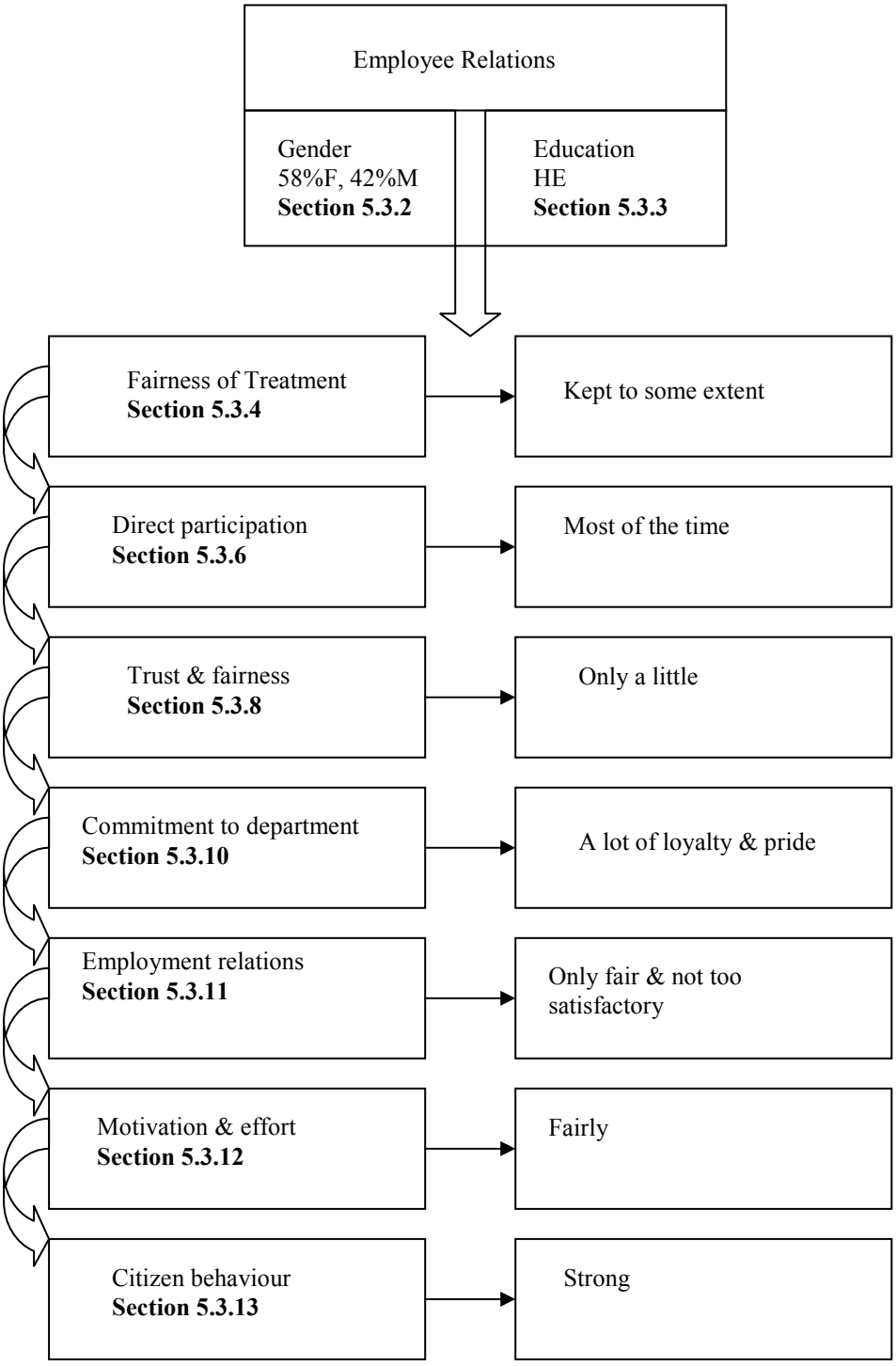


Figure 5.3.1 Overview of employee relations results

5.3.2 Gender

There were more females than males in this survey as females accounted for about 58% and males 42% as shown in Figure 5.3.2. This might be due to the fact that work undertaken by the two departments that were selected requires skills that are biased towards females. The work undertaken by the two departments are not technical or engineering based; there is general trend for non engineering or non technical fields to be female dominated (Adam, 2001: 39).

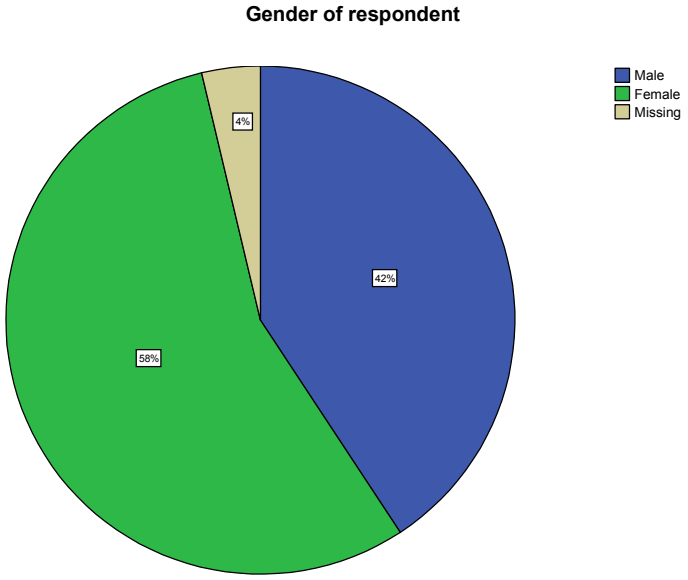


Figure 5.3.2 Gender of respondents

5.3.3 Education Level

Education level attained by employees is important as the role of education is to enable people to improve their working skills and perform better. The Botswana government has been giving the education sector one of the largest shares of the national budget (Gaolathe, 2005), (Gaolathe, 2007), (Gaolathe, 2008). This was reflected in the results of this survey as majority of respondents have at least higher education qualifications as shown in Figure 5.3.3

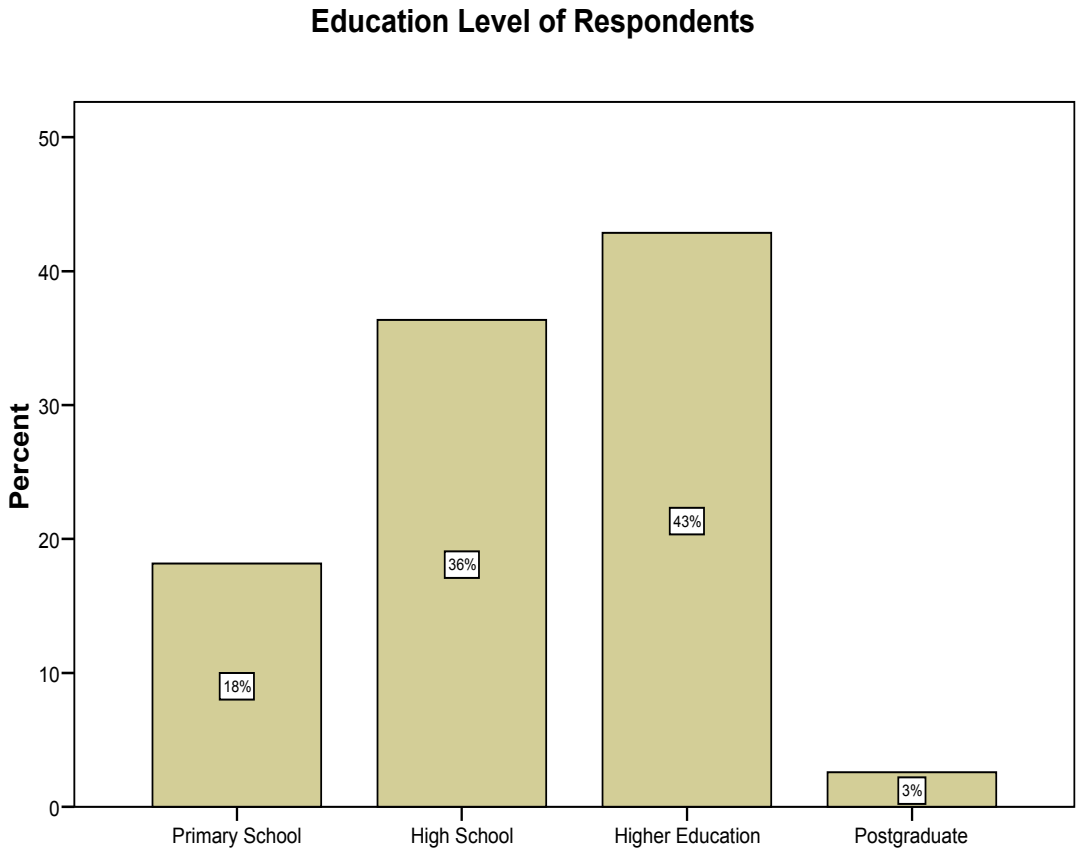


Figure 5.3.3 Education Levels of Respondents

5.3.4 Perceptions of Fairness of Treatment

Fairness of treatment is very important as it is globally expected that employers must treat their employees fairly (ILO, 1996-2008). The employment act of Botswana addresses issues of fair treatment and there is even an industrial court set up to deal with cases of fairness in the work place (Botswana, 2008).

5.3.4.1 Fair Treatment by Supervisors

In this question respondents were asked to indicate their perception of the supervision that they get from their supervisors. Supervision is supposed to be carried out fairly so that employees can work in an environment which is conducive. From the results of this survey the majority of respondents indicated that their department has kept fair supervision to some extent at about 52%, followed by not kept at about 22%. Figure 5.3.4 shows all results for this question. Always kept and kept to some extent received low response of about

5% and 6% respectively. The results indicate that there might be some problems regarding supervision in the public service in Botswana.

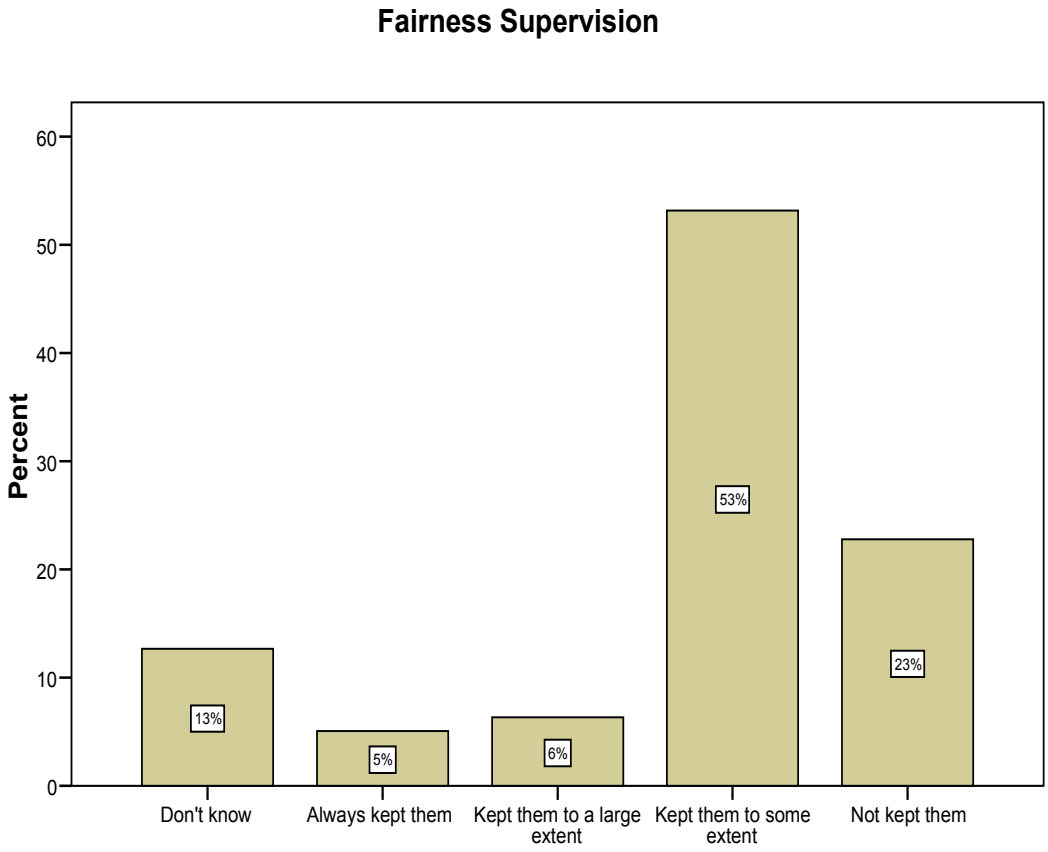


Figure 5.3.4 Employee Supervision

The problem of fair supervision in Botswana has been shown to demoralise staff working at one of Botswana border posts. Staff felt neglected, as despite reporting to their head office about their working environment not being ideal, the response from head office was slow in coming (BOPA, 2008a). There is a long bureaucratic process that employees, particularly those working in rural areas, use to report their problems to head offices based in the capital city in Gaborone.

5.3.4.2 Fair Pay

Payment of employees is probably one of the major reasons why people want to work. This is because the payment received provides employees with income that they can use to sustain themselves. However the issue of pay is a topic which is often debated by employees and employers. Employers may perceive

that what they offer is fair pay. However employees often argue that their pay is not adequate. This question was asked to get views of employees about whether their departments have kept their promise of fair pay. About 40% of respondents, the majority, indicated that this promise was not kept followed by kept them to some extent. Figure 5.3.5 show responses to all categories of this question.

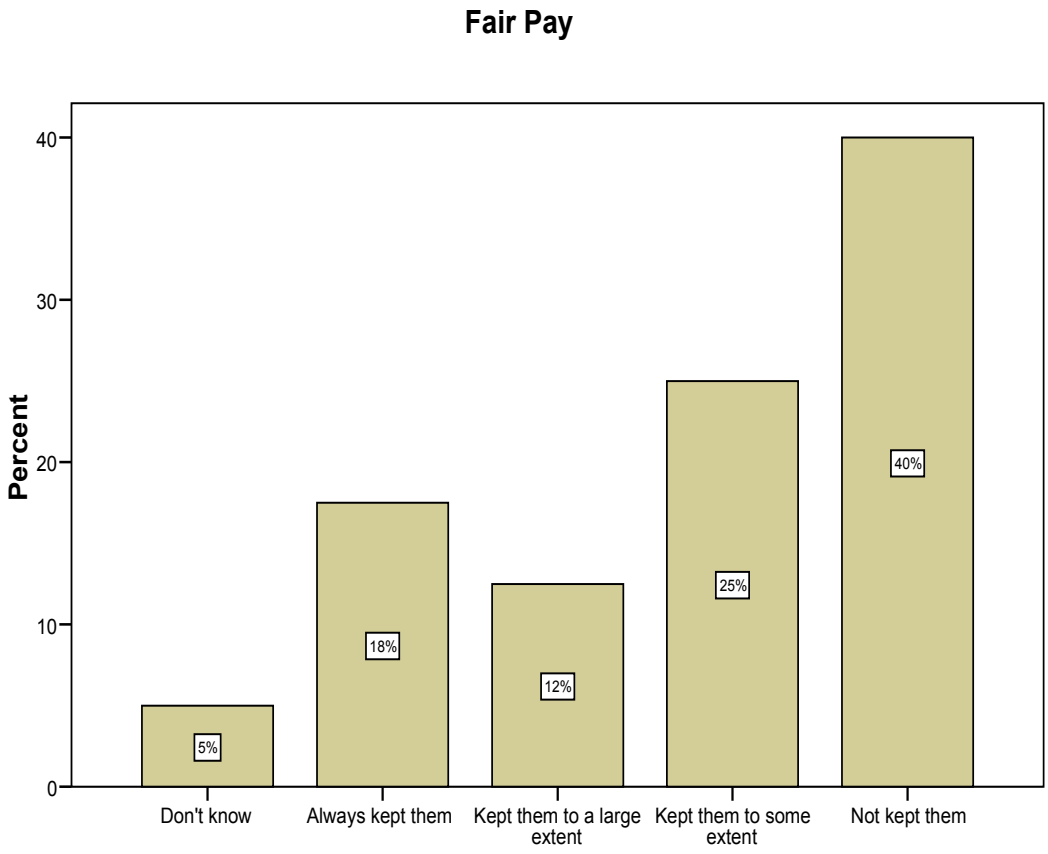


Figure 5.3.5 Perceptions about Payment

5.3.4.3 Reward for Input Effort

This question wanted to determine employees' perception of being rewarded for any effort they put into their work. The results show that the majority of employees felt that they are not rewarded for any input effort they put into their work. The responses No-probably not and No-definitely not accounted for 37% and 38% of responses respectively. Only about 25% of respondents were on the affirmative side as shown in Figure 5.3.6.

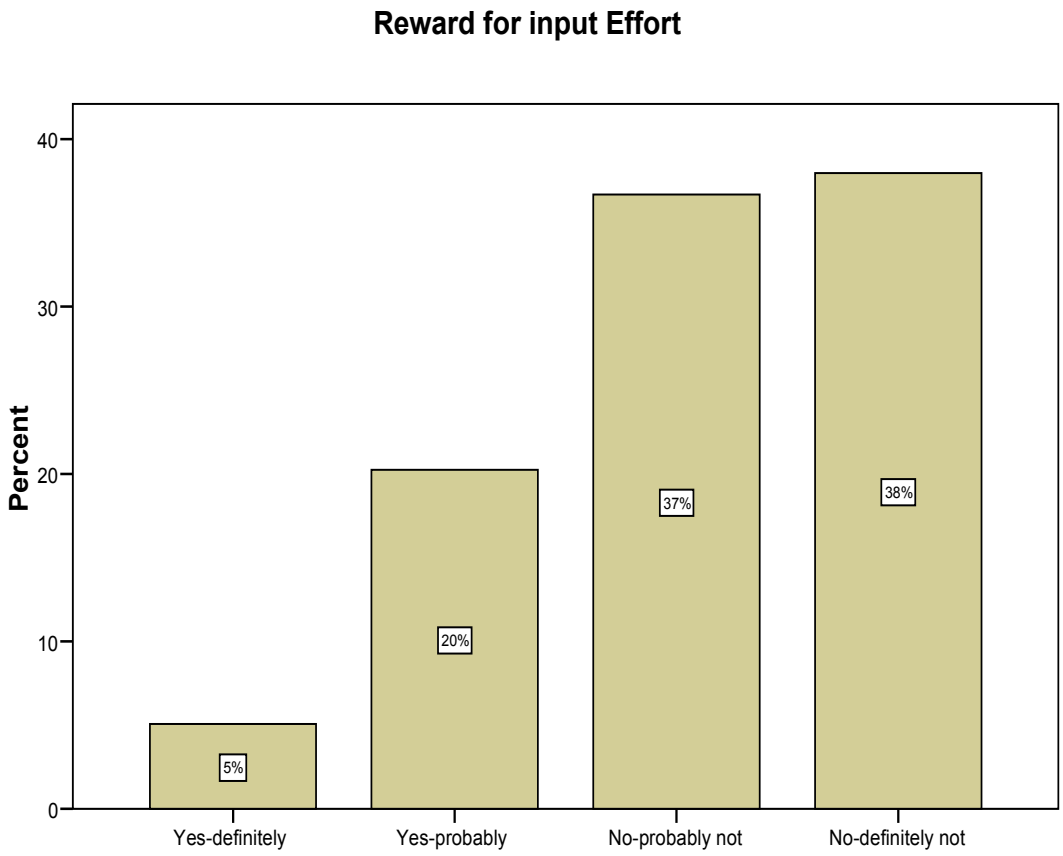
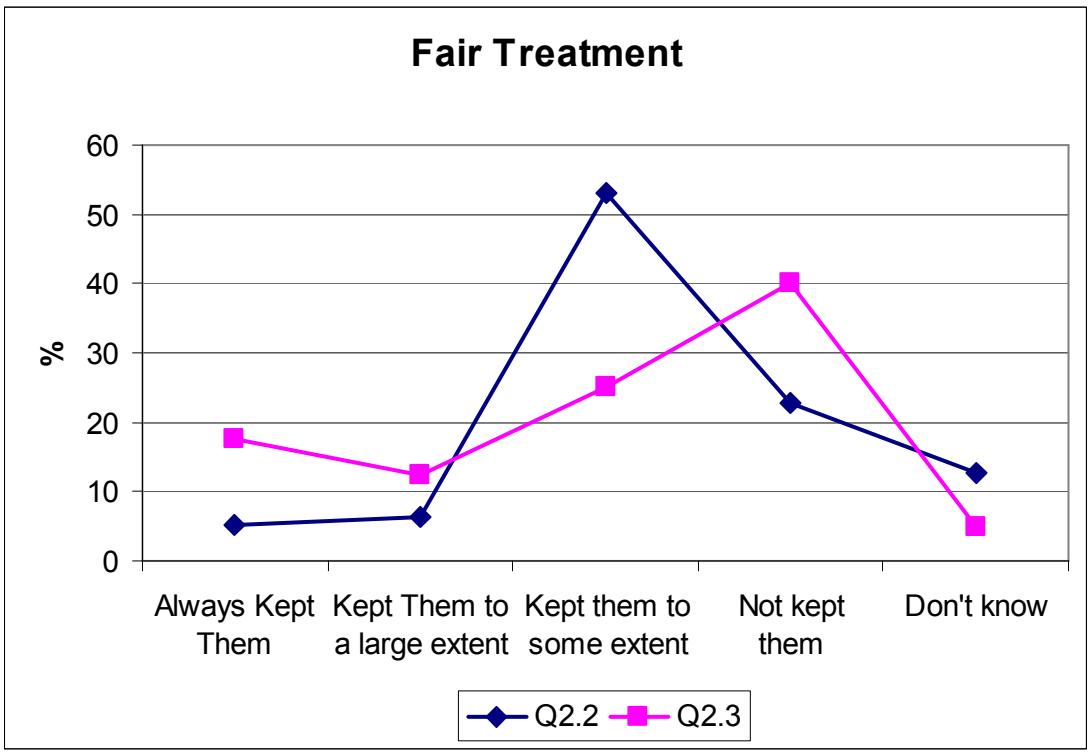


Figure 5.3.6 Rewards for Input Effort

5.3.5 Summary of Perception of fairness of Treatment

	Always Kept Them	Kept Them to a large extent	Kept them to some extent	Not kept them	Don't know	N
Q2.2	5.1	6.3	53.2	22.8	12.7	79
Q2.3	17.5	12.5	25	40	5	80

Table 5.3.1 Perception of Fairness of Treatment (%) N=No of Valid Responses



Q2.2 To what extent has the department kept its promises and commitments to ensure fair treatment by managers and Supervisors?
Q2.3 To what extent has the department kept its promises and commitments to provide you with fair pay for the work you do?

Figure 5.3.7 Employees Perception of fair treatment

This section on perception of fairness of treatment has revealed that employees are generally happy with the way they are supervised. The problem area appears to be regarding payment. The results show that the majority of employees are not happy with their payment.

5.3.6 Employee Direct Participation

Direct participation of employees is a way of establishing employees' involvement in the organisation they work for and also that they are kept informed (Guest and Conway, 1998: 11). Employee participation in matters relating to their work is a way of empowering them.

5.3.6.1 Work Initiative

This question's aim was to determine if respondents were free to initiate how they do their work. This was to establish if there is a likelihood of too much control as to how work is done. About 88% of respondents indicated that they take their own initiative on their work. The results are as shown in Figure 5.3.8.

This is good as it shows that employees were able to apply their skills to their work.

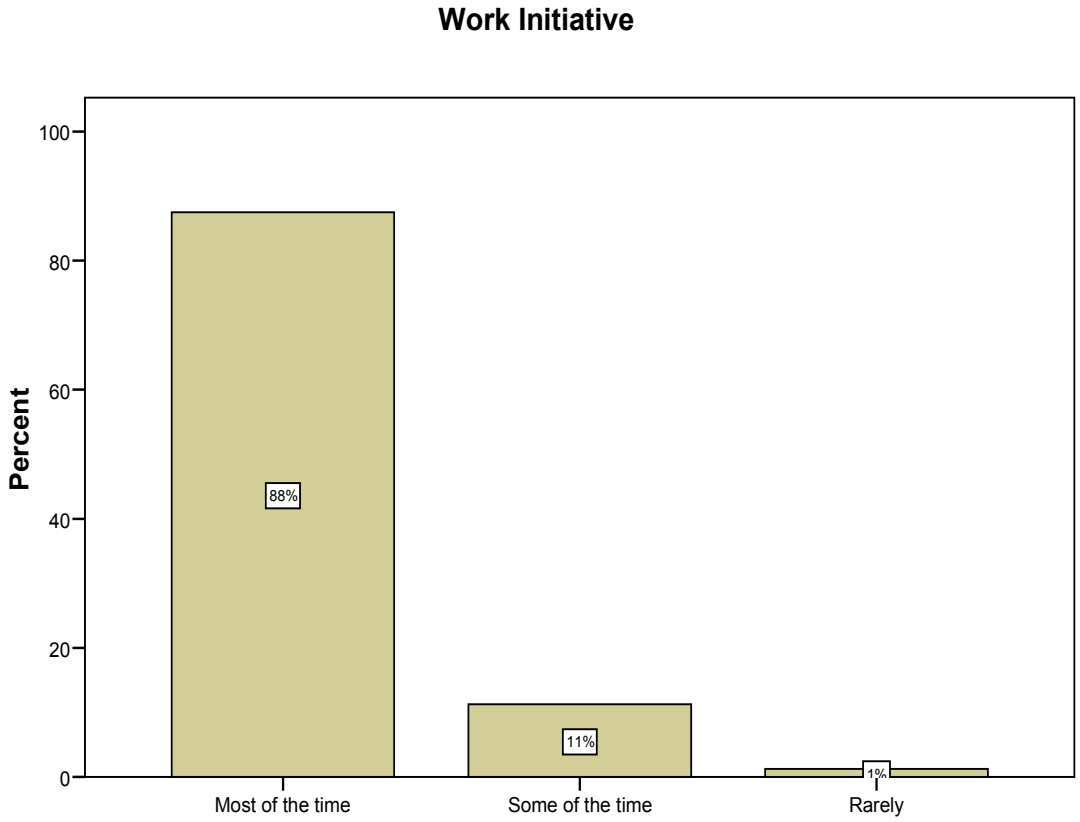


Figure 5.3.8 Work initiatives by employees

5.3.6.2 Plan Your Work

This question's aim was to find out if respondents plan how they work. It is somehow related to work initiative as, if the employees were free to initiate their work they are more likely to be able to plan it as well. The results show that majority of respondents plan their own work with those indicating most of the time accounting for about 66%, as shown in Figure 5.3.9

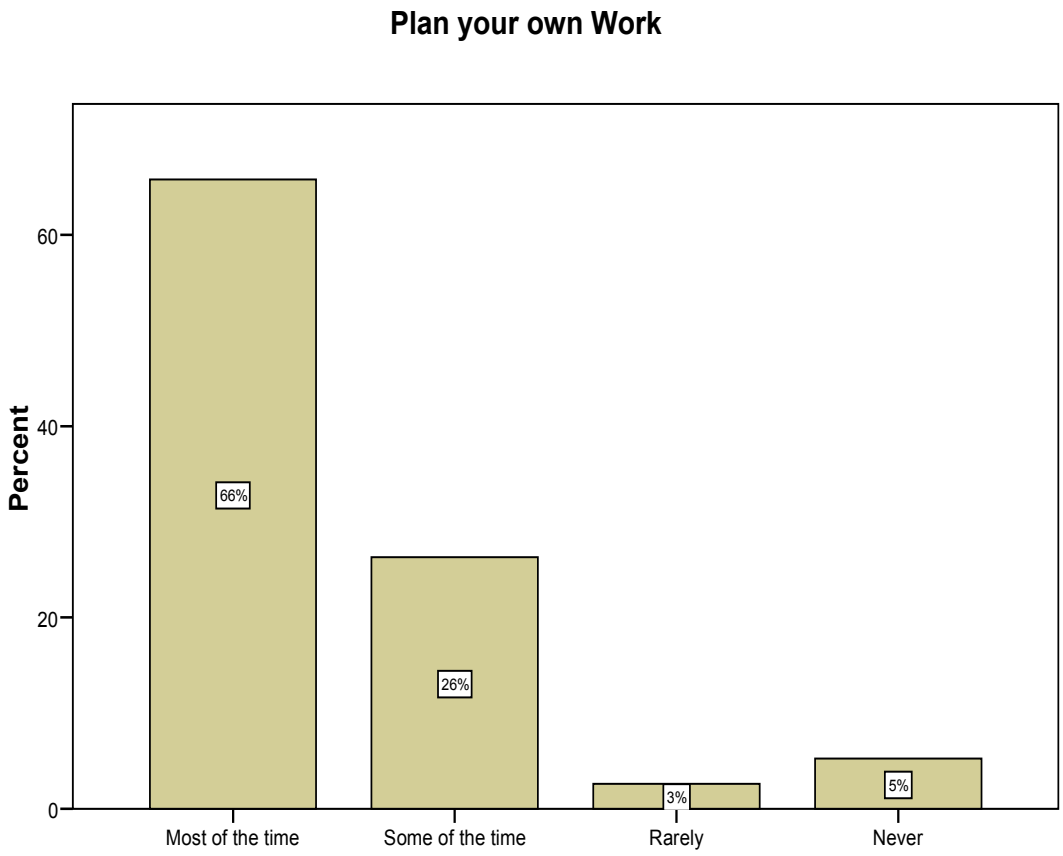


Figure 5.3.9 Ability of Employees to Plan their Work

5.3.6.3 Vary How You Work

This question was asked to determine perception of employees regarding work management. This was in order to find out if employees' work was made rigid by their employer with little room for employees to vary the order or priority of how they work. The majority of respondents, about 84%, indicated that they are free to vary how they work. Varying how they work most of the time had highest response rate of about 47% followed by some of the time at about 37%, as shown in Figure 5.3.10

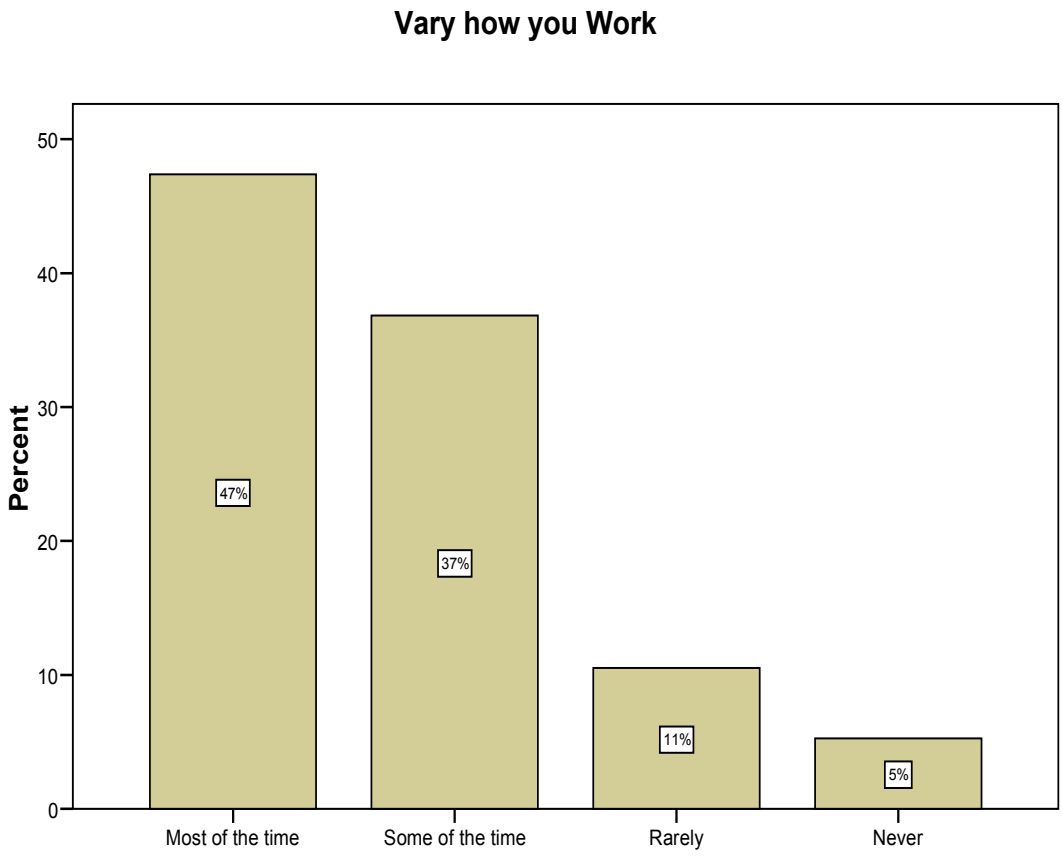


Figure 5.4.10 Employees Vary How They Work

5.3.6.4 Choose Assignment to Work On

In order to find out if employees were free to decide on which assignment to do, this question was asked to respondents. This question builds on previous questions as the main focus is to try and determine if there are rigid bureaucratic controls in the departments. Majority of respondents, about 37%, indicated that most of the time they choose their assignments, followed by some of the time with about 25%. The results are as shown in Figure 5.3.11.

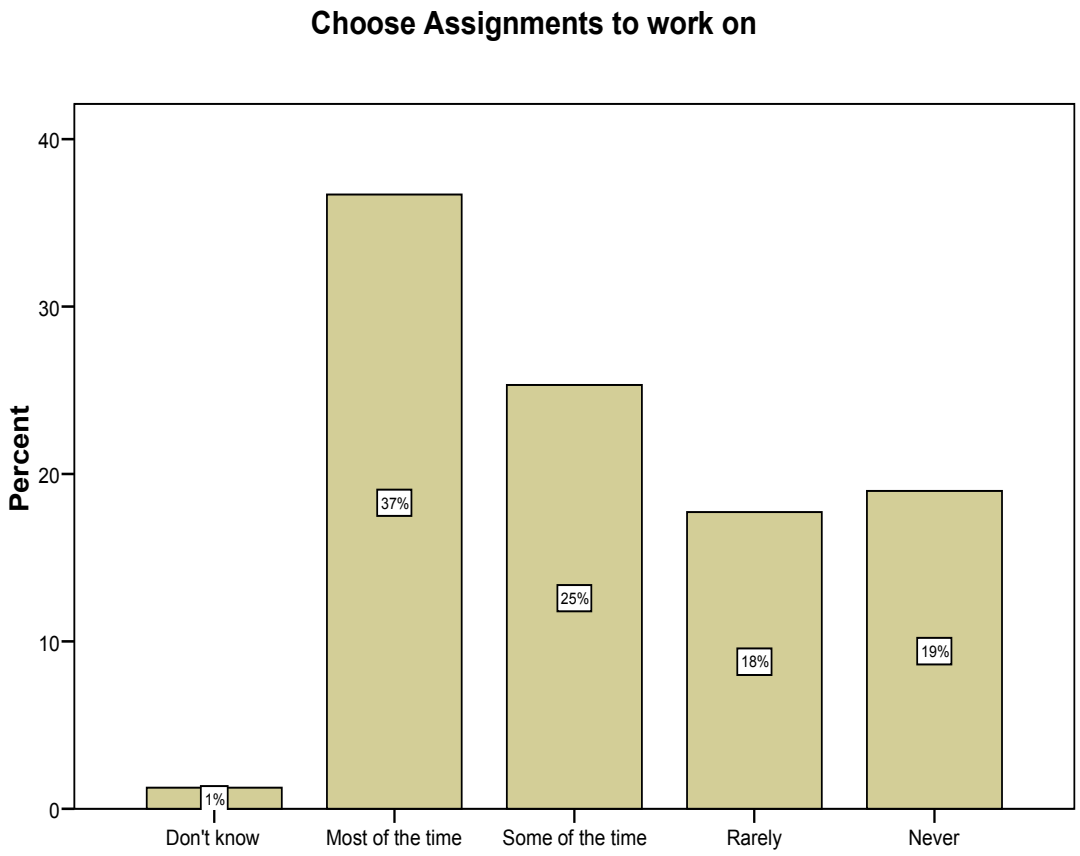
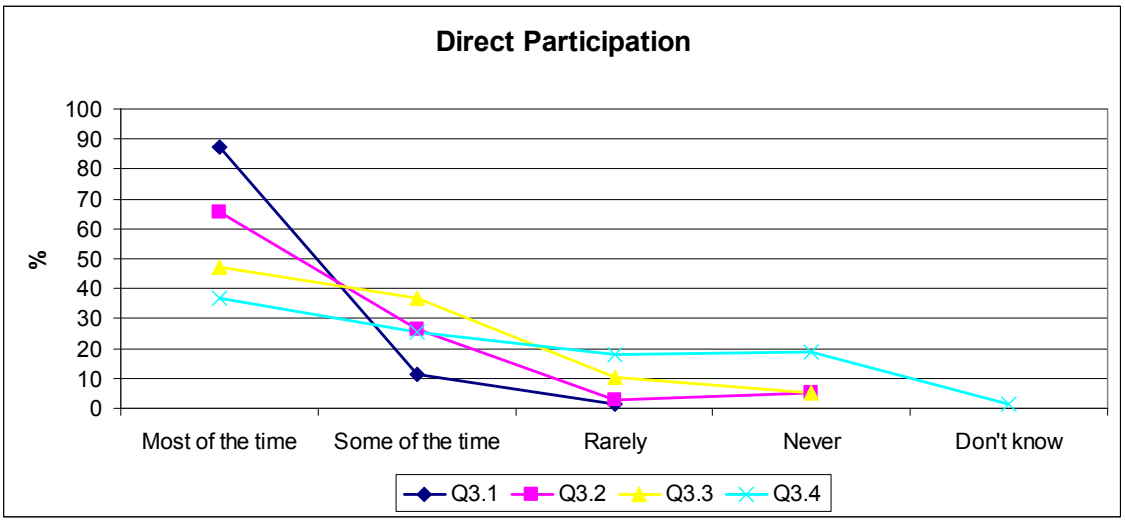


Figure 5.3.11 Choose Assignment to Work On

5.3.7 Summary of Employee Direct Participation

	Most of the time	Some of the time	Rarely	Never	Don't know	N
Q3.1	87.5	11.3	1.3			80
Q3.2	65.8	26.3	2.6	5.3		76
Q3.3	47.4	36.8	10.5	5.3		76
Q3.4	36.7	25.3	17.7	19	1.3	79

Table 5.3.2 Employee Direct Participation (%), N= No. of valid responses



How does each of the following best describe your participation in your job?
Q3.1 I carry out my work in the way I best think
Q3.2 I plan my own work
Q3.3 I vary how I do my work
Q3.4 I choose the assignments I work on

Figure 5.3.12 Employees Perception of Direct Participation

All the questions on direct participation show close similarity in response as shown in Figure 5.3.12. Perception of direct participation among employees is high among the majority of employees and declines towards the low levels of the scale.

5.3.8 Employees' Trust and Fairness

Trust that employees have for their employer to keep its promise is important as it creates a secure work environment. With the Botswana government introducing numerous strategies like outsourcing its services, it was therefore found to be important to determine the level of trust that employees have towards the department they work for.

5.3.8.1 Commitment to Employees

This question's aim was to determine employees' perception about commitment that they feel their department has towards them. It was a way to understand if employees feel that they are valued by their employer. Total valid response to this question was 80 responses. Hence perception figures are based on this figure. The majority of respondents indicated only a little commitment to be shown by their department. This accounted for about 44%. This was followed by those who responded with "Somewhat" which is between "a lot" and "only a little", at 25%. Full results are as shown in Figure 5.3.13.

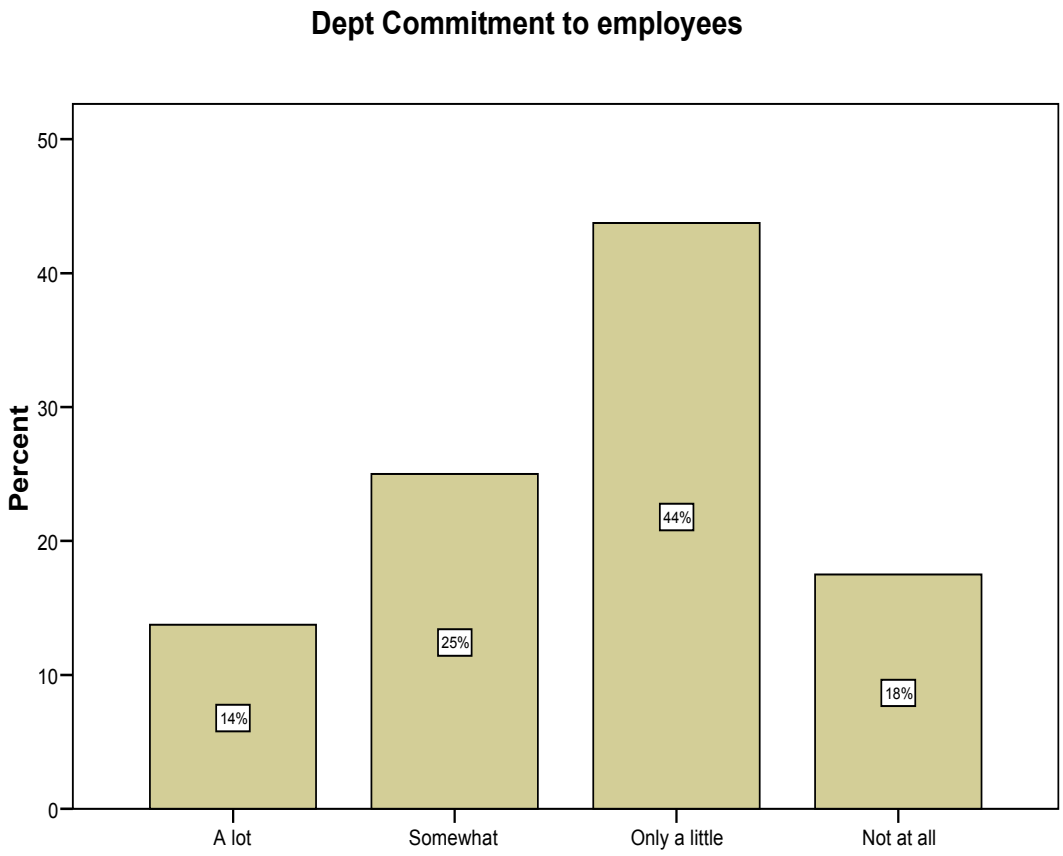


Figure 5.3.13 Department's Commitment to Employees

5.3.8.2 Trust of Management

The total valid response to this question was 77. When respondents were asked about whether their department management has high regard for their interest, only 18% indicated that they trust them a lot. The majority of respondents indicated that they trust management only a little, which accounted for about 38%. Full results are as shown in Figure 5.3.14

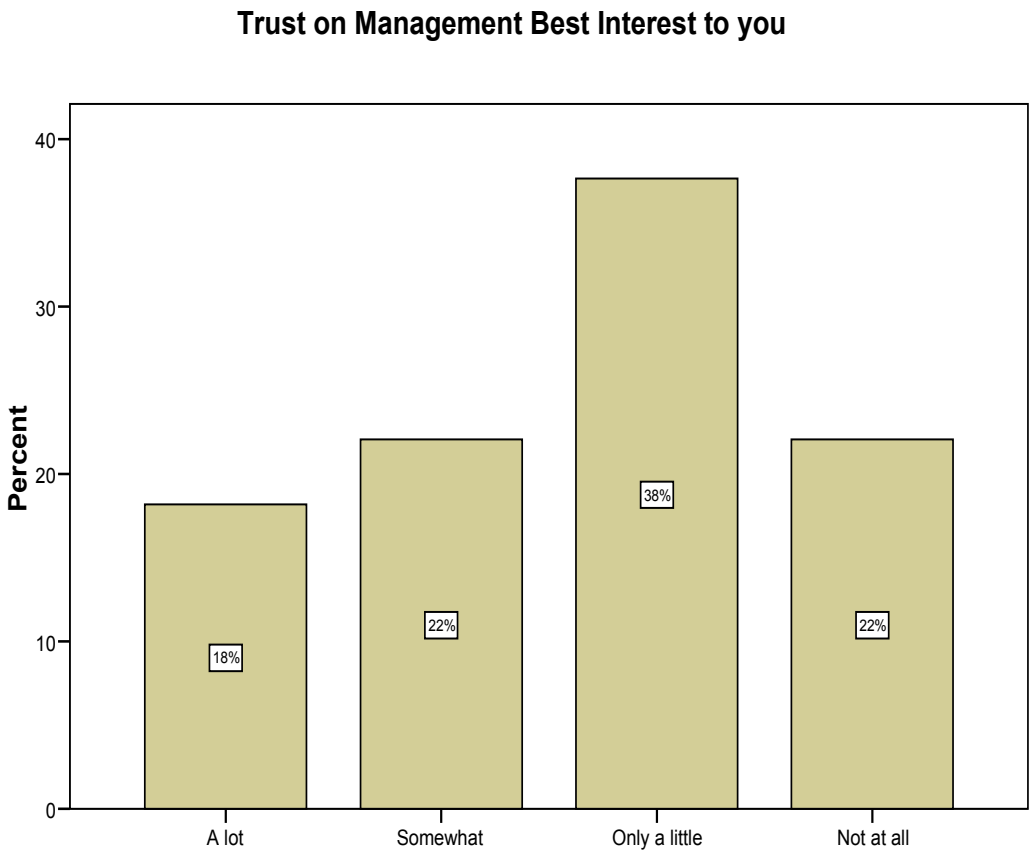
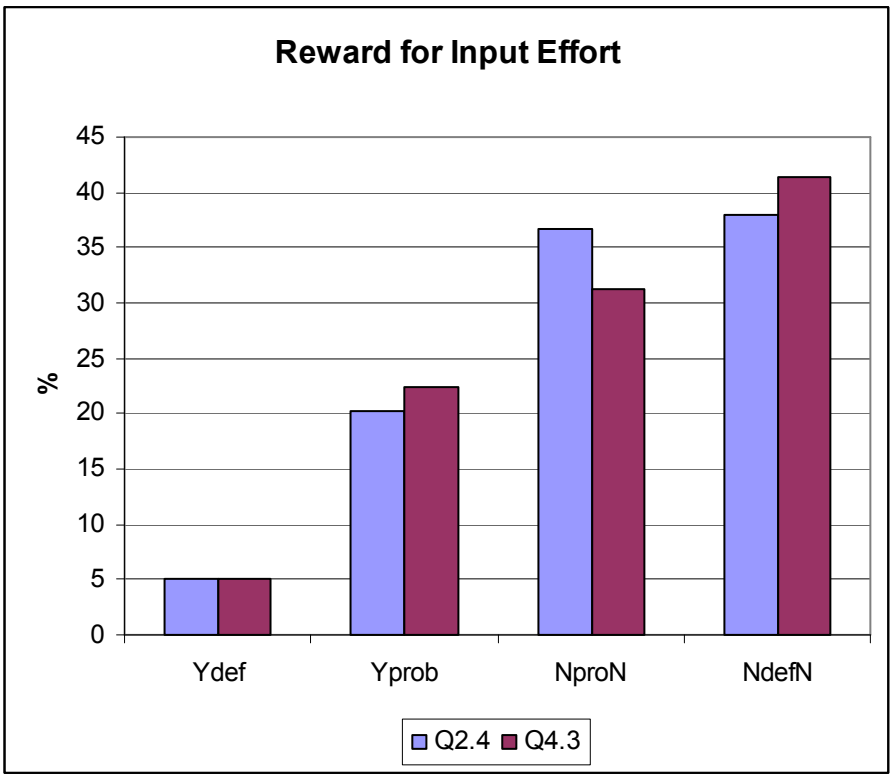


Figure 5.3.14 Employees Trust of Management

5.3.8.3 Reward for Input Effort

This question has been asked before under fairness of treatment. However it has been repeated to check consistency of responses given by respondents. If respondents were randomly responding to questionnaire it is more likely that the results to the same question when repeated will also show greater variation. Figure 5.3.15 show results of comparison of responses to the same question.



Ydef- yes definitely, Ypro- yes probably, NproN- no probably not, NdefN- no definitely not

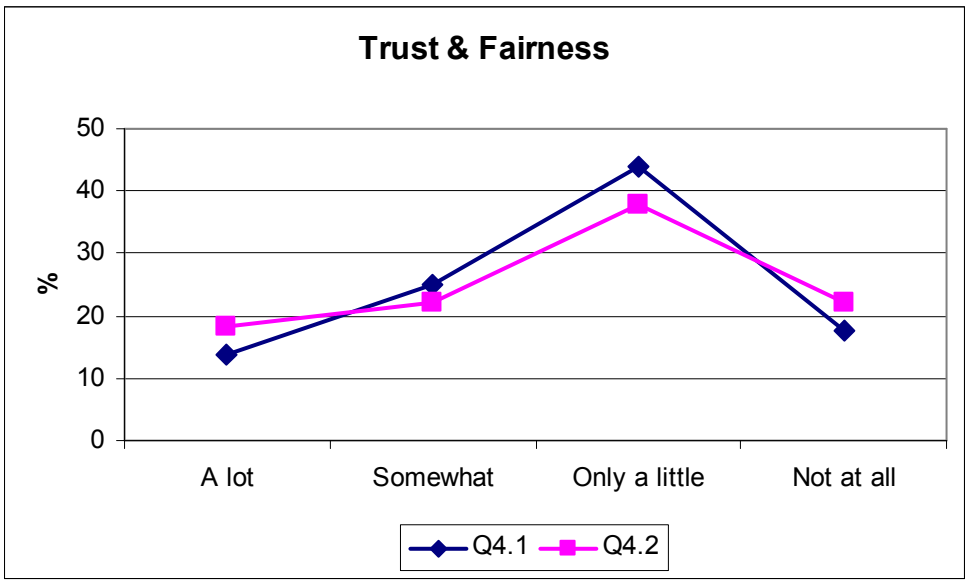
Figure 5.3.15 Comparison of a repeat question

The results show that the pattern of response was very similar, showing an increase from those indicating yes definitely (Ydef) to those indicating no definitely not (NdefN). The response to both question were about the same as Q4.2 had 79 responses while Q4.3 had 80.

5.3.9 Summary of Employee Trust and Fairness

	A lot	Somewhat	Only a little	Not at all	N
Q4.1	13.8	25	43.8	17.5	80
Q4.2	18.2	22.1	37.7	22.1	77

Table 5.3.3 Trust and Fairness (%), N= No. of valid responses



Q4.1 In general, how much do you trust your department to keep its promise and commitments to you and other employees?
Q4.2 To what extent do you trust management to look after your best interest?
Figure 5.3.16 Employee Trust and Fairness

Figure 5.3.16 shows that trust and fairness is not high among employees. The majority of respondents indicated that they perceive only a little amount of trust and fairness. There is similarity in response to the two questions asking about trust and fairness.

5.3.10 Levels of Commitment to the Department

Investment in developing human resources has been argued to lead to the ability of an organisation to employ and retain the commitment of employees. It is assumed that a higher level of commitment to an organisation is likely to increase employee performance and reduce risk of loosing staff (Guest and Conway, 1998: 21).

5.3.10.1 Loyalty to Department

This question's aim was to determine the extent to which employees feel they are loyal to the department they work for, loyalty meaning being able to defend and protect the integrity of the department they work for. This is very important, as high loyalty is more likely to imply that employee will do their best to avoid the name of their department being tarnished by bad publicity about its services. This question had 76 valid responses and 5 missing values. Majority of respondents (47%) indicated that they have "a lot of loyalty" and this was followed by "some loyalty" with 38%. Results are shown in Figure 5.3.17

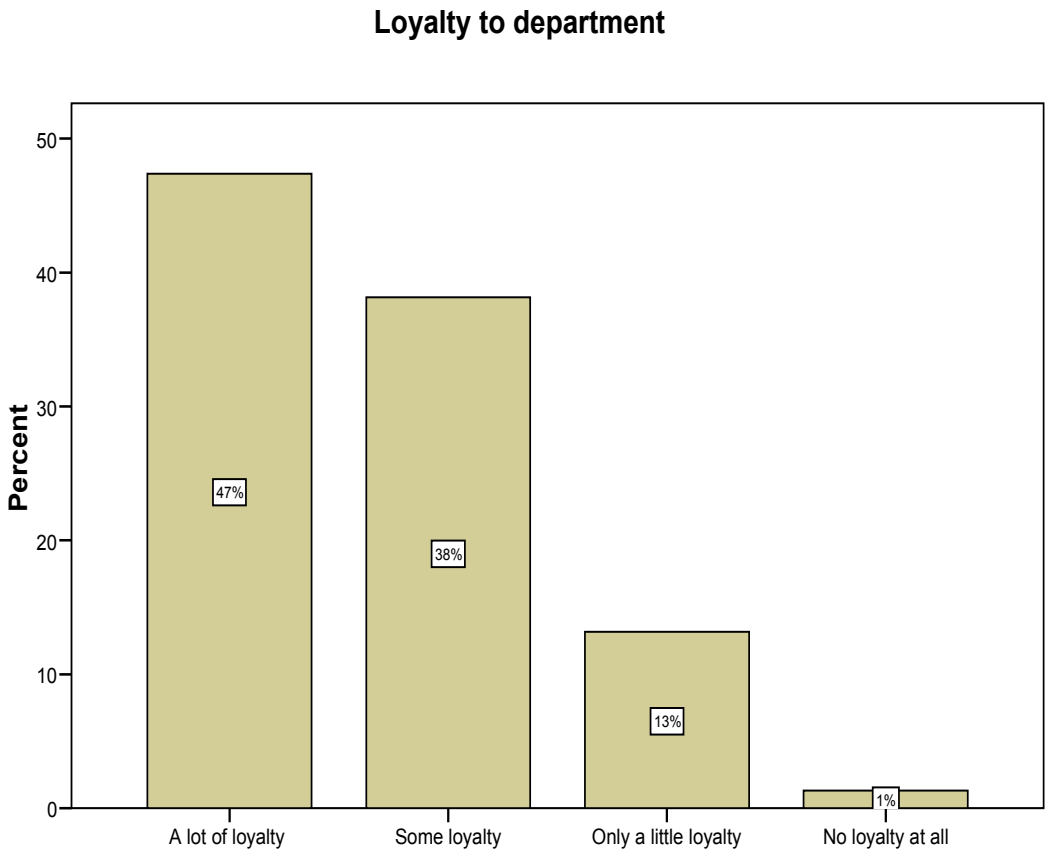


Figure 5.3.17 Employees Loyalty to Department

5.3.10.2 Pride in Working for the Department

In this question, pride meant being happy and content with the department that the employee works for. This question had 78 valid responses and 3 missing values. Majority of employees indicated that they were “very proud indeed” which had 31%. The total responses indicating an element of pride for working for the department accounted for 83% of responses. Lack of pride had smallest responses of 17% as shown in Figure 5.3.18

Figure 5.3.18 Employees Pride for the Department

5.3.11 State of Employment Relations

State of employment relations is the overall perception of working relationships between those in management and the people they manage. A good employment relationship is where individuals feel part of the whole organisation and are willing to do their best as they feel appreciated and valued. They are not just tools to do the job.

5.3.11.1 Employee and Management Relations

This question was asked to determine perception about employee relations within a department. It is very important to understand its status especially since one of the programmes that Botswana government launched in the mid 1990' called Work Improvement Teams (WITS) was to foster good working relations and foster team spirit in work (Hope, 1995: 47). This question had 78 valid responses and 3 missing values. The majority of respondents described

employee relations as “only fair”. This accounted for 41%, followed by “good” with 24%. It is worth noting that responses for “poor” and “very poor” had a total response of 26%. This indicates that there are some problems regarding employee relations among employees. Figure 5.3.19 show results for this question.

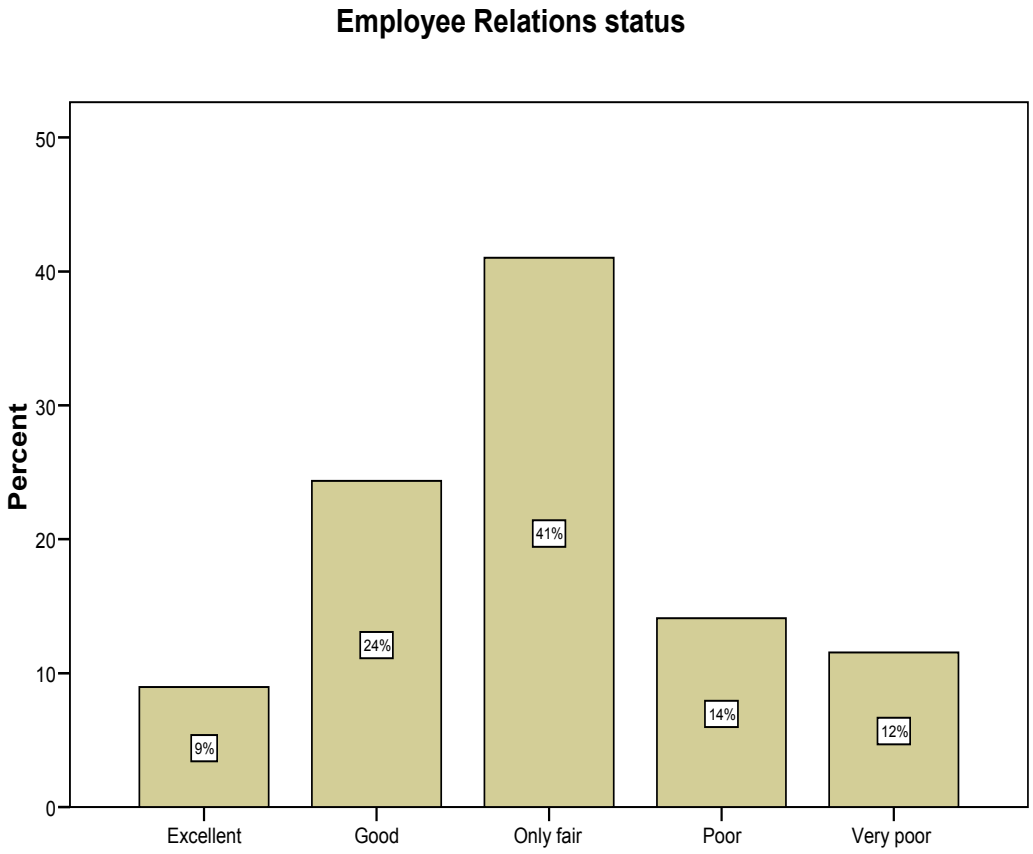


Figure 5.3.19 Perceptions about Employees Relations

5.3.11.2 Influence in Department Decisions

Educated employees are more likely to have desire to utilise their education in their work environment. Also they want to feel that they are part of the decision making process in an organisation. This is good as it gives them worth while experience, hence improving their own portfolios. This question was asked to find out if employees were satisfied with the department decisions relating to their work. There were 77 valid and 3 missing responses for this question. The results show a high level of dissatisfaction of 70%. The majority of respondents

(52%) indicated that they were “not too satisfied”. Figure 5.3.20 show results for all categories for this question.

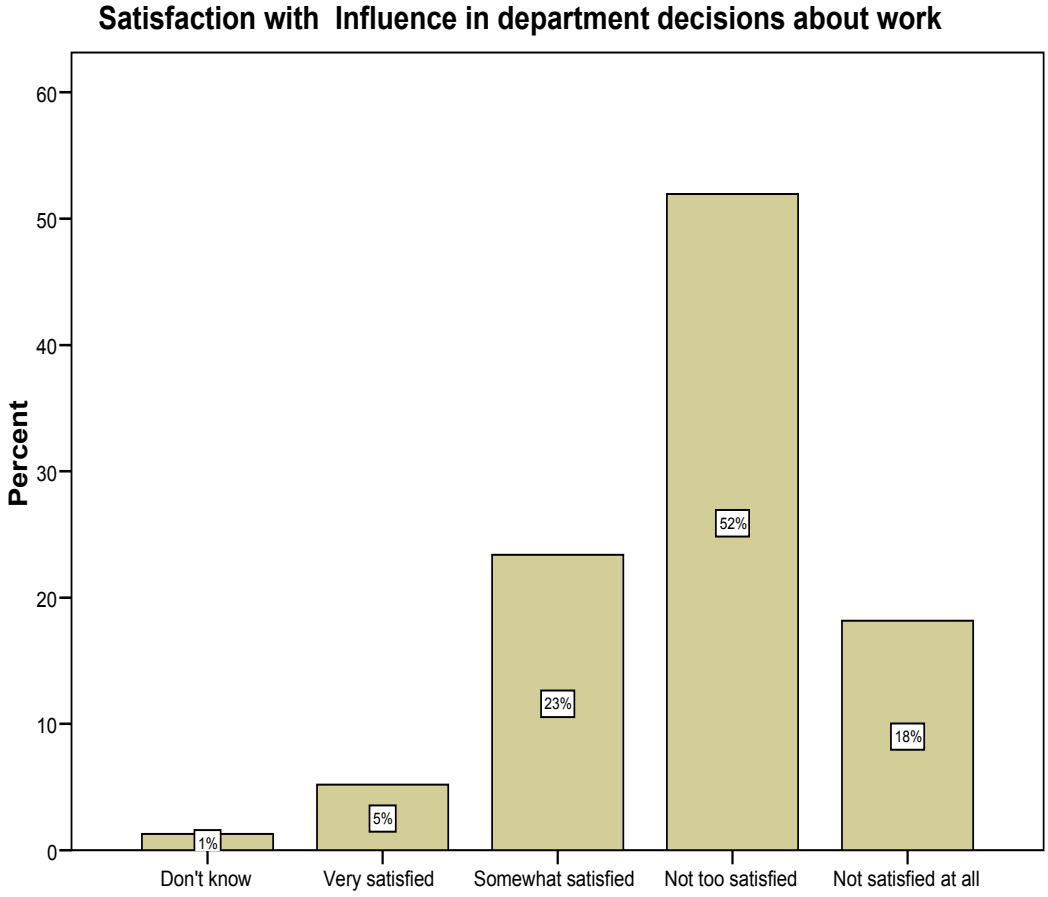


Figure 5.3.20 Satisfaction with Individual Influence in Department Decisions

5.3.12 Employee Motivation and Effort

Motivation and effort have been shown to be different factors. Motivation is related to increased participation and involvement in activities at work, while effort is related to external factors such as the amount of work to be done and demands from management (Guest and Conway, 1998: 27).

5.3.12.1 Motivation in Your Present Job

This question’s aim was to determine level of motivation among employees. Employees who are motivated are more likely to do their job better. This question had 78 valid and 3 missing values. Motivation seems to be low among employees. The majority of employees (51%) indicated that they were not

motivated. This is a major issue as low motivation is not desirable in any organisation. Figure 5.3.21 shows results for all categories for this question.

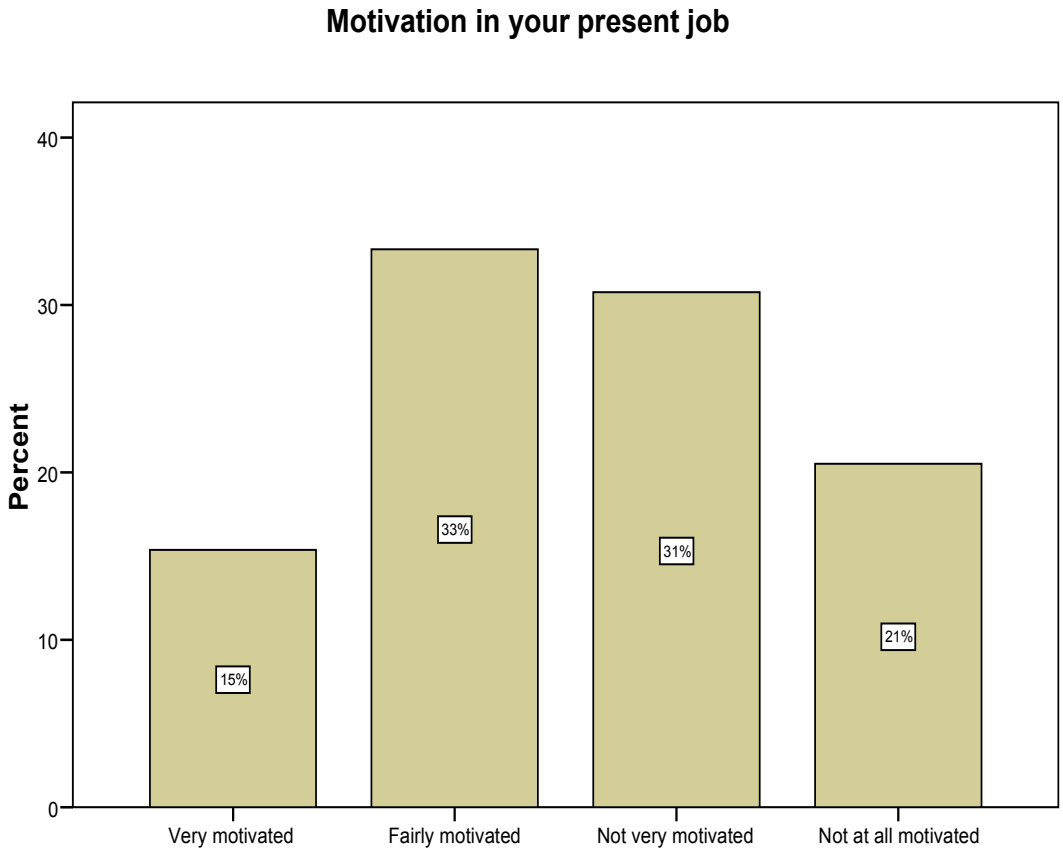


Figure 5.3.21 Employees' Motivation

5.3.12.2 Looking Forward to Work

Employment is a way of earning a living; hence employees may still come to work even if they do not like the job, but just so that they can earn income to meet their living expenses. This is particularly so in an environment where unemployment is very high. This question was asked to determine if employees like their jobs. This question had 78 valid and 3 missing responses. The majority of respondents reported that they had high desire for coming to work; this accounted for 63% of respondents. There was a significant portion of 17% who indicated that only "sometimes" are they looking forward to work. A major concern was the figure for those who indicated that "rarely" or "never" as both accounted for 20% of respondents. Figure 5.3.22 show results for this question.

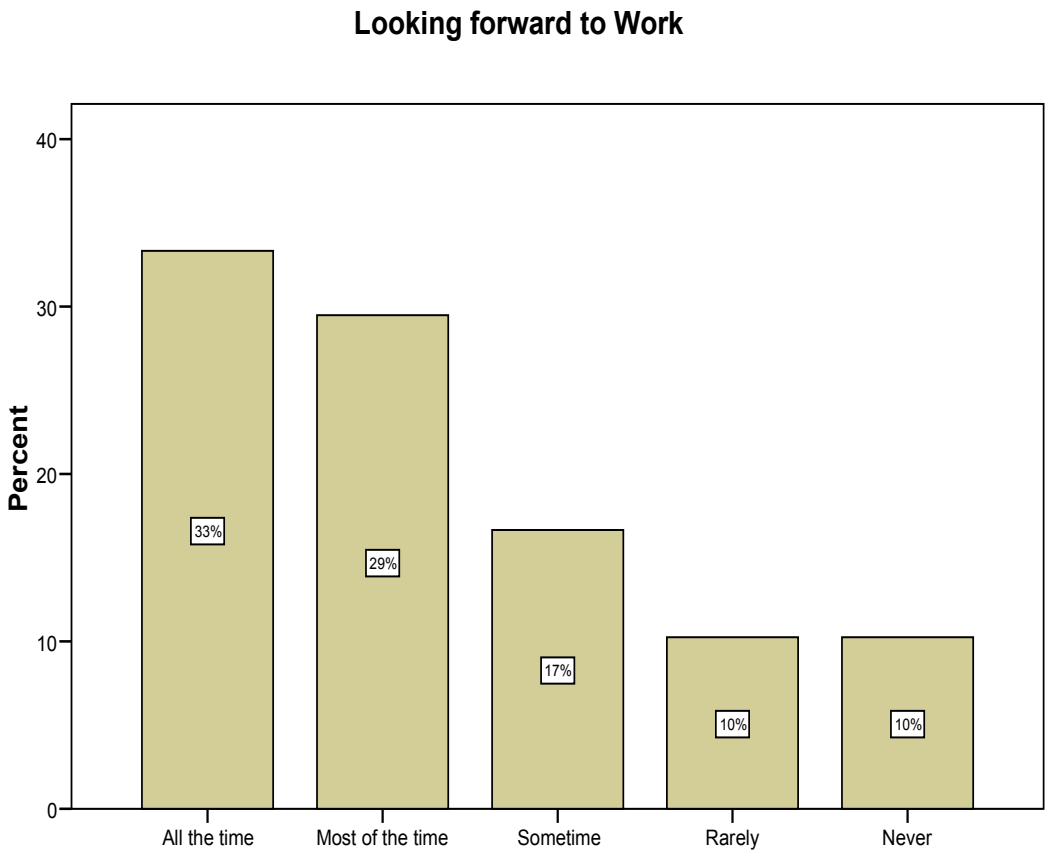


Figure 5.3.22 Employees State of Looking Forward to Work

5.3.12.3 Working Hard

Employees were asked to rate themselves on how hard they think they work. This is a very subjective question as a person is more likely to want to portray only the good things about their individual character. Since not working hard is an undesirable behaviour, people may not be honest about themselves. However where there is a genuine problem like an employee who feels that his job is not challenging and at the same time there are no prospects to make it challenging, such an employee may be inclined to indicate so. This question had 78 valid and 3 missing responses. 60% of respondents, the majority indicated that they were working very hard. However there were 6% of respondents who indicated that they were not working particularly hard. The results are as shown in Figure 5.3.23.

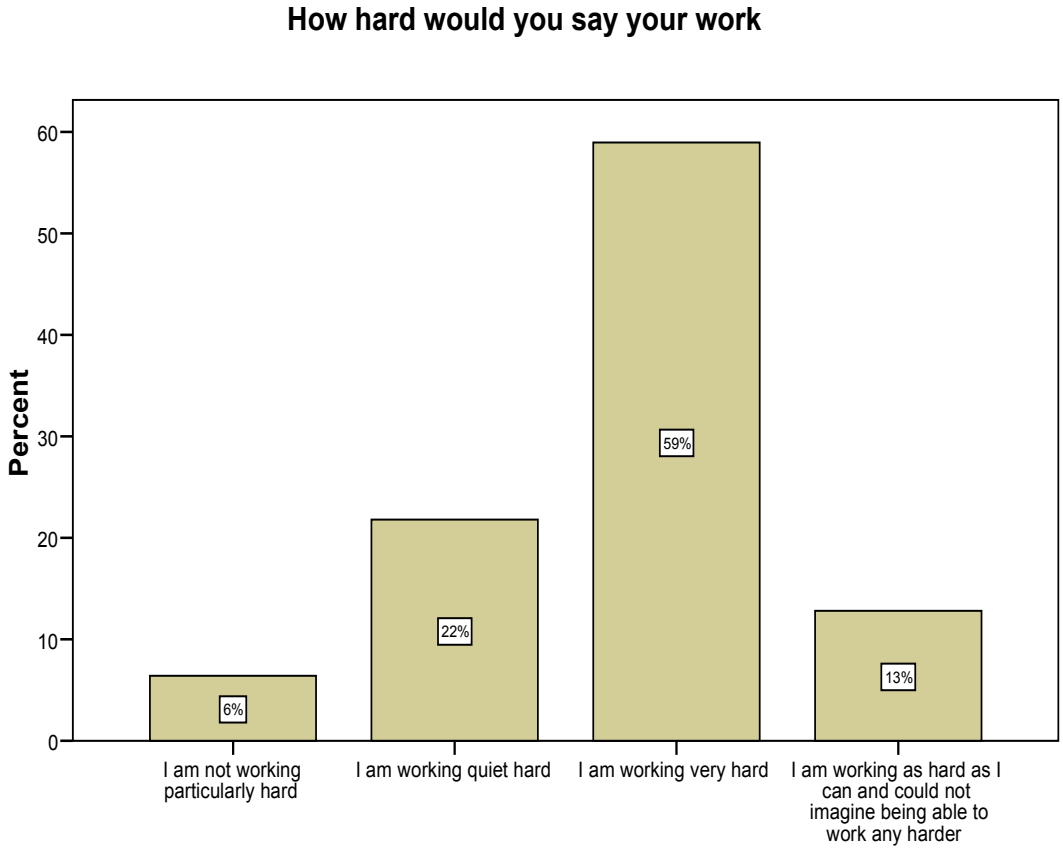


Figure 5.3.23 How Hard Employees Think They Work

5.3.13 Department Citizen Behaviour

Guest and Conway (1998: 29) argue that due to changing work environment and the need to offer quality service to customers, an employees may sometimes have to work beyond what is stipulated in their job description. However in organisation where there are rigid bureaucratic controls, employee's innovation may be restrained. The Botswana public sector is predominantly run along bureaucratic lines. For example every action that employee may want to do which is related to their job but outside practice, must be approved first by supervisors. Citizen behaviour is a way of an employee feeling attached to an organisation, as if it is the only organisation that is the best to work for.

5.3.13.1 Obligation to Work Even When Not Well

For health and safety reasons, an employee is not allowed to work when they are not feeling well, hence employees are entitled to sick leave (Botswana, 2008), (HSE, 2004). This depends more on the extent of the feeling, especially

if it is an illness or some mental state which if assessed by experts is found to pose a risk to an employee and others. Where there is a high commitment to an organisation, an employee might still feel the need to work even when not well. This question was asked to determine the level of willingness to work even when not well among respondents. The question had 78 valid and 3 missing responses. Desire not to work when not well was found to be low at 18%, this was similar to the response for those who had very strong desire. The majority of respondents were in the middle, indicating average desire at about 30%. The combined response for “strong” and “very strong” desire accounted for about 42%, indicating a relatively high level of willingness to work even under conditions which were not ideal to an employee. The results are as shown in Figure 5.3.24

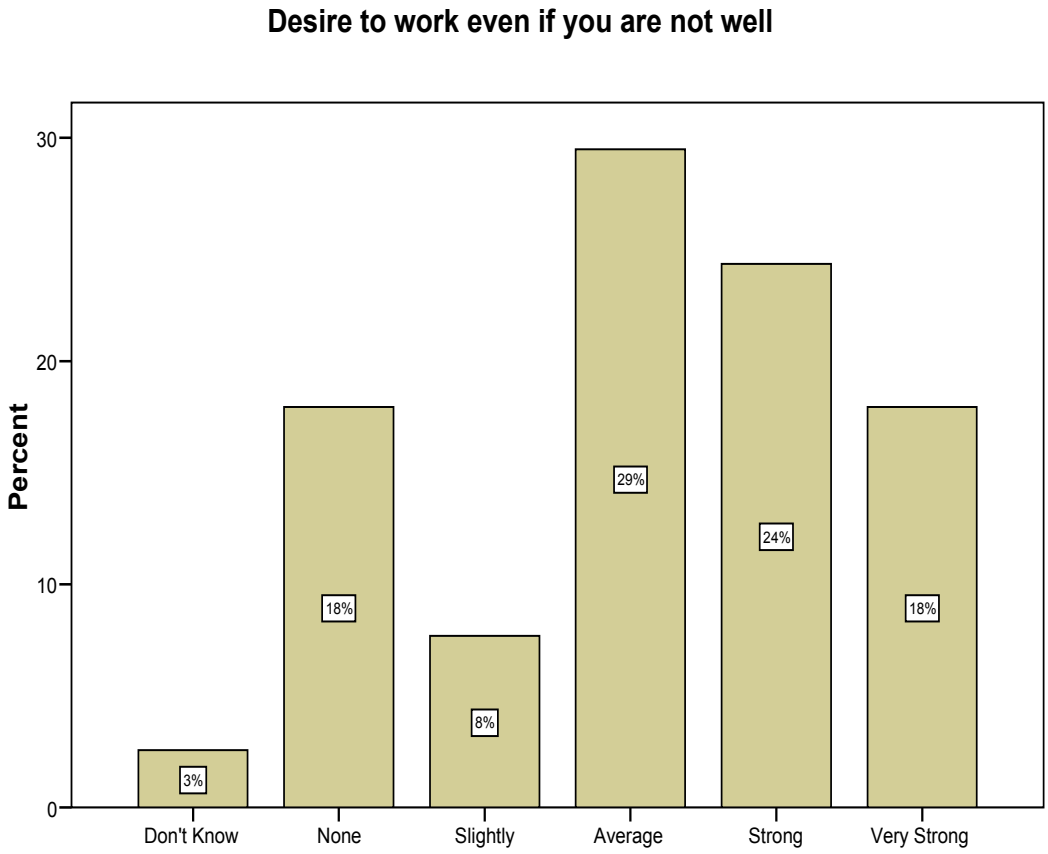


Figure 5.3.24 Desire to work even when not well

5.3.13.2 Loyalty to Department

This question wanted employees to evaluate the level of loyalty that they feel they have towards the department they work for. This question was also asked under commitment that employee have to the department (Section 5.3.8.3). There were 78 valid and 3 missing responses to the question. The majority of respondents (46%) rated their obligations to show loyalty as being very strong. Total response for “strong” and “very strong” was 75% of responses. Figure 5.3.25 shows results for all categories.

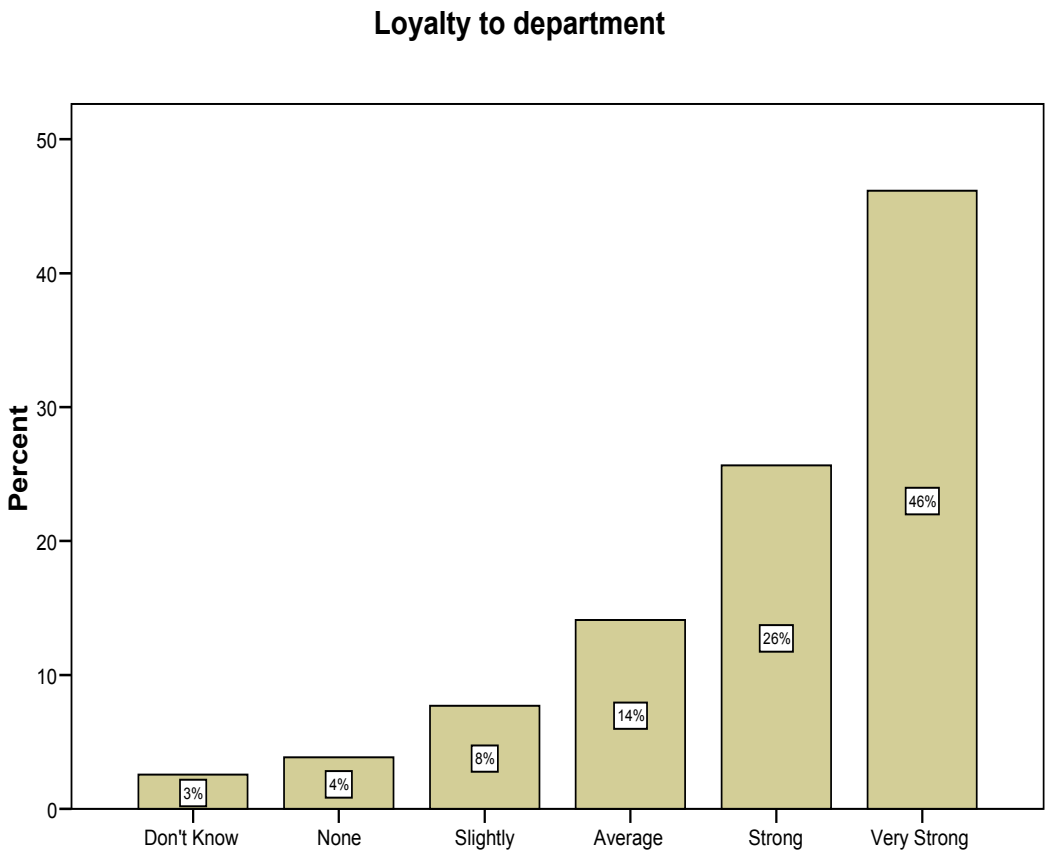


Figure 5.3.25 Loyalty to department

Comparison of results on employee’s loyalty is very similar as those obtained in Section 5.3.10.1. There are more people indicating high degree of loyalty than those indicting the opposite.

5.3.13.3 Obligation to Work Overtime

The Botswana government has stipulated the number of hours that an employee can work during the day. These are in line with The International Labour Organisation's guidelines. The Employment Act – CAP47:01 states that in a working week there are 5 working days and each working day has 9 working hours including 1 hour break as well as 30 minutes break for every 5 hours worked. Where these maximum periods are exceeded an employee is to be compensated by being paid overtime worked (Botswana, 2008). Botswana government employees who are classified as being in professional cadre are not paid overtime in the public sector, but are compensated by taking the overtime hours worked as leave hours. This can create problems especially where salaries in the professional cadre are low, for example Timotheus(2005) observed that it was possible for employees to earn more than their supervisors through working overtime.

Although the Botswana employment act stipulates the maximum period that an employee can work in a working week or working day, there might be times when an employee is required to work beyond the legal period. This might be due to there being lot of customers on that day who may not be able to come again next time. Due to financial reward associated with working overtime, it might be open to abuse, as employees may deliberately not work hard during working hours so that they can be allowed to work overtime to get the financial reward that goes with it. However where work ethics are very strong this may not arise.

This question had 78 valid and 3 missing responses. The overall results show that employees are more likely to agree to work overtime when required to do so as shown in Figure 5.3.26.

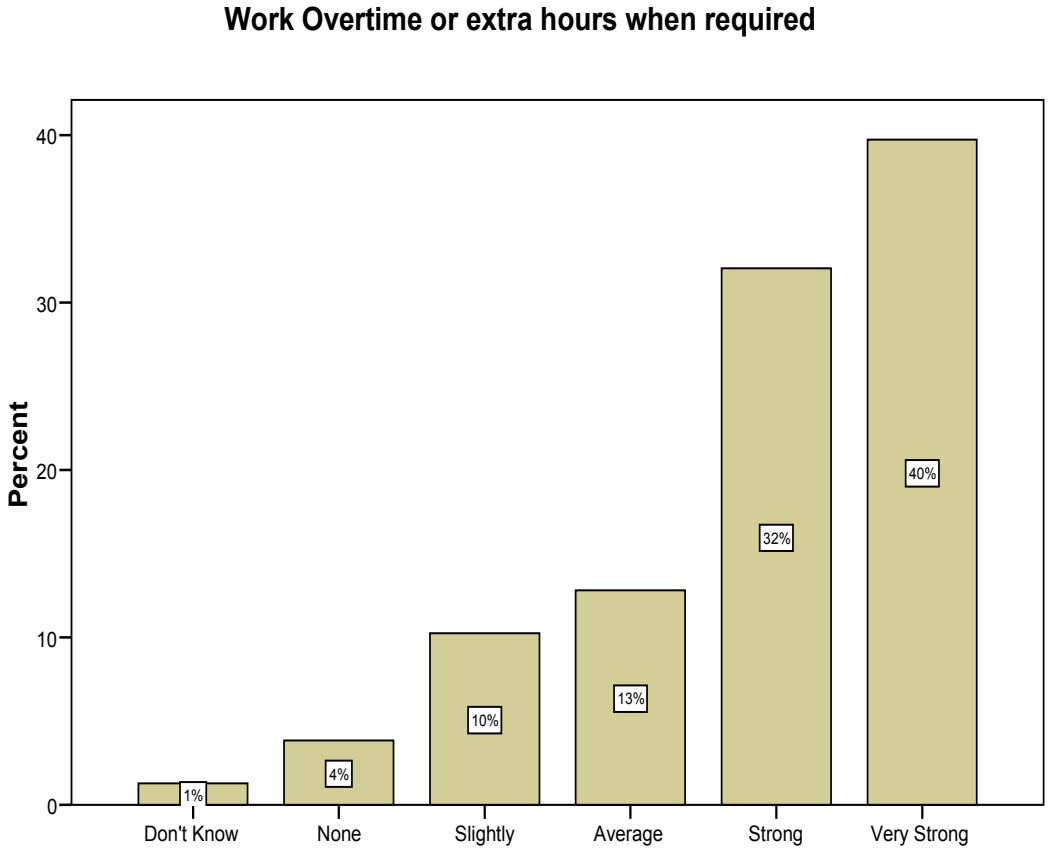


Figure 5.3.26 Work overtime when required

5.3.13.4 Volunteer to Do Tasks Outside Job Description

This question's aim was to determine the level of obligation that employees feel they have if asked to do tasks which are not directly within their job description. Where an employee is not strongly attached to an organisation, probably the level of volunteering will be low. High desire to volunteer show that employees want to go an extra mile to accomplish tasks that need to be done. This question had 78 valid and 3 missing responses. The results show that the majority of employees have very high feelings of obligation to volunteer to do tasks outside their job areas. This accounted for 45% of respondents as shown in Figure 5.3.27

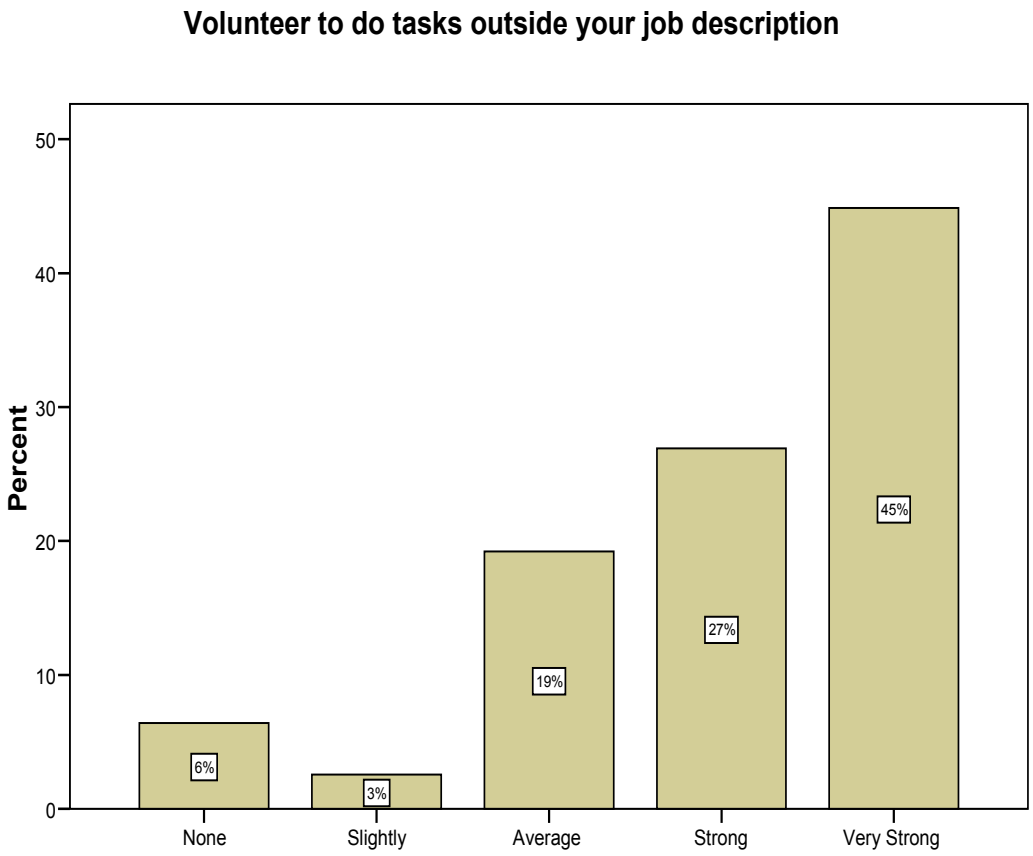


Figure 5.3.27 Volunteer to do tasks outside job description

5.3.13.5 Summary of Department Citizenship Behaviour

	Don't know	None	Slightly	Average	Strong	Very Strong	N
Q8.1.1	2.6	17.9	7.7	29.5	24.4	17.9	78
Q8.1.2	2.6	3.8	7.7	14.1	25.6	46.2	78
Q8.1.3	1.3	3.8	10.3	12.8	32.1	39.7	78
Q8.1.4		6.4	2.6	19.2	26.9	44.9	78

Q8.1 To What extent do you feel obliged to:

- Q8.1.1 Go to work even if you don't feel particularly well?
- Q8.1.2 Show loyalty to the department?
- Q.8.1.3 Work overtime or extra hours when required?
- Q8.1.4 Volunteer to do tasks outside your job description?

Table 5.3.4 Department Citizenship Behaviour (%), N= No of valid responses

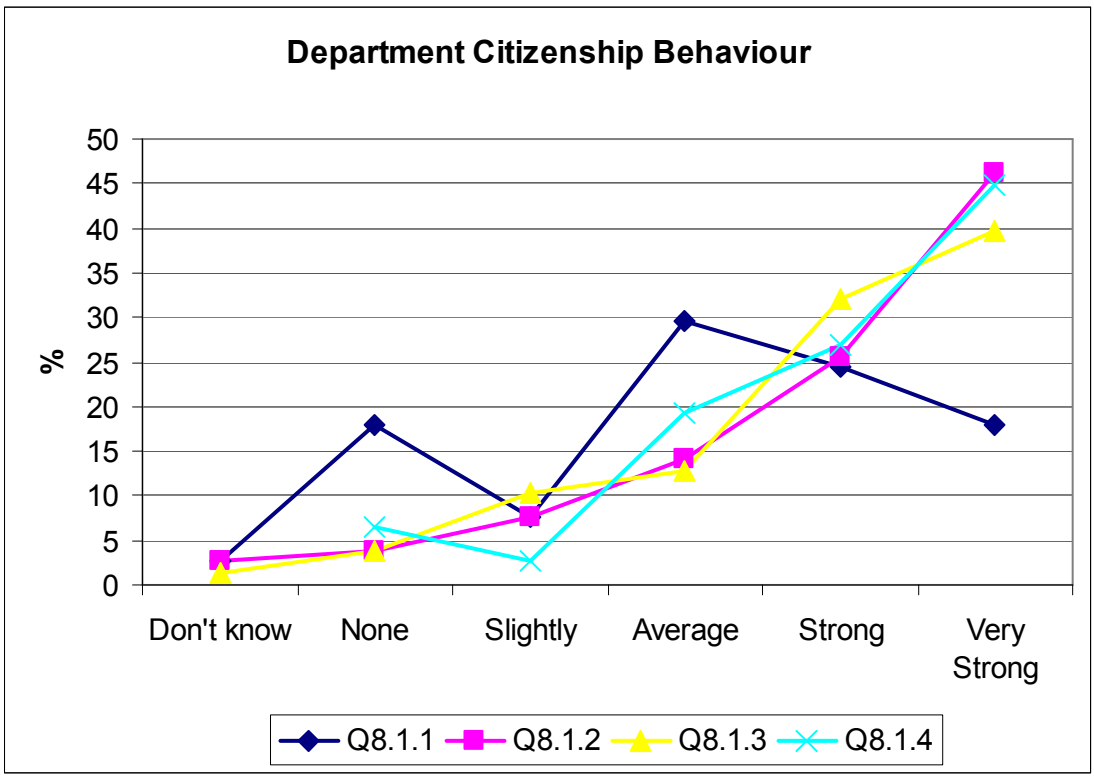


Figure 5.3.28 Employee Department Citizenship Behaviours

There is a very close similarity in responses to questions on citizenship behaviour. Only the question on coming to work when not feeling well shows significant variation from the others.

5.3.13.6 Cross Tabulation of Some of the Results

Due to the small response rate for employee data which was only about 78, it has not been possible to run a cross tabulation of variables that could yield statistically valid results. An attempt to cross tabulate education level and employee looking forward to work (Q8.1.1) resulted in only 25% of cell values containing more than 5 entries required. Therefore about 75% of cells in this cross tabulation have expected counts less than 5. Hence the chi square test could not be used as it requires majority of the cells to have values of 5 or more (Rose and Sullivan, 1993: 164) for its results to be valid.

5.4 User Satisfaction

5.4.1 Introduction

User satisfaction was undertaken to find out if employees have required skills and are also supported with the use of computing facilities within a department. User satisfaction is important for this research as users of IT need support and help especially when the technology does not work properly. Lack of adequate user satisfaction is more likely to lead to users not exploiting ICT. The instrument that was used to measure user satisfaction is SERVQUAL as discussed in Section 4.6.2.4. This instrument has been tested and validated for use in computerised information systems (Kettinger and Lee, 1994: 756).

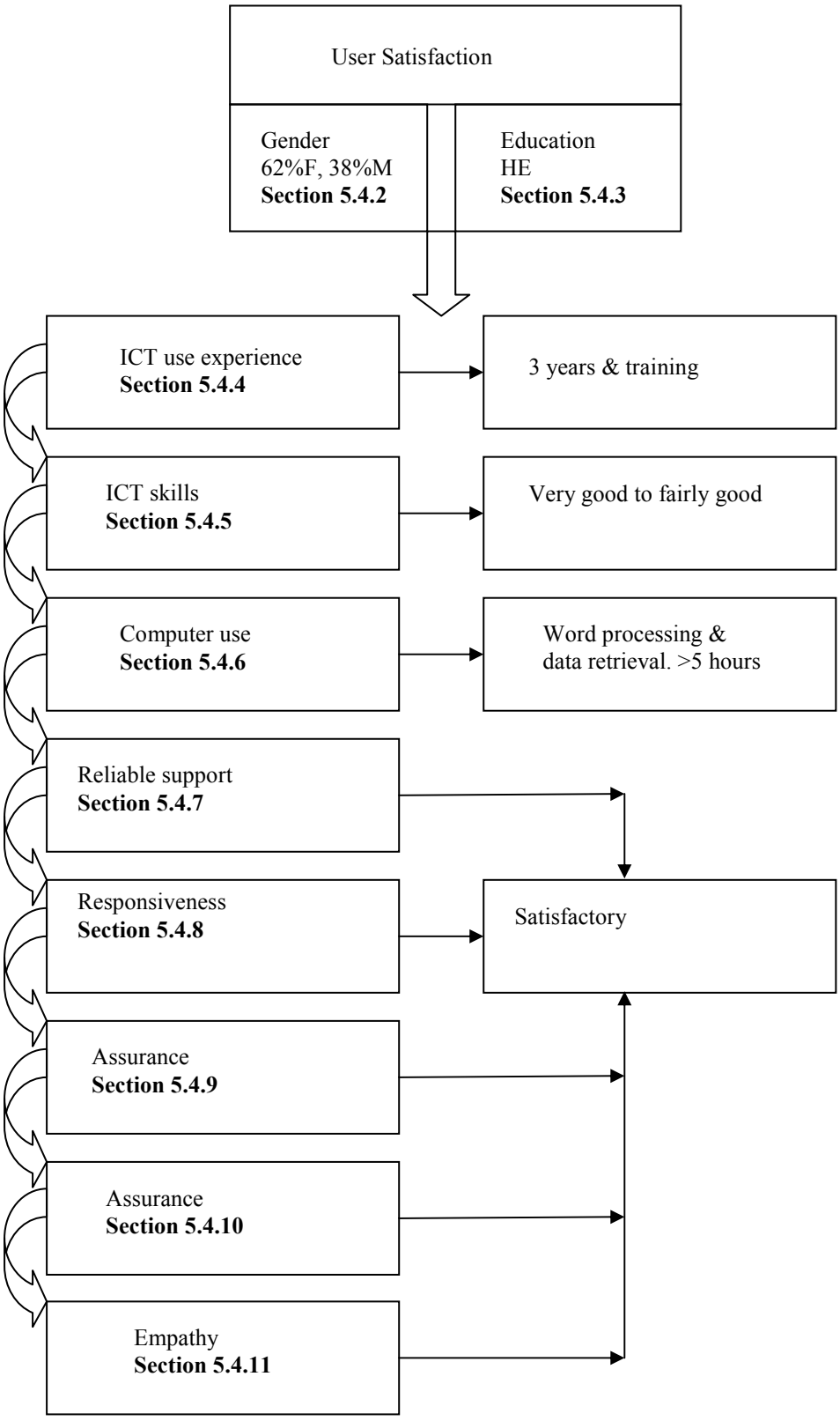


Figure 5.4.1 Overview of user satisfaction results

The results of each of the four factors in SERVQUAL were tested for internal reliability using Cronbach alpha test. The alpha values for all the factors were more than 0.9. The correlations of items for each factor were also high. This shows that the variations in survey responses were more likely to be due to the difference of opinions of respondents rather than to confusion or different interpretation of the questions. The results are shown in Appendix K.

5.4.2 Gender

Gender of respondents was biased towards females as there were more females (62%) than males (38%) from a total response of 61 valid responses to the question on gender. Gender biased towards females might be due to the fact that a significant number of females are employed as data entry clerks, jobs which are more inclined to be female dominated. This was also revealed under employee relations.

5.4.3 Education Level

The majority of respondents were holding high school qualifications (44%) followed by higher education with 40%. This might explain the assumption that the majority of employees are employed as data entry clerks which have low salary band that may not attract unemployed graduates. The results are as shown in Figure 5.4.2.

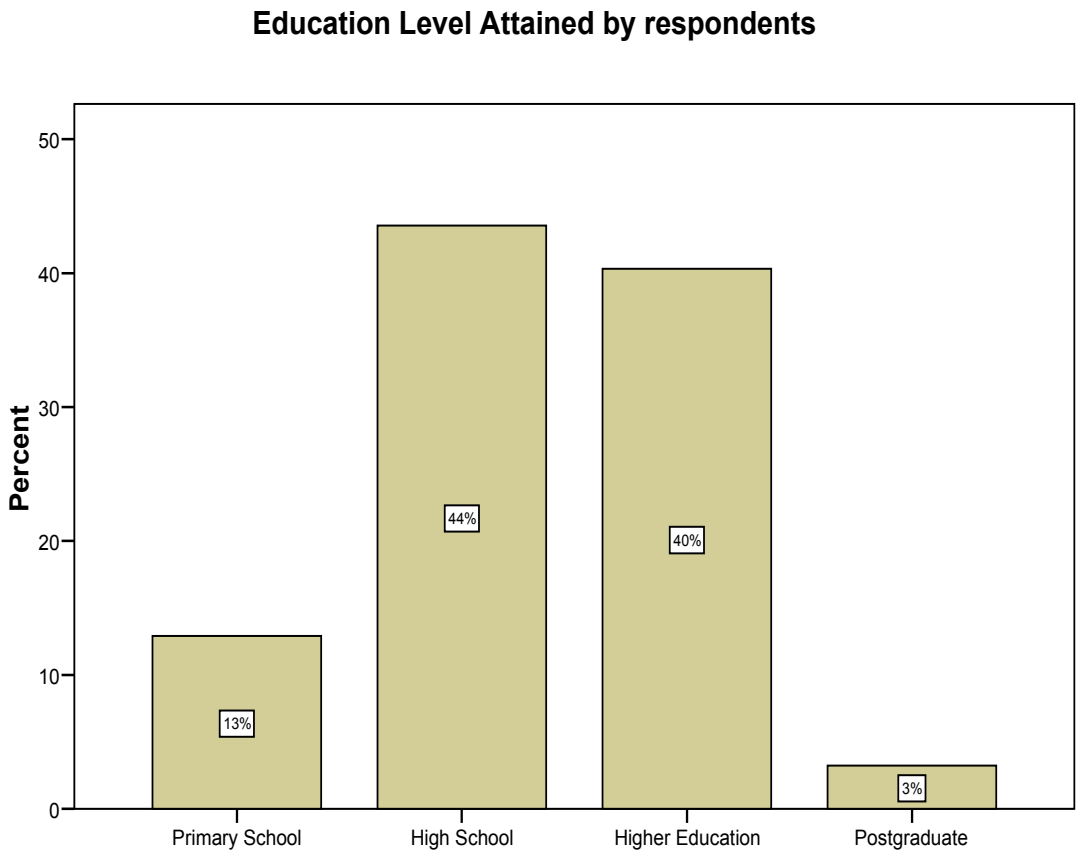


Figure 5.4.2 Education Levels of Respondents

A significantly low number of respondents had postgraduate qualifications (3%). Low response from this category might be due to the fact that employees with postgraduate qualifications hold senior positions. It was also very difficult to get responses from senior officers during data collection as they spent a lot of time in meetings. Senior management spending a significant amount of their times in meetings has been observed by other researchers about public sector performance in Botswana. These Meetings sometimes can take almost the whole day ((Botswana, 1992) as cited in (Kereteletswe, 2004: 74)), (Kgakge, 2002: 12).

5.4.4 Experience of Using Computers

The majority of respondents (about 61%) indicated that they have been using computers for at least three years. This indicates that significant portion of the respondents have had exposure working with computers for sometime. The results are as shown in Figure 5.4.3. Another important factor was that about 59

% of respondents indicated that they have undergone some form of training in using computers as shown in Figure 5.4.4.

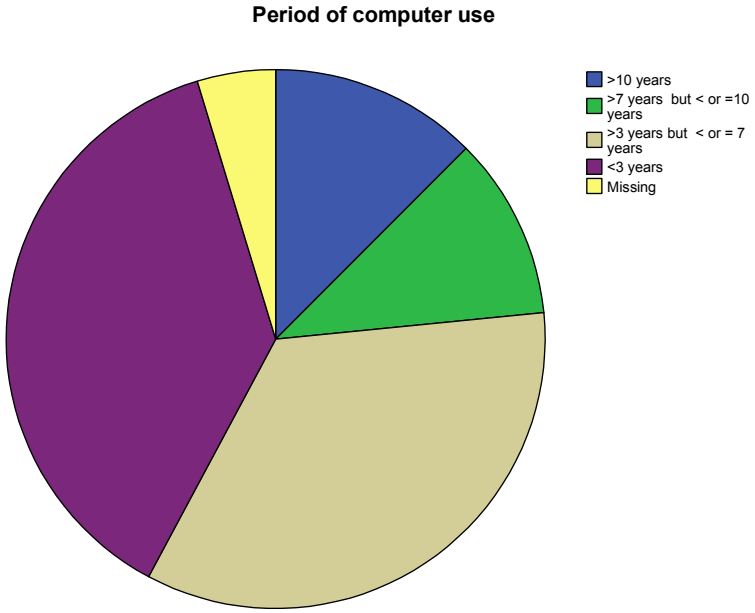


Figure 5.4.3 Experience of Using computers

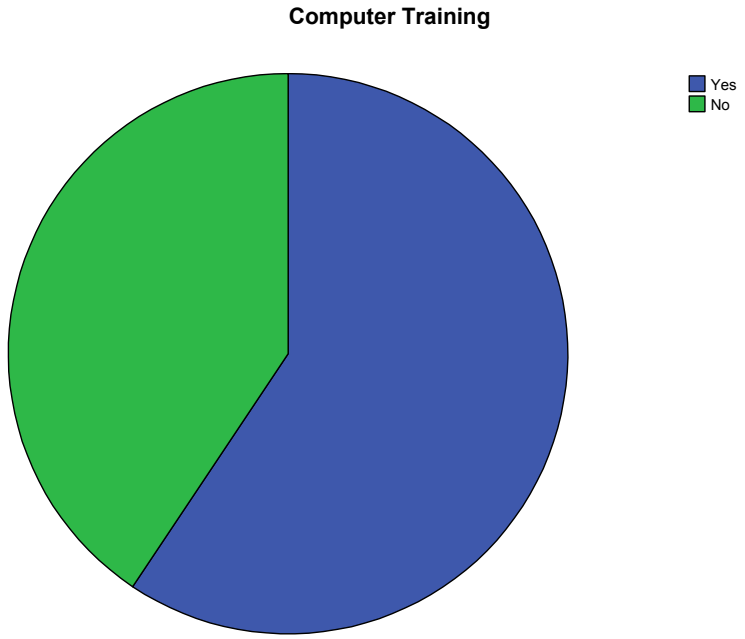


Figure 5.4.4 Computer Training

5.4.5 ICT Skills of Employees

Respondents were asked about whether they have undergone any form of training to acquire computer skills. The number of valid responses to this question was 62. Almost two thirds of respondents (59%) had undergone some form of training related to ICT. This was also corroborated by a significant portion (77%) who rated their IT skills as either being fairly good or very good as shown in Figure 5.4.5

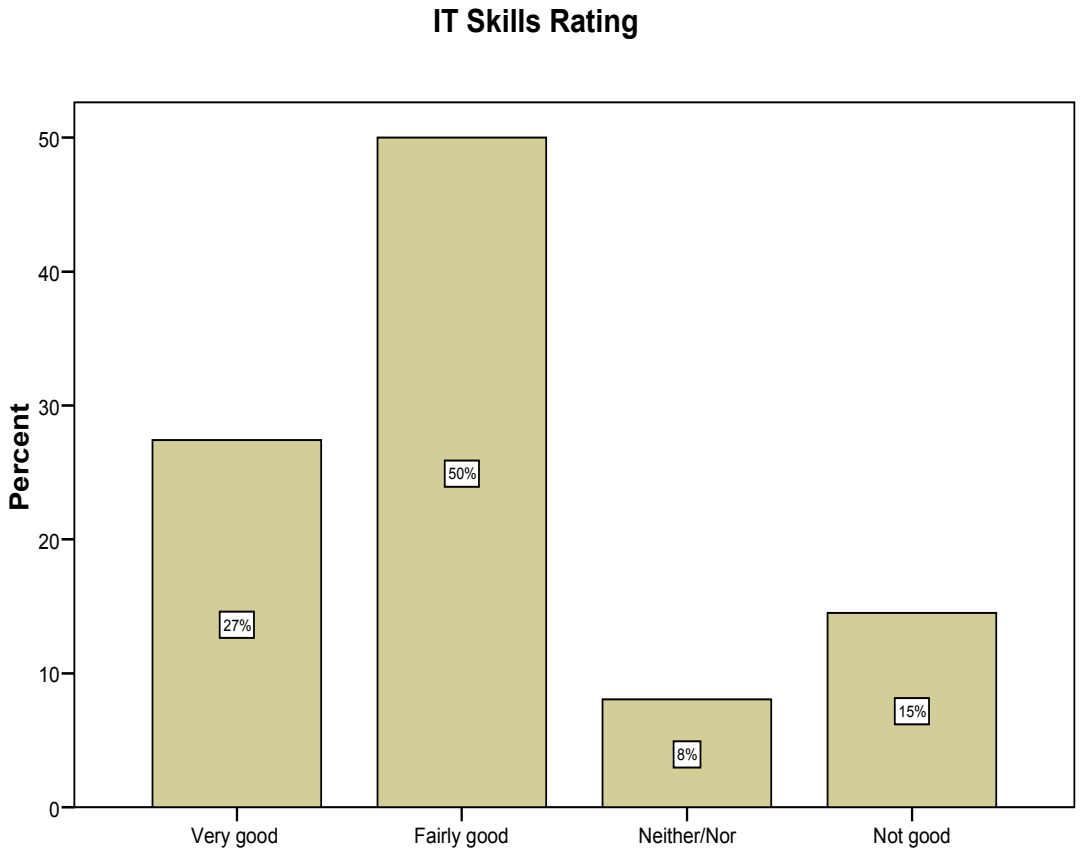


Figure 5.4.5 Self Rating of ICT Skills

5.4.6 Computer Use

Respondents were asked to indicate which tasks they do most when using a computer. Word processing and data retrieval were the major tasks that have intense use of computers, accounting for 36% and 39% respectively (Figure 5.4.6). This shows that word processing and data entry/retrieval were the main use of computers. Since these tasks are fairly routine and standard, they may

explain why the majority of respondents were high school leavers and not graduates. Access to the internet and email also had low response of about 10%. Since email is a form of communication it was expected that its use will be intense as a communication medium.

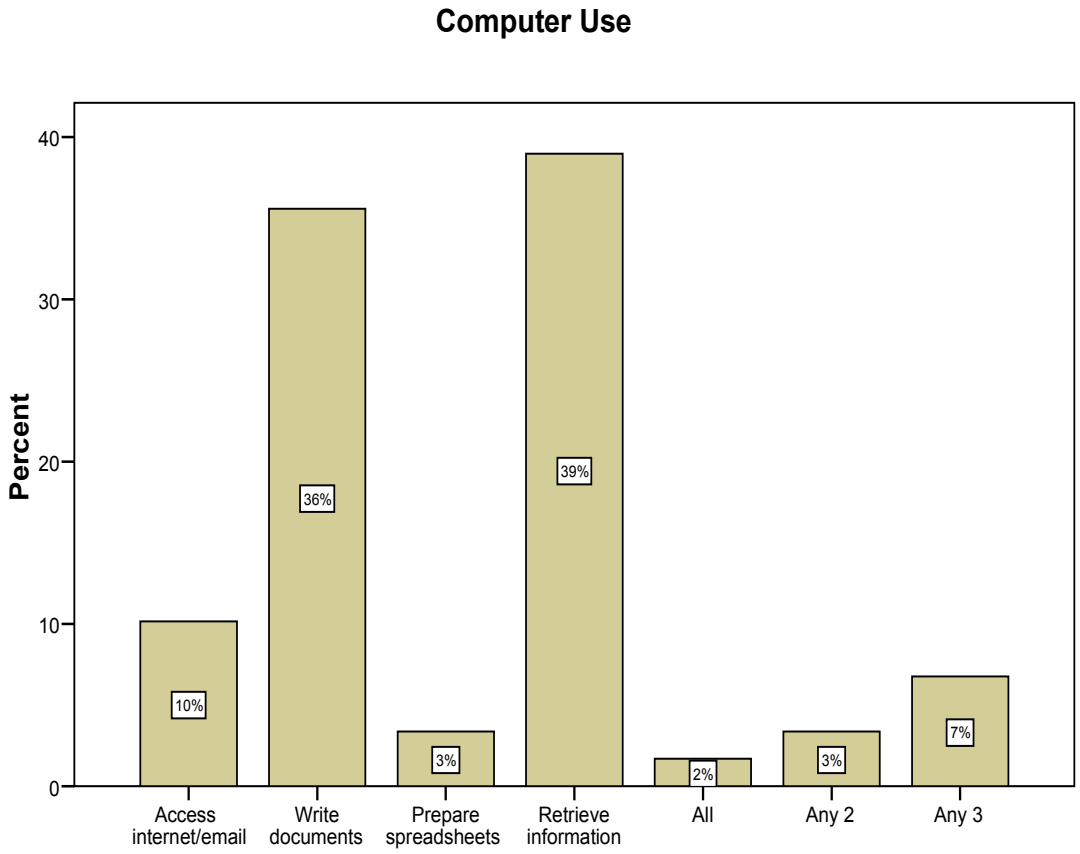


Figure 5.4.6 Daily Uses of Computers

The majority of respondents were experienced at using computers as almost 61% of them had experience of more than three years (Figure 5.4.2). This supports the significant number of employees who had rated their IT skills being fairly good to being very good as discussed in Section 5.5.4. Also about 77% of respondents estimated that they spent more than three hours in a working day using computers (Figure 5.4.7).

The next sections discuss user satisfaction results collected using SERVQUAL.

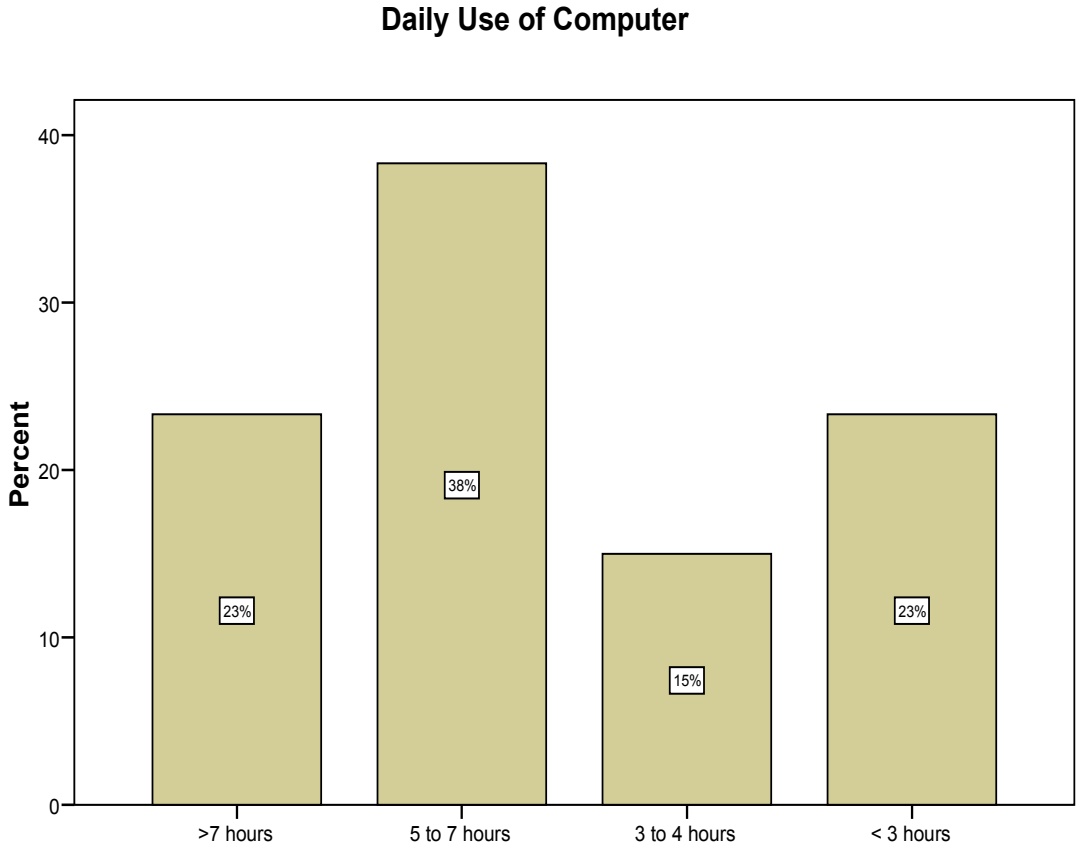


Figure 5.4.7 Estimated computer usage time per working day

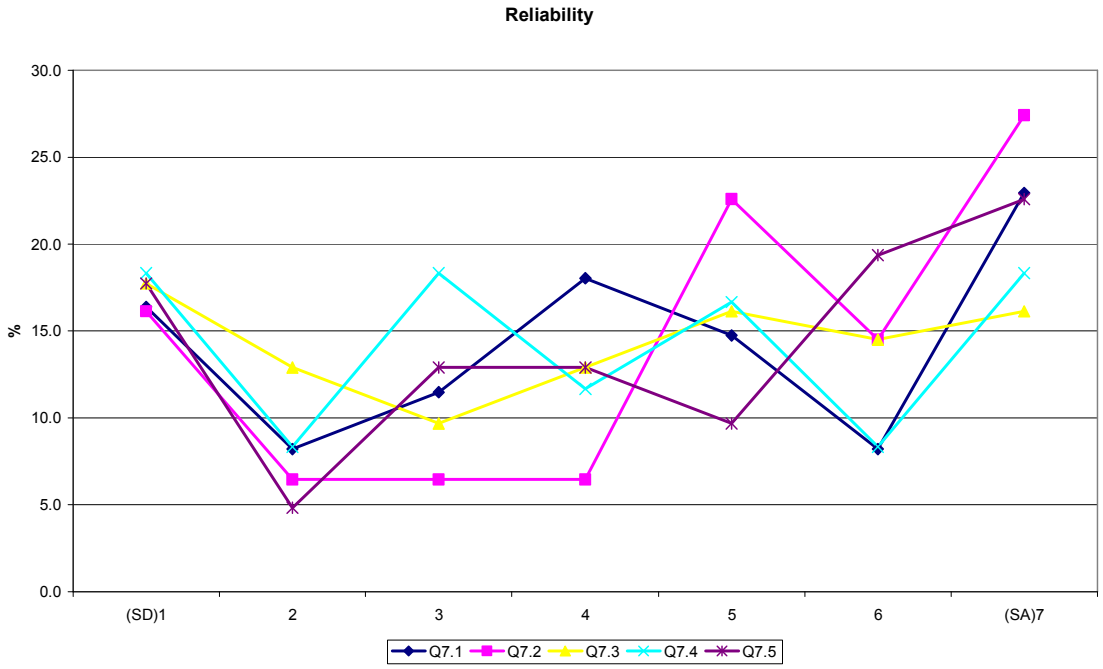
User satisfaction has been shown that it can be expressed in terms of attributes that describe the role that users perceive the IT department plays in their support of using the technology. These characteristics are reliability, responsiveness, assurance and empathy (see Section 4.6.2.4)

Data was collected from respondents using SERVQUAL (Kettinger and Lee, 1997) using Parasuraman et al. (1988: 38) 7 point scale. The scale starts from 1 representing strongly disagree (SD) to 7 representing strongly agree (SA). The middle value four is the neutral point. The results of each of the four attributes were tested for reliability using Cronbach alpha test (See Appendix K).

5.4.7 Reliability

Reliability is defined as *"the ability to perform the promised service dependably and accurately "(Kettinger and Lee, 1994: 744)*. The five questions asked about reliability show that there was less variation in the disagree side than on the agree side of the scale. For example all responses on strongly disagree were

between 16% and 18%. The affirmative side of scale has largest variation as shown by strongly agree which range between 16% and 23%. On the whole, there were fewer responses on the negative side of the scale than on the affirmative side as shown in Figure 5.4.8. The results show that respondents were more likely to determine and gauge lack of reliability of services provided by IT support service than when looking at the affirmative side of the scale. There was no clear consensus on the scale of agreement on the level of reliability although it was higher than for disagreement. The five questions asked about reliability are as shown on Figure 5.4.8.



Q7.1 When your department's computing services promises to do something by a certain time, it does so
Q7.2 When you have a problem, your department computing services shows a sincere interest in solving it
Q.7.3 Your departmental computing services performs the service right the first time.
Q7.4 Your departmental computing services provides its services at the time it promises to do so
Q.7.5 Your departmental computing services maintains fully-functional equipment and software.

Figure 5.4.8 Variation in level of reliability

There is less variation on responses on the disagree side as compared to the agree side. This shows that respondents were more certain about describing the negative side of scale than the other.

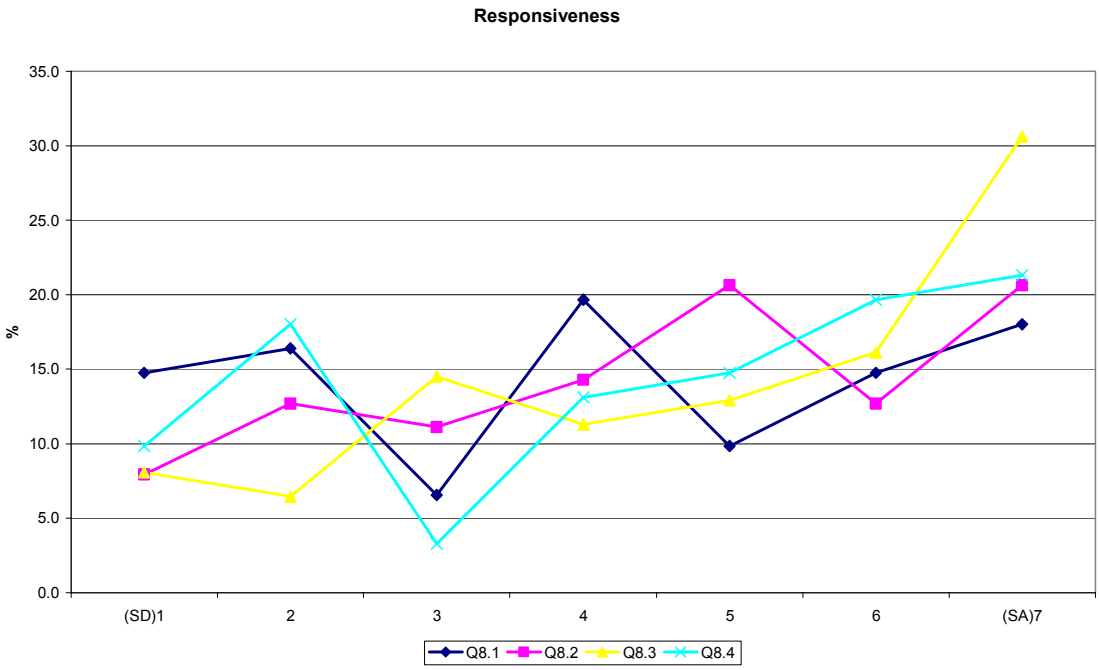
5.4.8 Responsiveness

Responsiveness according to Kettinger and Lee (1994) is

"The willingness to help customers and to provide prompt service" (Kettinger and Lee, 1994: 744).

Responsiveness is an attribute that determines the overall response received by users when they seek service from the IT department. The relationship between users of information technology and staff of IT service department may lead to lack of effective utilisation because users and IT staff view the organisation differently (Tesch et al., 2005: 345).

The four questions used to measure responsiveness of IT staff are as shown in Figure 5.4.9.



Q.8.1 Employees of department computing services tell you exactly when services will be performed.
Q.8.2 Employees of department computing services give you prompt service
Q 8.3 Employees of department computing services are always willing to help you.
Q.8.4 Employees of department computing services are never too busy to respond to your requests.

Figure 5.4.9 Comparison of responsiveness of IT service department.

The general trend on responsiveness of staff of IT staff to users shows that there is an increase in percentage of responses from strongly disagree (SD) to strongly agree (SA). There were less respondents on the strongly disagree as compared to strongly agree side of the scale. There is also an almost uniform variation in the percentage of responses on each scale value for each question asked on responsiveness.

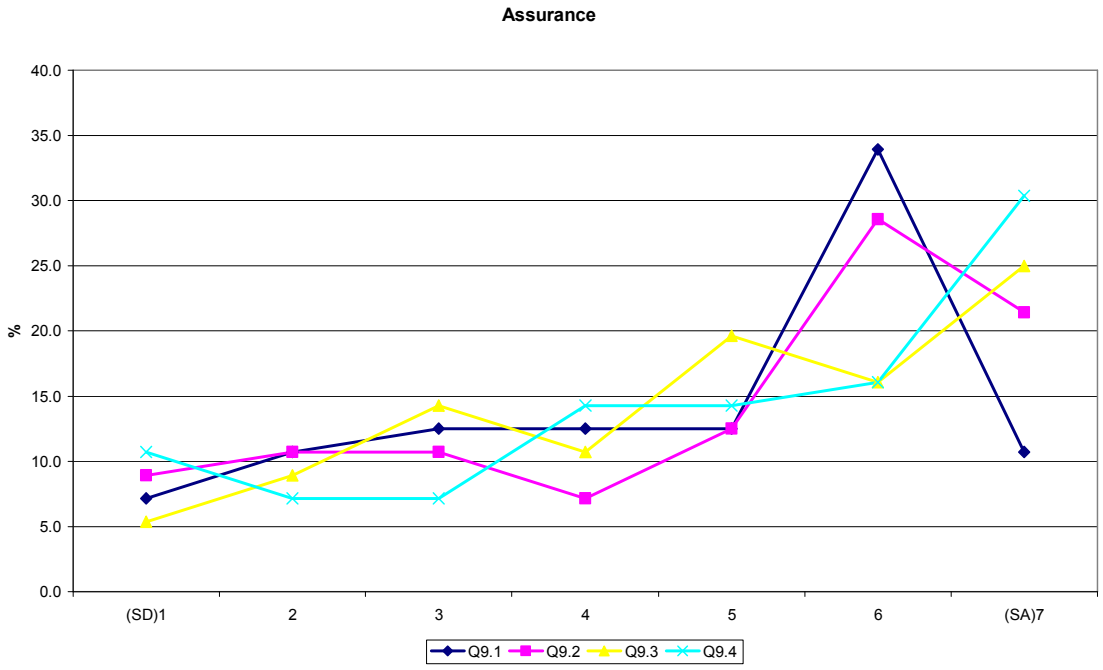
5.4.9 Assurance

Assurance is an attribute of quality that shows

> *"The knowledge and courtesy of employees and their ability to convey trust and confidence" (Kettinger and Lee, 1994: 744)*.

Staff of the IT unit of a government department plays a significant role in maintaining the IT technology functioning, which is common in any organisation. Users of IT need to have an assurance that when they have problems they will be attended to, i.e. they need assurance of technical support.

Result of responses show that assurance had the best constant variation across the scale. Apart from 6 and 7 values on the scale which had wider variation, the remaining had small variations as shown in Figure 5.5.10. There was a general trend of increase in number of respondents from the negative side of scale (SD) to the affirmative side (SA). The questions used to measure assurance are shown in Figure 5.4.10.

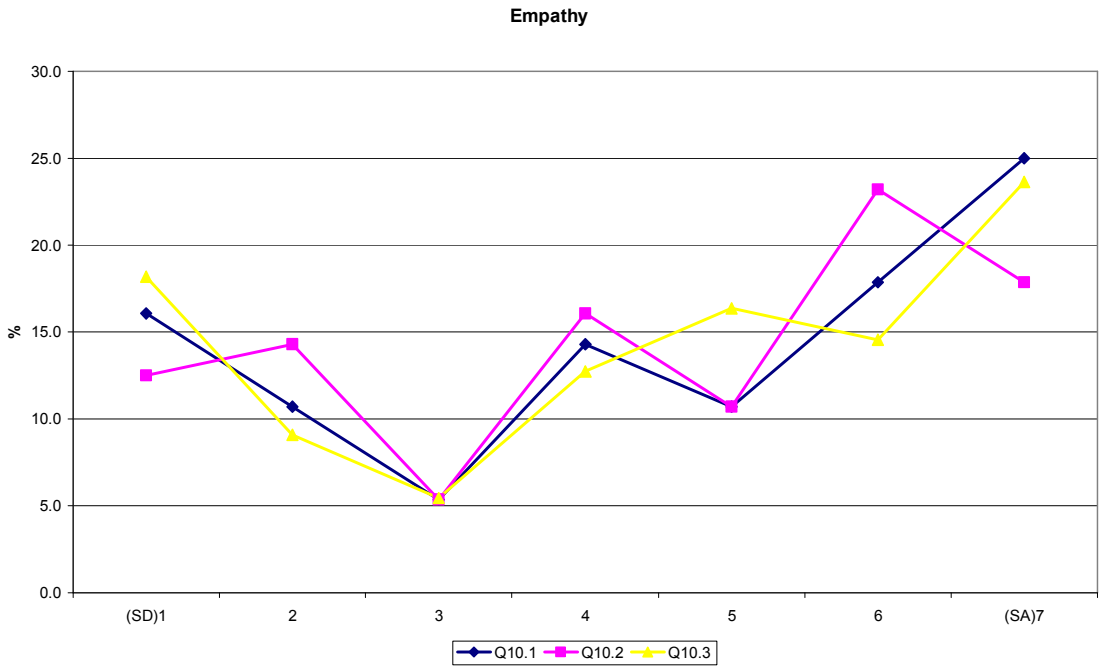


Q9.1 The behaviour of employees of department computing services instils confidence in you.
Q9.2 You feel safe in your dealings with the employees of department computing services.
Q9.3 Employees of department computing services are consistently courteous with you.
Q9.4 Employees of department computing services have the knowledge to answer your questions.

Figure 5.4.10 Assurance from IT staff

5.4.10 Empathy

The ability to provide caring as well as individual attention to customers by employees can be referred to as empathy (Kettinger and Lee, 1994: 744). Users of IT can be regarded as customers hence each individual customer may have different needs pertaining to the support that they need to use the technology effectively. These individual needs may range from the speed of learning to having fear to use the technology. Hence the IT staff at times may have to modify their approach as to how they offer support to meet individual needs. It is for this reason that empathy is also an attribute of quality of service. The questions asked to measure empathy are shown in Figure 5.4.11.



Q10.1 Your department computing services gives you individual attention
Q10.2 Your department computing services has your best interest at heart.
Q10.3 Employees of your department computing services understand your specific needs.

Figure 5.4.11 Users perception of Empathy

There is very close association in responses to questions about empathy. This shows that a significant number of employees rated empathy to be low among IT support staff. Although this is less than those who rated empathy high, it shows that IT support needs to be looked at to support users effectively.

5.4.11 Cross Tabulation of Results

5.4.11.1 Computer Ownership and Gender

Associated cost with internet access at home is the most important factor that prevents users from having internet at home. Therefore internet access at home remains the privilege of the few who have disposable income. Cost was cited by about 72% of respondents as the obstacle to internet penetration in homes. Since education level is biased towards males, a null hypothesis was proposed and tested for gender and computer ownership.

Gender and computer ownership association was tested by formulating the null hypothesis below:

HO: There is no gender bias in computer ownership

The results of testing the above null hypotheses are as shown in Table 5.4.1

			Home Computer		Total
			Yes	No	Yes
Gender of respondent	Male	Count	12	9	21
		% within Home Computer	57.1	28.1	39.6
	Female	Count	9	23	32
		% within Home Computer	42.9	71.9	60.4
Total		Count	21	32	53
		% within Home Computer	100.0	100.0	100.0

Table 5.4.1 Gender and Computer Ownership cross tabulation

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.463(b)	1	.035		
Continuity Correction(a)	3.332	1	.068		
Likelihood Ratio	4.467	1	.035		
Fisher's Exact Test				.047	.034
Linear-by-Linear Association	4.379	1	.036		
N of Valid Cases	53				

a Computed only for a 2x2 table
b 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.32.

Table 5.4.1a Chi Square test for Table 5.4.1

The results show that computer ownership, i.e. having a computer at home, was correlated with gender. Despite the fact that there were fewer males (40%) than females (60%), there was bias towards males having computer (57%) as

compared to females (43%). This association has a significant value of 0.035 at 95% confidence level as shown by Chi Square test in Table 5.4.1a

However when education level of respondents is introduced as a control layer, it shows that computer ownership increase with education level for both male and female as shown in Table 5.4.1b. This shows that the apparent relationship between gender and computer ownership is due to education level of respondents. The Chi Square test for the relationship has a significant value of more than 0.5 at 95% confidence level except for higher education which is 0.075 (See Table 5.4.1c). Due to the small sample, data using education as a control variable layer is not providing reliable results, as most of the cells contain values less than 5 as shown in Table 5.4.1b

Education Level Attained by respondents				Home Computer		Total
				Yes	No	
Primary School	Gender of respondent	Male	Count	1	2	3
			% within Home Computer	50.0	40.0	42.9
		Female	Count	1	3	4
			% within Home Computer	50.0	60.0	57.1
	Total		Count	2	5	7
			% within Home Computer	100	100	100
High School	Gender of respondent	Male	Count	3	2	5
			% within Home Computer	50.0	13.3	23.8
		Female	Count	3	13	16
			% within Home Computer	50.0	86.7	76.2
	Total		Count	6	15	21
			% within Home Computer	100	100	100
Higher Education	Gender of respondent	Male	Count	5	4	9
			% within Home Computer	50.0	36.4	42.9
		Female	Count	5	7	12
			% within Home Computer	50.0	63.6	57.1
	Total		Count	10	11	21
			% within Home Computer	100	100	100
Postgraduate	Gender of respondent	Male	Count	2		2
			% within Home Computer	100		100
	Total		Count	2		2
			% within Home Computer	100		100

Table 5.4.1b Education Level as a Control layer for Table 5.4.1

Chi-Square Tests

a Computed only for a 2x2 table
b 4 cells (100.0%) have expected count less than 5. The minimum expected count is .86.
c 3 cells (75.0%) have expected count less than 5. The minimum expected count is 1.43.
d 2 cells (50.0%) have expected count less than 5. The minimum expected count is 4.29.
e No statistics are computed because Gender of respondent and Home Computer are constants.

Education Level Attained by respondents		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Primary School	Pearson Chi-Square	.058(b)	1	.809		
	Continuity Correction(a)	.000	1	1.000		
	Likelihood Ratio	.058	1	.810		
	Fisher's Exact Test				1.000	.714
	Linear-by-Linear Association	.050	1	.823		
	N of Valid Cases	7				
High School	Pearson Chi-Square	3.176(c)	1	.075		
	Continuity Correction(a)	1.477	1	.224		
	Likelihood Ratio	2.955	1	.086		
	Fisher's Exact Test				.115	.115
	Linear-by-Linear Association	3.025	1	.082		
	N of Valid Cases	21				
Higher Education	Pearson Chi-Square	.398(d)	1	.528		
	Continuity Correction(a)	.036	1	.850		
	Likelihood Ratio	.399	1	.528		
	Fisher's Exact Test				.670	.425
	Linear-by-Linear Association	.379	1	.538		
	N of Valid Cases	21				
Postgraduate	Pearson Chi-Square	.(e)				
	N of Valid Cases	2				

Table 5.4.1c Chi Square test for Table 5.4.1b

5.5 Contribution of ICT

Using the Nolan instrument for maturity of information technology in organisations, employees were asked to state their daily tasks/functions and estimate the contribution that the use of IT makes to each task. Results from employees of the two departments are as shown in Table 5.5.1

	DTRS		DCNR	
	Function	**% IT Use**	**Function**	**% IT Use**
Operations	Payment Tracking	100	Maintenance of main ledger	0
	Issue goods to customers	0	Entering of payments	0
	Receiving goods from suppliers	0	Entering of airway bill	0
	Requesting quotations & buying	0	Reconciliation of main ledger	100
	Processing of payments/receiving goods on system	100	Payment of temporary assistant	100
	Procurement of various equipment and goods	100	Maintenance of sub warrant	0
	Tendering procedure & secretarial services	70	Preparations of claims	100
	External and internal supplies inspection	50	Reconciliation of claims	100
	Assessment of obsolete goods for write off	50	Attending to correspondences	0
	Typing manuscripts	100	Attending to clients	0
	Attend supervisors email	100	Posting letters	0
	Attending to visitors & directing them	0	Registration of incoming mail	0
	Receiving & recording assessment for staff	100	Dispatch of registered certificates	0
	Attend supervisors email	100	Attending to clients	0
	Attend to visitors	0	Revenue collection	0
	Receiving & directing incoming calls	0	Allocation of names of society	0
	Making appointments for the supervisor	0	Opening files	0
			Registering a society	0
			Dispatch ID cards	90
			Check quality of ID cards	90
			Filing	0
			Enquiries about ID cards status	100
Middle	Coordination of vehicle examination and testing	75	Industrial class files (updating records, cards, leave advance register)	70
	Monitoring of development projects	25	Industrial class estimates	60
	Maintenance of vehicle testing stations	30	Infinium update	100
	Implementation of quality management system	60	Transport coordination	50
			Register birth and death	100
			Supervise staff	95
			Appraise staff	98
Senior	Authorising payments, validation & approval	100		
	Processing payments of terminal benefits	100		
	Registration & licensing of vehicles	100		
	Registration & licensing of drivers	100		
	Collection of road user fees (revenue)	90		
	Issuing of road transport permits	20		

Table 5.5.1 Contribution of IT to Department Functions

The perceived contribution of information technology differs significantly in both hierarchy and between departments. There is low level of use of information technology at operational level as a lot of functions had scores of zero. Since customers interact mostly with staff at operational levels, this is where maximum contribution of IT can be expected, especially since tasks at this level are routine and easy to automate. The use of IT appears to increase from operation to senior level of department. Further inspections of the tasks that are carried out at upper level however show that most of them are routine and manual in nature. However it might be that there is lack of confidence in assigning such tasks to junior staff.

The Department of Civil and National Registration has the least use of IT facilities. This is despite the fact that there is a high employee to computer ratio in the department, as revealed by interview with deputy Director of the department, who indicated that almost every employee has access to a computer (see Section 5.6.2).

5.6 Status of ICT

A semi-structured interview was conducted to solicit information on the status of ICT in each of the selected departments. Initially the intention was to interview directors of the two departments; unfortunately after several attempts it proved difficult to meet them. They are constantly attending meetings. Also during field work, Botswana parliament was in session and at the Department of Road, Transport and Safety (DRTS), beside meetings, the other reason was that director was busy in preparing answers for the minister to respond to questions in parliament regarding the department. However eventually it was possible to have interviews with senior officers in the two departments.

5.6.1 Department of Road, Transport and Safety (DRTS)

The interview at the Department of Road, Transport and Safety was with the IT manager. The department has a website which is probably more informative compared to other Botswana government department websites. Unlike other departments which tend to contain descriptive information about the department, the website for DRTS provides information on route mileage and fares, downloading of application forms for driving license in pdf format. There is also a regular update of website information (DRTS, 2005). The only problem observed was that the website can not be accessed directly except through link from the ministry website.

5.6.1.1 ICT Cost

The department has a total of about 455 staff and 250 computers. This translates to 1 computer for every 2 employees. The IT unit has 5 staff as majority of IT functions are outsourced to the private sector as per Botswana government outsourcing policy. The small numbers of IT staff have remote access to computers located at various offices across the country; hence they provide remote access help to meet emergency help to staff at regional offices.

The department has a maintenance contract with private companies at a cost of about P104 000 for every 30 computers per month. With 250 computers this translates to about P832 000 per month (approximately £83 200 per month). The estimated cost of a computer in 2007 was about P10 000. The government buys high specification computers; hence the figure is above the one referred to

in Section 5.3.26.2. Hence the IT expenditure in the department has initial investment of about P2500 000. Since computers are bought and replaced at different times, this is not a very accurate figure, but it adds to the maintenance cost. The maintenance contract is very high and as the computer technology has improved significantly over the years, outsourcing of computer maintenance needs to be re-considered. The lifespan of a computer is between 6 and 8 years.

5.6.1.2 ICT Skills, Use and Challenges

For those employees who have been with the department longer, internal training was organised to provide them with computer skills. The trend now is to recruit people with computing skills as they are now available in the market.

There have been minor instances of abuse of computing facilities by staff, but it was reported that it is not a major issue, as there are measures in place to detect as much as possible access to obscene websites through the use of filters. Email accounts for about 60% of inter-department communication and the department website receives about 1000 hits per month. A significant portion of these hits are from outside Botswana, especially from UK and USA.

Major challenges facing the department regarding use of IT are reluctance among people to change and use IT facilities in their daily jobs. There is also a shortage of staff to provide service to the public. The outsourcing of IT functions has lead to shortage of IT staff who provide on the spot assistance.

5.6.2 Department of Civil and National Registration (DCNR)

The Department of Civil and National Registration (DCNR) was formed in 2003 by merging two separate divisions namely: National Registration and Civil Registration (Namogang, 2005: 3). DCNR is responsible for registration and production of national identity cards (ID) for all citizens of Botswana who are 16 years and above. It also registers both death and births and produce certificates for these. Every child born within Botswana is supposed to have a birth certificate. Death certificates are often used as the official proof of death and are required to deal with any matter that affects a deceased person. The department has two computer based system used to support registration of national identity card as well as another system for births and deaths.

The department runs two computer based systems, namely the National Registration System (NRS) to produce identity cards and the Birth and Death Register System (BDRS) to produce birth and death certificate. The NRS system was among the first computerised systems in the public sector. It had numerous problems as, even after its introduction, production of identity card continued to take a long time. The system was even investigated by the Auditor General's office in 2004 (Namogang, 2005: 9). Since the department has two computer based systems in place to cover its main functions, it was selected in the study as its employees are more likely to have had more exposure to computers than other departments.

An interview was held with assistant Director of the department. The department has staff of about 460 and number of computers was estimated to be about 200. This gives a ratio of about 1 computer to every 2 employees, a figure similar to that of DRTS. The department does not have IT staff as they use a maintenance contract. It was however indicated that the department intends to employ an IT officer. The department has a network covering 31 offices located throughout the country.

5.6.2.1 ICT Cost

The National Identity System contract runs for two years at an estimated cost of about P3.9 million and the birth and death registration system also has a two year contract at cost of about P1.5 million. Hence the maintenance contract for both system totals P5.4 million (Approximately £540 thousand).

5.6.2.2 ICT Skills, Use and Challenges

There is an in-house training to provide employees with IT skills to enable them to use the system. This is mainly for data entry and validation. Both systems have audit trails which allow for back tracking on usage. This has had an extra benefit as employees do not abuse it by accessing obscene websites as the system allows their identity to be identified. The department does not have a website.

Major challenges facing the department are problems due to outsourcing of the IT services, as they are only called when there is a problem and this can lead to loss of time. There is increasing demand on the system especially during election periods when most people register.

5.7 Summary

This chapter has analysed data that has been collected as part of the research. It has also provided areas which may directly or indirectly affect ICT exploitation.

There is high unemployment among the sample population. High unemployment has numerous anti social aspects that may hinder ICT exploitation and diffusion such as crime, social security and low standard of living. High unemployment may explain low computer ownership in homes as the results have shown that only people with high education qualifications and are working are more likely to have a computer at home. The various variables that were used to determine satisfaction level of the sample population show that majority are satisfied. The biggest dissatisfaction is on matters relating to the fact that it takes longer to get service from government. Also there are unsatisfactory measures in place to manage queues in government departments.

For employee relations, it emerged that majority of employees hold high education qualifications. Unfortunately results show that there are problems regarding fair treatment, trust and motivation. The other aspects of employee relations are satisfactory according to results of this research. The problems that are revealed by this research regarding employee relations require a different approach and they cannot be solved by ICT availability.

Those using ICT have been shown to have higher education qualifications, experience in using computers and have undergone formal training to acquire IT skills. They also have good IT skills. Despite this they only use computers for word processing and data retrieval. Data retrieval is done using the specific IT applications in a department. Use of internet/email and spreadsheet in official duties is fairly limited. Regarding IT support as measured using SERVQUAL instrument, users are satisfied with the support they get.

ICT penetration is very high in government department as compared to general public. This is because the government has the financial power to buy the technology. Majority of citizens do not have disposable income to afford computers for home use. On the other hand analysis of department functions reveal that functions are mainly manual and do not take advantage of available ICT. ICT use is limited to only using IT systems in place.

CHAPTER 6: DISCUSSION OF RESULTS

6.1 Introduction

This chapter discusses the results in relations to the research objectives that were presented in the introduction chapter. It highlights the problem areas that the results have revealed. This discussion of results is based on the analysis that was done on the previous chapter.

6.2 Customer satisfaction

Major areas that show low dissatisfaction with the majority of customers are those dealing with having to queue for services. There is also evidence from this research that there are no effective measures in place to manage queues. This is a serious issue as more than 70% of respondents indicated that they sometimes queue for more than an hour. The inability to offer service the first time is also a big problem.

There is a significant cost associated with information technology in both departments that were covered in this study. These departments represent typical government departments in Gaborone and other major towns and villages. Provision of computer facilities has covered all government ministries as reflected in the budget allocated for information technology which for the current plan period is about 3.7% of national budget (See Section 3.2.1). However the level of use of information technology is very low as reflected in contribution of information technology to department functions. This has also been observed by Mia and Dutta (2007) who stated the following:

> *"… Botswana is losing ground in all components of the NRI with particularly noticeable drops in the environment (from 43rd to 63rd) and usage (from 71st to 81st)" (Mia and Dutta, 2007: 15)*.

The amount of investment in information technology in central government is not reflected in the intensity of use of the technology.

The outsourcing policy of government services to the private sector is costly to Botswana government. Although there are about 210 citizen owned IT companies registered under the government local IT company preference scheme, most of them are in the wholesale business of IT products and services (PPADB, 2008). Developments of advanced IT applications are often

bought from outside the country, for example the Botswana Police is in the process of buying a finger print system from France (BOPA, 2008b). The other side effect of the outsourcing policy is lack of exposure of IT staff employed in IT units to develop their skills as the work is done by the private sector. Information technology artefacts have also become one of the major imports that Botswana is facing. The other being food (89%) (EarthTrends, 2003) and energy (75%) (See section 3.9.2.1).

For hardware, the only way is for the government to import the technology as very little manufacturing takes place in the country. Application software has much more potential for it to be developed locally to meet local demand. For example applications that require use of spreadsheets can be developed within the country.

6.3 Natural Products Barrier to Innovation

Botswana's economy depends heavily on one commodity, diamond export. The country is the largest world producer of diamonds by value (Makwinja, 2006: 50), (Botswana, 2007a). This heavy reliance on minerals is common among the mineral rich African countries. For example Nigeria is among the top oil producers in the world (WORLDBANK, 2008b), but this has created more problems than benefit for the country through political instability and corruption (CIA, 2008b).

Unfortunately natural resources like minerals have high demand from outside Africa; hence foreign companies from developed countries are willing to invest in the mining and processing of such minerals. The country owning the minerals then receives profit from sale of the product. The major obstacle that may affect investment of major international corporations to exploit precious stones like diamonds is political instability. Botswana has had a stable political environment since independence in 1966. In 1968, after discovery of diamonds in Botswna, Botswana government formed a joint venture company with De Beers called Debswana to mine and sell diamonds (Debswana, Not Dated). Botswana's economic growth from being a poor country in 1966 to become a high medium income country can be attributed to stable political environment and revenue from diamonds.

Botswana is a rich country with poor people (Mogalakwe, 2008: 433). A significant portion of the population do not benefit much from the wealth of the country as the following observation illustrates

> *However, it is doubtful that much more than half the population has significantly benefited from increased income and standard of living - beyond the general and widespread provision of schools, clinics, clean water and improved roads (Parsons, 1999).*

The challenge is for Botswana to turn its diamond revenue into activities that can sustain the livelihoods of people by promoting self reliance and the desire to excel so that the international business community can regard it as a destination for investment. Although the diamond mining employs a large number of people, there is still problem with lack of employment in rural areas. This is highlighted in the following observation

> *Four out of five rural households survive on income of a family member in town or abroad. That still leaves a significant number of rural households, usually female-headed, with no source of income known to statisticians (Parsons, 1999).*

The biggest challenge facing the country is economic dependence on other countries for almost everything. It has been possible to import goods as the country can afford to pay. This dependence on other states has led to lack of innovative personal as the focus is how best to utilise money from diamond revenue and not how to be creative and innovative to attract foreign direct investments. The government has realised this to be a problem and has often come up with financial incentive schemes such as Financial Assistance Policy, Citizens Entrepreneurship Agency. Unfortunately such schemes have not been successful as the business idea concentrates more on consumption of goods and services with the government instead of top world class businesses that can attract the international market.

Diamond mining has had negative impact on agriculture output in Botswana. Before independence, subsistence agriculture was the main economic activity. Although subsistence farming was in small scale, at least it enabled every household to be self sufficient in meeting their basic food requirements. The spirit of self-reliance was one of the strategies adopted to guide Botswana's development after independence. This encouraged individuals to work hard to meet the challenges like the arid nature of the country.

However self-reliance has significantly declined as the government has introduced a social welfare system which has had a negative effect by making people rely on government hand-outs and subsidies. The government can afford to do this due to revenue accrued from the diamond industry. The principle of social welfare is good in theory, especially to the disadvantaged section of the community like the elderly and people with disability that restrain them to work. However; for the able bodied members of the community, social benefits lead to lack of desire by the beneficiary to be responsible for their well-being. Too much dependence on Botswana government to provide both economic and social services has been observed to be one of the causes of poverty in the country (Osei-Hwedie, 2004: 10).

The Botswana government wanted the majority of citizens to benefit from wealth of the country, for example introduction of free education in the 1980s. However some parents ended up not taking part in playing their role by, failing to support their children to learn and look after school property.

6.4 Botswana's opportunities and challenges

Botswana has an environment which offers opportunities for exploitation of ICT as well as challenges that hinder this. These are summarised in Table 6.1

Opportunities	**Challenges**
Unemployed graduates with IT skills	High unemployment
High literacy rate	HIV/AIDS
National electricity grid coverage	Dependence on electricity import
Fairly distributed & faster GDN coverage	Low investment in R&D
Small population & large geographic area	Settlement policy
Increase in number of Botswana nationals working abroad	Over dependence on imports
High solar radiation	Increasing crime rates
	Urban migration

Table 6.1 Opportunities and Challenges to Botswana

6.5 State of Employee Relations (Psychological contract)

One of the objectives of this study was to look at the state of psychological contract among a sample of the public service. The results are summarised in Table.6.2. There are more positive aspects of the psychological contract than the negative ones.

Area	Positive	Negative
Fairness of Treatment	Fair supervision	Fair pay
		Reward for input effort
	Work initiative	
	Plan you own work	
Direct Participation	Vary how you work	
	Choose tasks to work on	
		Commitment to employees
Trust & Fairness		Trust on management
		Reward for input effort
Commitment to Department	Loyalty to department	
	Pride for department	
Employee Relations		Influence in department
Motivation & Effort	Looking forward to work	Motivation about job
	Working very hard	
Citizen Behaviour	Work even when not well	
	Loyalty to department	
	Work overtime	
	Volunteer	

Table 6.2 State of psychological contract in Botswana Public Sector

The major theme that can be deduced from the negative aspect of the state of psychological contract relates to issues around payment. This reflects the high cost of living in Botswana as the bulk of domestic consumption is imported. The situation of Botswana as a consumer country has been summarised as a nation:

> *"Where our consumption originates from outside our economy and almost all of our production is exported out of our country; meaning*

we consume very little of what we produce (e.g. diamonds, beef, etc.) and produce a small percentage of what we consume (food, petrol, textiles, machinery, etc.)" (Parameswaran, 2008).

As a consumer nation, Botswana faces problems due to the fact that it has no control on prices charged for goods that are produced outside. The country is subjected to economic factors outside its territory as it can not influence production processes to reduce costs.

6.6 Maturity Level of Government Departments

There is difference in the level of contribution of IT to department functions for both departments which were used as case studies in this research. DRTS has a higher level of use of IT than DCNR as shown by having fewer functions which do not use IT at all. DCNR has more functions which are carried out manually.

There is also no clear difference in the nature of functions performed at various levels of the two departments. Some of the functions performed above operation level are automated manual tasks which can be done at operation level. The strategic functions are limited.

Contribution of IT to department functions is still below the initiation stage of Nolan's model. This is because a lot of department functions are still carried out without use of computers despite the fact that they are available and employees have the skills to use them.

The contract cost for DCNR is about P5.4 million (£540 thousand) for two years. Since this department has about 200 computers, this translates to about £113 per computer per month. For DRTS the contract is about P832 thousand (£83.2 thousand) for 30 computers per month or £2800 per computer per month. The maintenance cost of a computer per month for DCNR and DRTS is about 34 % and 853% of national average monthly salary respectively (Section 5.2.26.2).

The high cost of ICT to the Botswana government is not reflected in its use as this research has shown that computers are mainly used for word processing. Use of ICT in the public service is low but the price is high.

Using the IT Value hierarchy the maturity level of government department is determined. This is a very important stage to determine as it can help to identify issues that needs to be addressed to move to the next level. The various criteria

at every level were discussed in Section 4.6.2.1. Using data from this research Botswana government maturity level is estimated to be at Level 1 as shown in Figure 6.1.

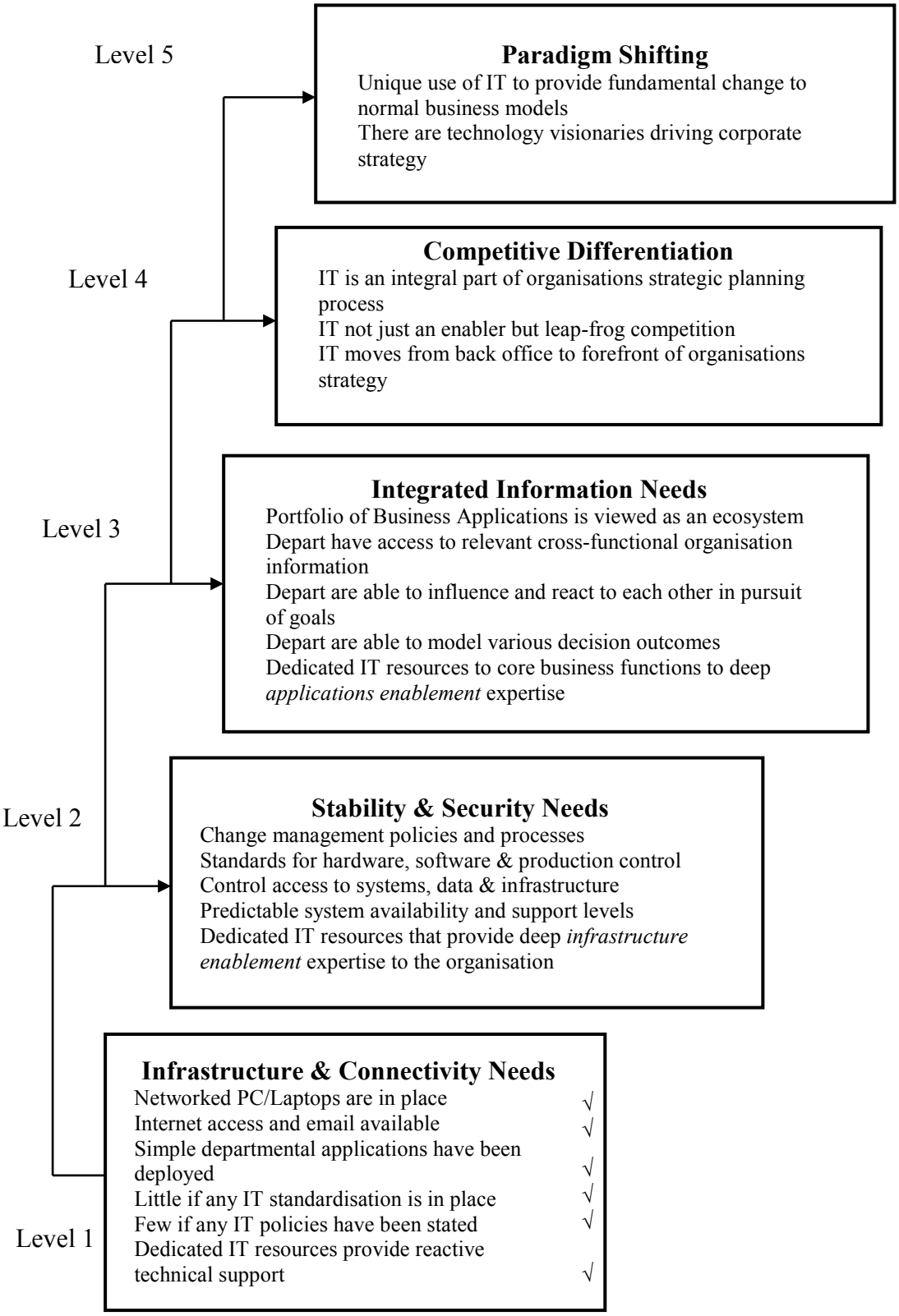


Figure 6.1 Urwiler & Frolick (2008) Maturity Levels

The high cost of IT experienced by government departments is probably due to the fact that the focus is more on providing the IT infrastructure and connectivity needs i.e. Level 1 stage of maturity level of IT usage. Botswana has been at this position for a very long time, for example internet access in government departments has been available since the mid 1990s. To gain value from IT investments, Botswana needs to move from its current position of maturity to at least the next level. Issues that need to be addressed and how to migrate to the next level are discussed and recommended in the next chapter.

6.7 Summary

This chapter has highlighted that perception of poor service delivery is mainly due to the fact that customers wait for a long time to get the service they want. This is despite high visibility of computers in government departments. The high penetration of IT in the public sector is due to the fact that Botswana government has the financial power to buy the technology. Unfortunately the wealth of the country is not reflected in the social life of citizens as the majority do not have disposable income. This was shown by low computer penetration in the general public. Botswana government employees are significantly dissatisfied with their remuneration. So despite the government having the financial power, salaries are deemed to be low by public service.

Using the theory of IT maturity models, Botswana government departments have been shown to have been stagnant at the initial stage for a very long time. The discussion of results of this chapter as well as information from previous chapters is then used to develop a framework that can help the Botswana government exploit the existing IT infrastructure. This is proposed in the next chapter.

CHAPTER 7: FRAMEWORK FOR BOTSWANA

7.1 Introduction

The previous chapters have provided international best practice for ICT exploitation. Data from Botswana has been analysed to determine Botswana's position in the global ICT world. This chapter describes the proposed framework, the main aim of this research (Section 1.4). The proposed framework is intended to guide policy makers as well as other stakeholders on how best to exploit ICT infrastructure that exists within the public sector. The framework is in two parts. The first part is a national framework. The national framework is a strategic foundation on which future ICT developments are to be based to benefit all sectors of the economy, public as well as international interest. The emphasis is to use existing ICT to address unemployment that is facing the country. The second part is the public sector framework. The public sector framework emphasise using the existing ICT infrastructure to the maximum to meet current challenges facing citizens of Botswana. These two frameworks are based on results of this research as well as from a wide body of literature concerning theory of exploitation of computing power. Further work is needed to discuss the framework with relevant authorities in Botswana, something which was not possible during the research due to time constraint.

7.2 National Framework for ICT exploitation

This study proposes a national framework that can be developed to exploit existing ICT infrastructure in Botswana by all stakeholders. The framework is built on the foundation laid by the existing government data network and its capabilities. The framework is as shown in Figure 7.1. Due to costs associated with ICT artefacts, it takes time for diffusion of ICT to reach critical mass in any country. This is why even developed countries have not yet reached home computer ownership of 100% among population. Addressing unemployment, increase use of IT and research and development especially in solar energy are central to success of the framework.

The proposed framework is advocated for because if Botswana is to succeed and benefit from a globally connected knowledge economy, there is a need for planning how information is generated, protected, shared, stored etc. Just as a

country needs transport and land use planners, there is a need to have digital information planners to facilitate speedy and accurate information within the country as well as other stakeholders outside the country. Singapore's success in exploiting ICT can be attributed to the national information infrastructure that was developed in 1992 (NCB, 1992: 15).

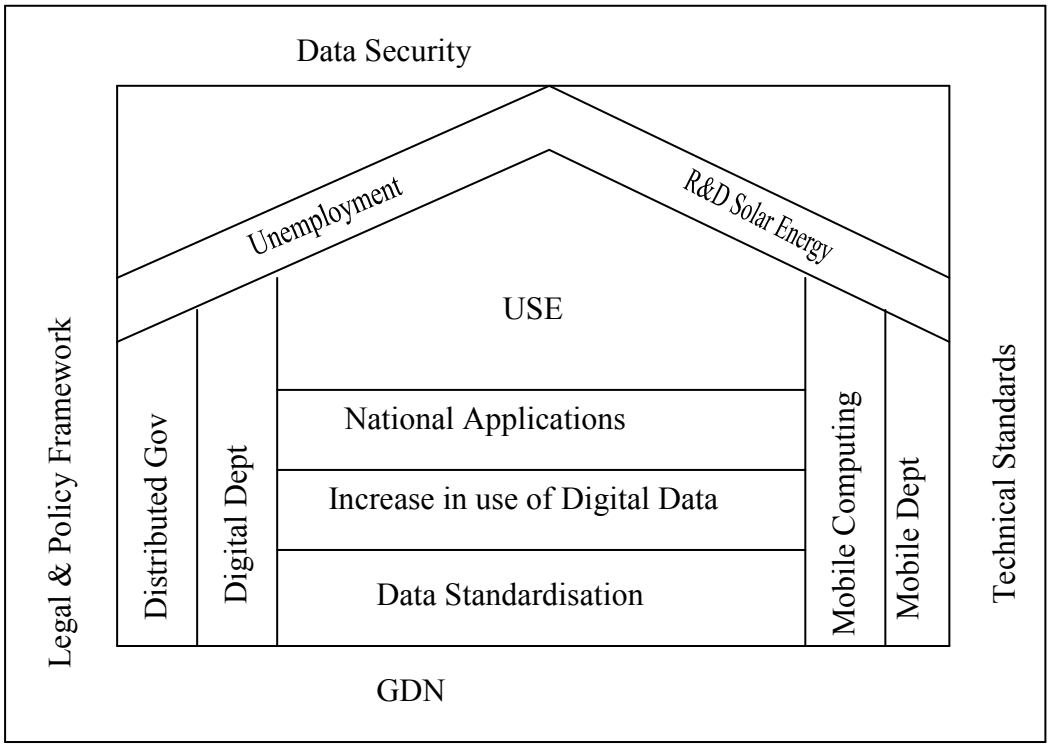


Figure 7.1 Botswana's National Framework for ICT Exploitation

The national framework proposed and illustrated in Figure 7.1 depends on maturity level that Botswana as a nation aim to achieve regarding ICT. (Urwiler and Frolick, 2008: 85) have shown that the role of ICT can either be as a commodity or innovation asset. There are various challenges that have to be met along each stage of maturity development of ICT. Some of the challenges require immediate action while others need long term approach.

7.2.1 Government Data Network (GDN)

The Botswana government data network as it exists today covers the geographical area of Botswana fairly well. Even in parts of the network with low speed of 2 MBPS, this can allow for exchange of large documents like a bible in less than a minute for example between Ghanzi and Gaborone, covering roughly a distance of about 712km.

7.2.2 Legal Framework

The legal and policy framework is required in order to provide an environment that has legal standing. This will cover issues regarding cyber crime as well as intellectual property rights which can negatively affect the growth and use of digital information. The Botswana government has started ground work on this issue through the adoption of National ICT Policy in August 2007.

7.2.3 Technical Standards

Technical standards are required to ensure that the information infrastructure meets local as well as international standards. This is particularly true looking at the rapid change that ICT undergoes rapidly and often. This requires high level expertise as well as ongoing research with leading international drivers of the ICT sector.

7.2.4 Data Security

The biggest issue to be a central theme in this framework is data security. Digital data can be subjected to security threats mainly because it is easy to carry around and it can be exposed to global internet threat. Paper based information was made secure by providing physical infrastructure such as a building which can be locked or access manually restricted. There is a need to have measures in place to address security issues, just like soldiers protect national boundaries; digital network requires its own military to protect it.

7.2.5 Data Standardisation

Data standardisation will look at issues regarding how information is collected. Electronic data interchange, use of bar codes, are some of the issues that data standardisation can address. The fundamental principle should be that data must be captured once and then shared with those who need it. Issues of type of personal data to be captured and privacy need to be addressed in data standardisation. Data acquisition, transmission and storage need to be in digital form as far as possible. Increase in the development of national IT based applications developed locally has the potential to create employment opportunities and benefit all sectors of the economy.

7.2.6 Distributed Government and Digital Department

Data standardisation will facilitate departments to have digital information. In this form data becomes ready to be manipulated using the data network. Digital

information requires less physical storage as compared to paper based information. Departments with digital information make it possible for their information to be accessed from anywhere if ICT is used. This leads to an almost distributed government as access to government information is not constrained by distance or time.

As Botswana government is the main economic driver i.e. private business in Botswana relies on doing business with government directly or indirectly, distributed government around the country will open up employment opportunities around the country. This will reduce land shortage in and around Gaborone. Gaborone and surrounding villages have experienced land related problems because as government ministries are located in Gaborone, so businesses also prefer to locate in or near Gaborone, this leads to land speculation which increase the cost of property around the city.

Distributing government agencies around the country will also help in tackling unemployment in rural areas. This may result in increase in disposable income and may further increase national computer/internet penetration.

7.2.7 Mobile Computing & Department

The convergence of computer technology with mobile communication offers a great opportunity for exploitation especially in developing countries. Botswana has a small population and is distributed in small numbers covering a large geographic area. This makes Botswana less attractive to global businesses which are after large consumer markets. Wireless data networks, as well as mobile computing developments are leading to the use of cell phones to be used as computers as well. Due to low cost of mobile phones, they have managed to reach critical mass in many countries including poorer ones. The mobile phone with computer capability will require less electric power; hence in a country of high solar radiation like Botswana, solar power offers great opportunity to meet electric power needs of mobile computing. This area needs to be researched further to exploit use of solar energy as a renewable form of energy to meet domestic needs.

The most important point is that for Botswana to exploit her ICT infrastructure there needs to be immediate action on any plans being proposed. Learning as you do is probably the best philosophy as ICT is continuously changing and systems becomes obsolete quickly after getting to the market. Botswana has

experienced over 40 years of participatory democracy of free and fair elections, a feature not common in Africa. Despite this the country remains almost unknown to the rest of the world. It is time the country takes advantage of ICT to market itself to the outside world.

There has been a lot of negative publicity about the public sector in Botswana, mainly from politicians. Public servants in Botswana appear to be servants to politicians and not the public. There is a need to modernise the public sector in Botswana to recognise employees of government as agents of change that can take the country forward. Since the public sector is politically neutral it needs to be protected from unfair criticism from politicians. The major problem that everyone faces in Botswana is that consumption of basic needs is from outside. This makes the cost of almost everything expensive. It is common for a lot of highly trained manpower in the public sector to leave it and join the private sector, or go to government funded organisations which have some form of autonomy and yet funded by government such as Botswana House Corporation, Botswana Telecommunications Corporations etc. Migration to developed countries by skilled employees as soon as they have been trained is on the increase, especially those with medical professional skills putting strain on the medical sector in Botswana.

7.3 Framework for the Botswana Public Sector

Why is there lack of exploitation of IT in Botswana public service? This is the research question that was introduced in Section 1.1. Drawing on the results of this research the answer to the question is because Botswana has not moved out of the initial stages of exploiting IT. Botswana has concentrated on providing the infrastructure and connectivity without looking beyond this stage. Also there are still some issues which remain to be addressed, for example IT standardisation and IT policy have not been addressed adequately.

In order to understand Botswana's environment in relation to ICT exploitation, Nolan and Urwiler/Frolick maturity models have been used. The main reason for using these models was to adopt a simple approach that can have practical applications to a developing country like Botswana. These maturity models are simple and easy to understand as well as to use. Botswana's stage of development in ICT exploitation can best be explained using ICT maturity levels

as shown in Figure 7.2. The theory of maturity levels was discussed in Section 4.6.2.1

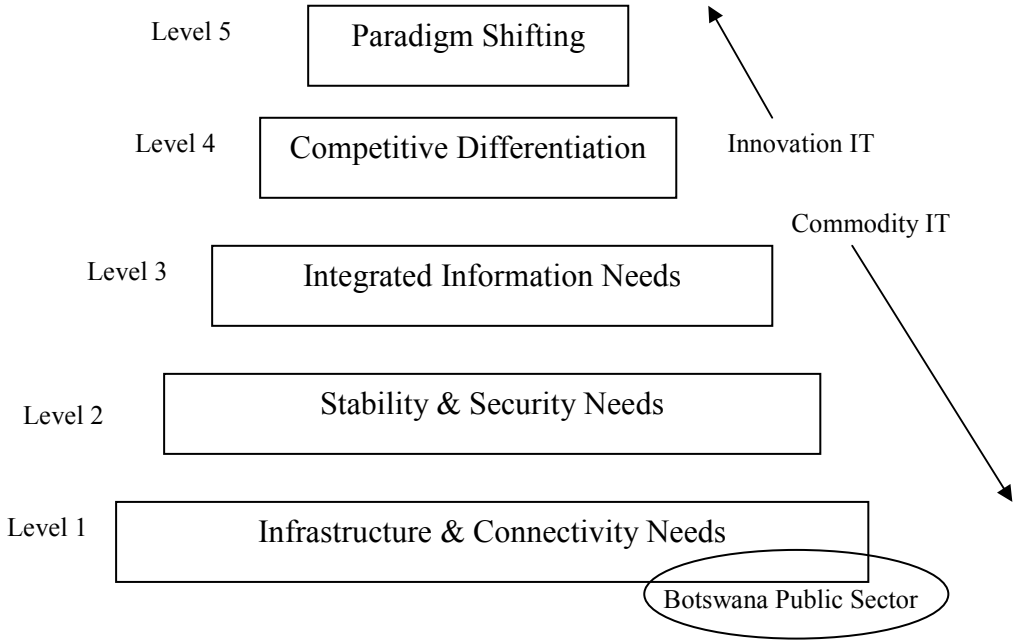


Figure 7.2 Botswana's Position based on Urwiler & Frolick (2008) Maturity Levels.

The maturity levels are stage process development, as to move up the ladder all the previous levels must be satisfied. The guiding principle is for Botswana to determine what the future focus for IT is. If the focus is for IT to be a commodity, the country needs to at least aim to attain level 3. However if the focus is for IT to provide competitive advantage like competing with other countries for foreign direct investments or markets, then the focus needs to be innovative approach of IT.

Having established the position of Botswana in terms of maturity level, the next issue is to look at how Botswana can move from the current position to the next level. In this research it is recommended that Botswana attempts to go one stage at a time. This is because Botswana has problems when it comes to implementation of policies, hence it might be risky to try to make more than one move at a time. The main advantage with moving two stages at a time is that the benefits can be attained much quicker, but this will require dedicated and

committed staff, which is currently a problem as people are not content with their salaries as discussed in Section 5.4.7.

In order for Botswana to move from her current position of level 1, there are primary issues that need to be addressed by policy makers, ICT sector and academics with vested interest in Botswana. These issues are to be addressed to facilitate implementation of the proposed framework for ICT exploitation in the public sector. Which level must Botswana aim to move to? This question requires further discussion with Botswana authorities as its answer depends on the overall strategy about the role of ICT as discussed in Section 2.4.4. However this research recommends aiming to move to the next level of the current stage i.e. level 2. This is because level 2 issues concern stability and security needs of ICT. The need to have a stable and secure ICT is required to meet the needs of higher levels. It is not recommended to move two levels at a time as this requires a lot of technical knowledge and committed employees. This research has revealed problems regarding human resource especially retention of qualified staff in the Botswana public sector. However while aiming to move to level 2; the ultimate goal must be at least to reach level 3 so that the public sector can benefit from integrated information systems that can meet the needs of customers irrespective of their geographic location. The issues that need to be addressed for Botswana to move from level 1 to level 2 are summarised in Figure 7.3.

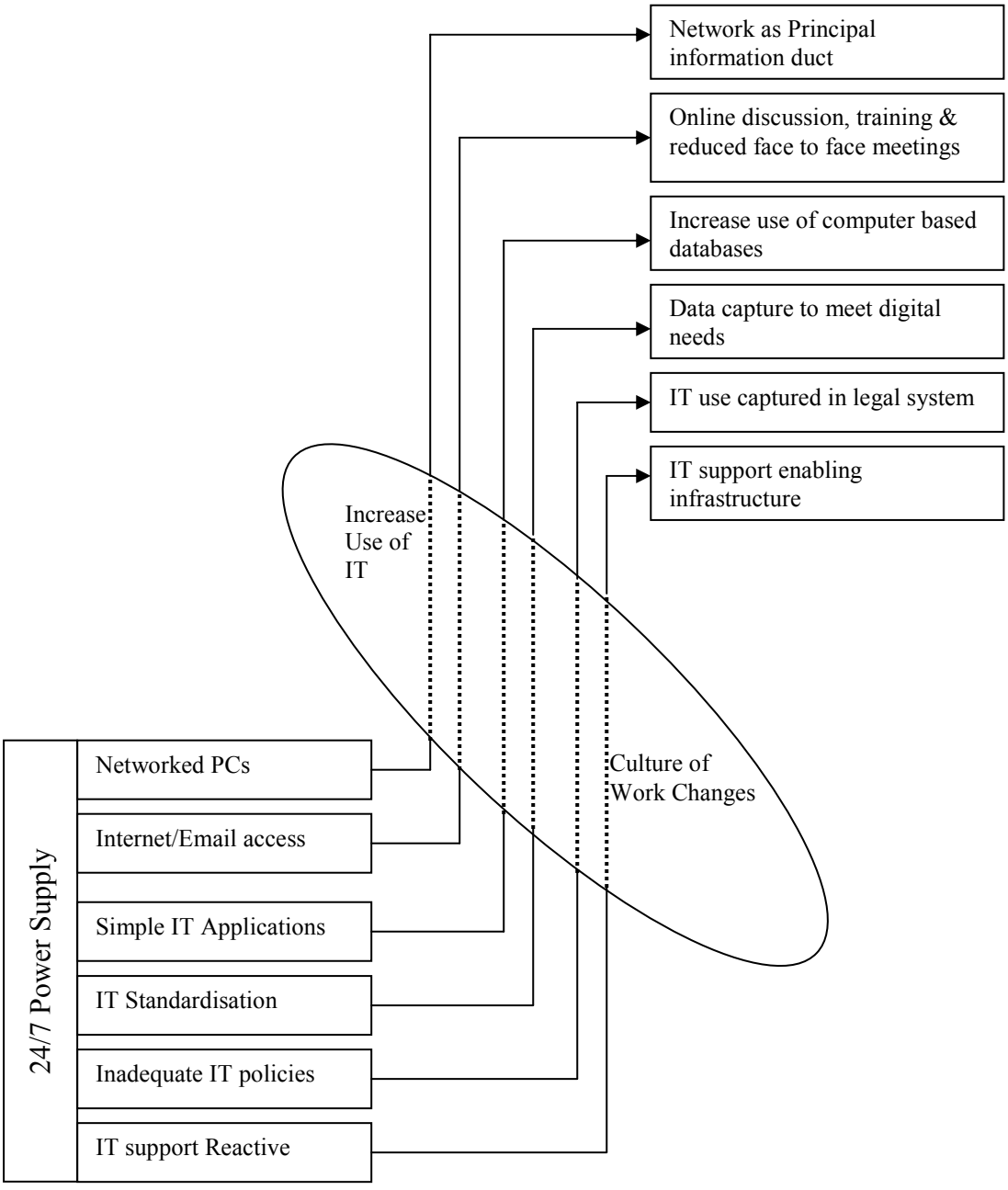


Figure 7.3 Botswana Government ICT Exploitation Framework.

7.3.1 Reliable Power Supply

Botswana relies on imported electric power. This makes the country vulnerable to any economic change that takes place in countries where electricity is sourced. There is a need to provide reliable power supply if IT is to enable

services to be available around the clock. This is particularly true for e-commerce where trading might takes place any time of the day. Botswana has abundant solar radiation. As the world faces energy crisis due to depletion of fossil fuels, the trend is to develop alternative renewable energy sources which are environmentally friendly. Solar energy is one of the environmentally friendly energy sources gaining interest globally. Lack of electricity at Botswana border posts is one of the reasons why Botswana is not able to introduce electronic passports (Siele, 2008). The Botswana government wanted to introduce electronic passports to deal with increase in forged passports.

7.3.2 Networked PCs

This research has shown that personal computers are available within central government. There is a need to increase use of existing local area networks within departments that link to the national data network. These local area networks can facilitate inter department collaboration and be the backbone for electronic departmental functions if intensively used. Networked PCs need to be looked at as the principal conduit through which information is managed within government, both with internal as well as external stakeholders. At the moment government data network is mainly used for internet access with very little information management.

7.3.3 Internet/Email

The existence of internet and email has the potential to enhance improvement in operations of the public sector. With senior officers spending a significant portion of their working time attending meetings at the expense of their daily jobs, increased use of email for online discussion can reduce the frequency of face to face meetings. If existing internet and email is not linked to departmental functions, this may encourage use of such facilities for non official matters. Significant questions that members of parliament ask during Botswana parliament debates are statistical questions. Senior officers spend a considerable amount of their time collecting such statistical information to prepare answers for their ministers. If government data is made digital and accessible, this will reduce data mining that government officials have to do to prepare answers.

7.3.4 Simple IT Applications

There is an urgent need to develop computer based databases to capture almost all department information management. Computer based databases can replace the manual filing cabinet which consumes space and time when retrieving data. At the moment there are basic IT applications such as pay roll, vehicle registration/licensing and national registration systems. There is room for development of more IT based systems with the potential for integration of these systems at a later stage. The principal theme of development of such systems need to be that data must only be stored once and shared electronically with other government departments and external stakeholders.

7.3.5 IT Standardisation

The available IT infrastructure lacks appropriate standardisation to enable it to be used. The way data is captured and stored is still on paper based information management approach. There is a need to prepare guidelines on standardised IT regarding data capture and how it is shared. Central to this is to protect data. Digital data is portable because of its format, but this can create problems if there are no guidelines as to what form of protection are in place if data is physically moved around. Laptops and external digital storage devices can be lost and measures need to be in place to protect information that they may contain from falling in the wrong hands.

7.3.6 Inadequate IT Policies

The use of IT needs to conform to existing legal system in Botswana to protect the users of the technology as well as the IT industry. IT policy needs to reflect on issues like data protection as well as management. Use of internet does not recognise territorial boundaries, hence while IT policy should be based on the Botswana legal system, it must also reflect on the needs of the global market. Lack of adequate IT policies may lead to Botswana becoming a base for cyber crime.

7.3.7 Reactive IT Support

Use of IT requires support to keep the technology working. This is even more so in a country like Botswana whose natural environment is not ideal for temperature and dust sensitive IT based technologies. The temperatures of Botswana, coupled with dust problems are not conducive for IT hardware. This research has shown that maintenance of IT resources in government is

outsourced to the private sector. There is no scheduled maintenance and support is provided when the problems arise.

7.4 Increase use of IT in public sector

The central issue to the successful implementation of this framework depends on increase in use of existing ICT infrastructure in the public service. By significantly increasing the use of existing ICT facilities, employees will be able to master the technology and be ready to adapt to changes of ICT as it happens. This research has shown that the level of use of ICT facilities in the public sector is very low. Computers are used as advanced typewriters (see Section 5.5). The department functions also are oriented towards doing things manually. Employees have the basic skills required to use computers. There is a need to modernise department functions to exploit existing ICT infrastructure. This will require cultural changes, which will be discussed in the next section

7.5 Culture of work changes

The current work practices in the Botswana public sector have been in place for a long time. They were designed to meet non IT work environment. Since they have been in place for a long time they have become culturally accepted. Unfortunately for the Botswana public sector to gain from exploiting IT, changes are required to some of the cultural beliefs related to work practices. There are major cultural challenges that are indirectly leading to lack of exploitation of IT within the Botswana public sector. As discussed in Section 2.5.2, there are conflicting interests in governance in any public sector due to political, customers and employees level of influence on one another.

Customers and politicians have the greatest influence on employees. The results of this research have shown that employees in Botswana public sector have limited influence about their work (Section 5.4.23). Botswana has her own unique cultural context which differs from those of western societies. Not only is there political pressure, there are also cultural differences regarding leadership. It has been shown that in Botswana, leadership within the public sector is treated like a family institution with the leader being a father figure (see Section 3.1). This leads those who are in leadership positions to have power, authority

and control over their subordinates. The problem with this is that it limits exploitation of human knowledge and innovation from junior employees.

Cultural issues in Botswana public sector if not addressed, will lead to a further lack in the utilisation of ICT as employees especially those at lower levels are not given the opportunity to exploit the technology. The success of looking at cultural issues in the work place and adjusting them accordingly to take advantage of ICT capabilities will also benefit exploitation of ICT at national level.

7.6 Summary

This chapter has introduced a framework that can help Botswana to exploit ICT based on Botswana's environment and condition as a developing country. The framework prescribed is at public sector and national level. The public sector framework focuses on increasing use of ICT in central government. The national framework covers the whole country and its aim is to provide benefits of increased use of ICT to the private and public sector as well as citizens irrespective of their geographic location in Botswana.

While further work is required to sell this idea to policy makers in Botswana, the fundamental point is that action is required immediately. The public sector ICT framework requires immediate implementation after further discussion with relevant authorities. The national ICT framework is a long term strategy that may help in moving the ICT agenda forward to everyone in the country. It is difficult to prescribe a theoretical concept that requires testing and implementing in Botswana. This is because the country is rich as measured by its GDP. Unfortunately the wealth is from single sector, namely diamond mining. It is therefore easy and convenient for the government to buy solutions from outside the country. There is a huge digital divide between ICT availability in central government and the general public. The public can benefit from increased use of ICT facilities to serve them. The next chapter is a final chapter and it discusses conclusions that can be drawn from this research.

CHAPTER 8: CONCLUSIONS

8.1 Introduction

This final chapter describes the conclusions that can be drawn from results of this research. It then makes suggestions as well as description for future research. The primary aim of this research was to develop a framework that can help Botswana exploit ICT applications in the public sector. This has been achieved although further work is required to validate and test the framework.

8.2 Key findings

The main conclusions that can be made form this research based on the objectives of this study (Section 1.4) are as follows:

- Botswana ICT infrastructure is concentrated in central government, at business and public level diffusion is very low. Lack of reliable and sustainable electricity supply is a major challenge to ICT applications.
- Reluctance to change and problems in project implementation are the major limiting factors to exploitation of ICT in Botswana public sector.
- Customer dissatisfaction is due to delays experienced when seeking service from government agencies.
- ICT user support within the public sector is satisfactory, but use of ICT is limited, hence this may change with increased use.
- A good psychological contract exists among public servants. However there are problems related to pay and low motivation among employees.
- Based on literature and results of this research, a national and public sector frameworks have been developed to help raise level of ICT use in Botswana.

This research has shown that public perception of unsatisfactory performance of Botswana public service is mainly due to the fact that it takes too long for customers to get the service. On the other issues regarding the type of service that customers receive, the majority of the population is satisfied.

The availability of computer facilities and an educated workforce in the public sector raise customer expectations. About 66% of respondents were of the view that the use of computers can contribute to improved service delivery.

Computer ownership is very low as only about 28% of respondents have a computer at home. Considering that this research was based in the city of Gaborone, ownership of computers among the general population is likely to be even lower.

The following findings have also emerged from this research:

- The maintenance cost of government computers are of the order of 8 times the national average salary
- Many departmental tasks are still performed manually despite the presence of computers and people capable of using them.
- Perception of poor service delivery is mainly due to delays customers experience when seeking services.
- Customers' waiting time is about 12% of official working time
- The majority of public sector employees are not content with their salaries and feel they have no influence in department decisions

This research shows that the answer to the research question which was introduced in Section 1.1 is that ICT level of use is very low. Despite the availability of computers in government departments, tasks and processes have not been adjusted to take advantage of opportunities that ICT provides.

8.3 Recommendations

In order for the Botswana government to exploit the existing ICT applications, the following short and long term recommendations are proposed. For the immediate measures standardisation and data interchange issues need to be addressed.

The Botswana government does not have standardised digital information capture and sharing. Data is captured to meet needs of generating information manually. There is a need to have standards regarding electronic data interchange using computer based databases.

Digital information infrastructure planning needs to be integrated into infrastructure development plans just like land use planning.

Outsourcing of IT function needs to be reviewed as the fast changing nature of IT requires a different management approach. Also outsourcing of IT may affect security issues regarding IT operations and the data network.

For long term measures, renewable solar electric power, distribution of ministries across the country as well as settlement policy needs to be looked into.

To address the problem of electric power in Botswana, research on harnessing solar power needs to be given high priority as a long term electric power needs strategy for the country. With the growing interest in use of alternative form of energy, Botswana is at an advantage as the country receives one of the highest solar radiations in the world. The future of computing is moving towards mobile computing i.e. wireless computing (Karlson et al., 2004: xiv). Mobile computing devices will require local power supply hence solar power batteries have potential in this area. Botswana is in a much better position to gain from investing in research on solar powered batteries for mobile computing of the future.

Due to land shortage in Gaborone and problems that this creates, ministries and departments which are located in Gaborone but are renting offices from the private sector need to be distributed evenly in the country and use ICT applications to facilitate communications and information sharing. The benefits of ICT become more apparent when used to manipulate and share information over long geographic distances as compared to shorter distances.

ICT industry has been shown to have the following sectors; end users, equipment and terminal vendors, operators, service providers, service and application developers and sub-suppliers (Karlson et al., 2004: 2). To address unemployment problems in Botswana, the focus needs to shift from ICT being a wholesale sector to service and application development. These areas can create employment for unemployed graduates as well as provide solutions to local problems.

Botswana's success in the 21st century will depend to a large extent on the strategy adopted to address the challenges facing the country. Dependence on the mining sector export makes the country vulnerable to external economic changes. While no country can be truly economically independent, over dependence on imports for almost every product can be an economic

insecurity. The way forward is for the country to actively promote research and development especially on how to adapt to environmental conditions that prevail like high temperatures and frequent draught.

The country has expertise to implement and intensify research through the University of Botswana which has faculties encompassing major fields like engineering, technology, science, business, social sciences and humanities. The proposed second university in the country will also increase human capital for the country to exploit.

The Botswana government is the main financier for the University of Botswana. The government is in a better position to influence and encourage research on the problems facing the country by specifically linking funding to these needs. The University of Botswana will then feel duty bound to raise its research output to meet the needs of the country. This approach appears to be working well for main funding bodies in the UK (HEFCE, 2007).

Botswana's situation illustrates that while lack of ICT infrastructure is often cited as one of the barriers for developing countries to exploit ICT, it is not enough to have ICT. It is also important to know what ICT is being used for. This research has shown that employees of Botswana government have access to computers, networks with a fairly fast speed by African standards as well as ICT skills. Despite having all these there is still an information flow delay which leads to customers having to wait for a long time and hence customer dissatisfaction.

Low internet penetration in the general population in Botswana is a major challenge to the government efforts of providing services online. High crime in Botswana also challenges any efforts to establish community access points that the government wants to set up in rural areas or providing computer facilities in public libraries.

ICT has the potential to play a role in addressing the challenges that Botswana is facing. Perhaps if ICT can be made an integral part of addressing Botswana's challenges, then its capability can be realised. For example migration of people to the capital city can be reduced by distributing government ministries across the country and then ICT used to facilitate communication and data exchange among remotely located ministries. Even in the capital city, government ministries are not located in one building, but are spread across the city. The existing government data network is capable of facilitating this.

Botswana's fourth president who came to power on 1st April 2008 is emphasising successful implementation of government projects and effective service delivery. The government has for the first time set up a Customer Service Standards Framework which stipulates time limit as to how long each ministry and departments commit themselves to accomplish a task. The main objective of these is to have standards by which customers can judge performance of government.

The biggest problem facing the Botswana government is how best to transit from paper based information to digital information. Paper based information management is rooted in operations of many organisations as it has been in place for a long time while digital information is a fairly new concept. Digital information is easy to manipulate using ICT when compared with paper based information. Digital information especially in developing countries has not yet become socially acceptable. It also requires changes in an organisation and change is not easy to introduce.

8.4 Further Research

Due to limitations of this research as discussed in Section 1.4, a qualitative approach is suggested to look at issues regarding low salaries that have been shown to be the main problem within the public sector based on results of this research. Botswana's GDP is estimated to be about US$ 10.6 billions and population estimate is about 1.9 million (WORLDBANK, 2008a). Probably it is this high GDP that raises employee's expectations regarding payment. Further research is required to turn this wealth into sustainable resources that can promote high standards of living.

Further work is required to discuss the proposed framework with all stakeholders in Botswana. This will involve discussion with academics, politicians and other policy makers on issues related to government operations. It is not going to be easy as this framework challenges established practices on government that is administered from a capital city. On the other hand developing countries like Botswana have opportunity to be able to decentralise government operations as IT now makes information exchange easier irrespective of geographical locations. Older cities like London were set up at a time when communications relied on human manpower to deliver data contents.

Therefore there was a need for government departments to be close to one another.

In 2004 the government set up a forward thinking initiative on how IT can be used to improve service delivery. Unfortunately to date very little has taken place. Botswana does not have a good record when it comes to project implementations. A different approach is required to highlight the importance of action and learning from any mistakes that are made. ICT changes so fast that delays to act can lead to a lost window of opportunity.

8.5 End Note

This research has revealed a lot of areas that were not even envisaged at the beginning regarding the ICT landscape in Botswana. There is a huge digital divide in Botswana that requires innovative approach to address. Botswana faces unique challenges mainly due to the fact that the country is a consumer country. In the modern globalised world, countries that are succeeding are those that are producing goods or services to the global markets. Botswana as a consumer country is on a fragile line especially due to the unstable political environment of her neighbours who are also major trade partners. Hopefully this research will provide a new approach on how ICT increased use can modernise Botswana government operations by distributing government evenly across the country. This will also evenly distribute employment opportunities.

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APPENDICES

Appendix A: Research Permit Application Form

REPUBLIC OF BOTSWANA

Research Permit Application Form

Two copies of this form should be completed and signed by the applicant who wishes to obtain a permit for conducting research in the Republic of Botswana, and sent to the Permanent Secretary of the relevant Ministry (see guidelines for addresses). These forms should not be submitted unless the Guidelines for the Application for a Research Permit has been carefully studied. A copy of any project proposal submitted to funding agencies must accompany this application. Please refer to Annexure I attached to this application form.

Description of the Proposal

1. (a) Title of Research:
Evaluation of Impact of IeT Applications in Performance of Government Department of Botswana: A Case Study of Selected Departments

.....

(b) Discipline involved:
PhD Research with University of Salford

.....

.....

2. Name and Address of Applicant:

Title: Mr. / ~~Mrs. / Miss / Dr. / Prof~~:
Tiroyamodimo Mogotlhwane
.....

Box 50185
.....

Gaborone, Botswana
.....

Telephone: 72261789.

Fax: 3185100 (Attention: G. Mashadi) E-mail: mogotlhw@mopipLub.bw

3. Name and address of home institutions (if any) to which you are affiliated:

Department of Computer Science.
University of Botswana
P/Bag 0022
Gaborone

.....

4. Name and address of supervisor of research in home country or responsible referee
Professor F. Khosrowshahi

.....
School of Build Environment
University of Salford.
The Crescent
Salford, UK
M5 4WT

.....

Research plans

5. (a) Main aims (general)

Develop a framework for ICT application in aid of improving productivity in public service in Botswwana.

(b) Objectives: brief description of issues/ problems and/or topics to be investigated; relevance of the research; hypothesis; risks etc. *(attach a Research Proposal)*
Determine the following:

- Maturity level of ICT in government departments
- Limiting factors to full utilisation of ICT
- Customer satisfaction levels on service from government departments
- Level of user satisfaction with ICT use and support. • State of psychological contract among civil servants

Develop an instrument to help evaluate impact of ICT application in government departments .

.....

.....

.....

. .....

(c) Methods and techniques

Interview.
Questionnaire
Document analysis .

. .....

. .....

. .....

6. Budget for the costs in Botswana (give detailed breakdown of research costs such as subsistence, travelling, local staff, secretarial services, seminar, printing etc.). Please state amount in Pula.

Publications	P500
Research Assistant	P1500

. .....

. .....

. .....

. .....

7. Name and address (including telephone and e-mail) of financial sponsor(s) of the research (if appropriate)

Director.
Staff Training & Development
University of .Botswana Private
Bag 0022
Gaborone

. .....

. .....

8. Has funding already been obtained? (yes/ ~~No~~)

(a) If yes, please state the total amount granted, and the name and address of the funding agency .

.....

P2000

.....

.....

.....

(b) If no, what steps are being taken to ensure sufficient funding?

.....

.....

.....

.....

9. If you have previously done research in Botswana please give details of the research .

.....

.....

.....

.....

10. Name and address (including telephone and e-mail) of institution in Botswana to which the researcher is to be affiliated.

Department of Computer Science
University of Botswana
Private Bag 0022
Gaborone

.....

.....

11. Details of Botswana - based personnel that will be involved (names, functions, qualifications).

2 Unemployed Form 5 schoolleavers to be employed as research assistants .

.....

.....

.....

.....

.....

12. Places in Botswana where the research is to be undertaken:

Gaborone

.....

.....

13. Proposed time - schedule for the research:

February - April 2007

.....

.....

.....

14. Plans for dissemination of research findings:

PhD thesis
Journal and Conference publications

.....

.....

.....

15. How are the research findings going to be used in the home country?

As a reference material for academic and public use.

.....

.....

.....

16. Any other information.

.....

.....

17. Signature of applicant: .....

18. Date: ..... .

19. **For Official Use Only**

Action taken:

.....

.....

.....

Action Officer: ..... Date: .....

Permit: Granted/ Deferred/ Rejected .....

ANNEXURE 1

(i) Submit the following identity (Omang)/ passport particulars

Name:	Tiroyamodimo Mogotlhwane
Date of Birth:	8th October 1965
Nationality:	Motswana
Omang/Passport Number:	N533140
Place of Issue:	Gaborone
Date of Issue:	30th June 2001
Date of Expiry:	29th June 2011

(ii) Submit a Research Proposal

(iii) Attach an up to date curriculum vitae

(iv) Applicants from foreign countries are advised not to leave for Botswana before obtaining a research permit from the relevant Ministry.

(v) Statutory deposit of resulting publications:

Resulting publications should be directly deposited with the following institutions and any other departments as may be specified in the permit.

1. Director, Botswana National Library Service, Private Bag 0036, Gaborone, Botswana

2. Director, Botswana Archives and Records Services, PO Box 239, Gaborone, Botswana

3. Ministry of Communications, Science and Technology, P/Bag 00414, Gaborone

4. Director, Research and Development Office, University of Botswana Private Bag 0022, Gaborone Botswana

(vi) For any correspondence pertaining to a research permit issued, always quote the permit reference number.

Request permission to use CIPD copyrighted material

CIPD reference number:

To enable production of an accurate quotation for the following request to reproduce copyrighted material, the following information is detailed:

Date of request: 28th September 2006

Reply required by: 15th October 2006

Name of applicant(s): Tiroyamodimo Mogotlhwane

Please complete sections 1, 2 or 3 (whichever applies).

Section 1: I wish to publish a new printed work containing some of your copyrighted material

Name of publisher of new work:	
Title of my/our forthcoming publication:	PhD Thesis
Custom publishing: Y/N	
Estimated date of publication:	2008
Approximate 1st print run/forecast sales units for 1st year:	3
List price of product:	
What rights are required? (Delete as appropriate) Non-exclusive license to publish in all forms throughout the world/license to publish in book form throughout the world/license to publish in electronic form only/other (or other rights acquired).	Re use material in my research for PhD

I/We request permission to use the following material from one of your publications:

Title: Fairness at Work and the Psychological Contract
Author(s)/Editor(s): David E. Guest & Neil Conway
Publisher: Institute of Personnel and Development
Edition, Vol., date: 1998
ISBN: 0 85292 706 X
URL (where appropriate)
Material used (page nos.): 4, 11, 18, 22, 24, 27, 31
Illustrations as follows:
Original references (e.g. Table 5): Table 1, Table 3, Table 5, Table 7, Table 8, Table 9, Table 11
Original titles:
A photocopy of the material concerned is attached. /No (Delete as appropriate)

Section 2: I wish to include your copyrighted material in a presentation and/or course handouts/ conference handouts/ or other course materials (delete whatever does not apply)

Name of course/conference:	
Name company organizing course/conference	
Number of delegates attending:	
Date of course/conference:	
Price per delegate:	
Number of handouts to be produced:	
Number of slides containing CIPD copyrighted in presentation:	
If course/conference is non-commercial please specify exact nature of event:	
Are speaker fees being paid? yes/no	
What rights are required? (non-exclusive license to publish in all forms throughout the world/license to	

publish in printed form throughout the world/license to publish in electronic form only/other).	

I/We request permission to use the following material from one of your publications:

Title:
Author(s)/Editor(s):
Publisher:
Edition, Vol., date:
ISBN:
URL (where appropriate)
Material used (page nos.):
Illustrations as follows:
Original references (e.g. Table 5):
Original titles:
A photocopy of the material concerned is attached.

Section 3: I wish to include your copyrighted material on a secure website/public website/intranet (delete whatever does not apply)

Name of company/organization that owns the website:	
URL of site where material will be hosted:	
Maximum number of intended users:	
Describe nature of use - If Commercial use – give monetary value of activity. If non-commercial use – please specify exact nature of use:	
Password protection details (how we ensure only authorized persons can access the material):	
Format in which the material will be made available (Word, HTML, PDF etc):	
Duration of permission being requested:	
What rights are required? (non-exclusive license to publish throughout the world/license to publish in electronic form only).	

I/We request permission to use the following material from one of your publications:

Title:
Author(s)/Editor(s):
Publisher:
Edition, Vol., date:
ISBN:
URL (where appropriate)
Material used (page nos.):
Illustrations as follows:
Original references (e.g. Table 5):
Original titles:
A photocopy of the material concerned is attached.

Please return this form to: Rights and Permissions, CIPD Publishing, 151 The Broadway, London SW19 1JQ
rightsandpermissions@cipd.co.uk

Appendix B: Approval of Research Permit

FAX: 3907426

REPUBLIC OF BOTSWANA

MINISTRY OF LABOUR AND HOME AFFAIRS
PRIVATE BAG 00
GABORONE

REF: CHA 1/17/2 VIII (65) 09 March 2007

Mr Tiroyamodimo Mogotlhwane
P O Box 50185
GABORONE

Dear Mr Mogotlhwane

APPLICATION FOR A RESEARCH PERMIT

Please refer to your application for a research permit dated 5th February 2007.

You are hereby granted permission to carry out research entitled **"Evaluation of Impact of ICT Applications in Performance of Government Department of Botswana: A case Study of Selected Departments"**. You will conduct your research at the **Department of Civil & National Registration.**

The permission is granted subject to the following conditions:-

1. Copies of any report/video produced are deposited with the Director of Research and Development office of the University of Botswana, Department of Civil and National registration, Botswana National Library Service, and Botswana National Archives and Records Services.
2. The Permit does not give authority to enter any premises, private establishment or protected area. Permission for such entry should be negotiated with those concerned.
3. The permit is valid for a period not exceeding 4 months beginning 12th March 2007 to 31 July 2007.
4. You shall conduct the study according to the particulars furnished in the application form.
5. Failure to comply with any of the above – stipulated conditions will result in the immediate cancellation of the permit.

Yours faithfully

Ogomoditse M Matsila
For/**PERMANENT SECRETARY**

Om

TELEPHONE: 3958500
TELEGRAMS: WORKCOM
FAX NO: 3915303/3902922
REFERENCE:

REPUBLIC OF BOTSWANA

MINISTRY OF WORKS & TRANSPORT
PRIVATE BAG 007
GABORONE
BOTSWANA

WC 1/2/1 IX (13)

14 February, 2007

Mr. Tiroyamodimo Mogoithwane
P.O.Box 50185
Gaborone

Dear Sir/ Madam

Research Permit Application

We make reference to your letter dated 5 February 2007 in connection with the above captioned matter.

We wish to inform you that we are not able to accede to your request to access vehicle registration database. Such database is considered to be classified and access to it is restricted for security reasons. Our Department of Road Transport and Safety however will be happy to be of assistance by furnishing you with any other information you might need to meet your research requirements.

Yours Faithfully

Leslie M. Mpofu
For/ Permanent Secretary

Appendix C: Permission to use CIPD questionnaire

University of Salford
A Greater Manchester University

Mailbox usage: 28.75MB / 50.00MB (57.51%)

Date: Thu, 12 Oct 2006 18:00:36 +0100
From: Mala Bhaumik <rightsandpermissions@cipd.co.uk>
To: T.M.Mogotlhwane@pgr.salford.ac.uk
Subject: FW: request
Part(s): 2 T. Mogotlhwane- Full C P D Copyright Request Form.doc application/msword 82.11 KB

Dear Tiroyamodimo,

Thank you for requesting formally for copyright permission to re-use CIPD material.

Please feel free to use this material as part of your PhD research. A full acknowledgement of the source is required in any published version that contains CIPD content.

Kind regards.
Mala

Mala Bhaumik
Rights and Permissions
CIPD Publishing
151 The Broadway
London
SW19 1JQ
Email: rightsandpermissions@cipd.co.uk
<mailto:rightsandpermissions@cipd.co.uk>
Tel: +44 07811333900
Fax: +44 020 8612 6771

-----Original Message-----
From: Tiroyamodimo Mogotlhwane
[mailto:T.M.Mogotlhwane@pgr.salford.ac.uk]
Sent: 28 September 2006 10:38
To: Ruth Lake
Subject: Re: request

Thank you very much for your immediate response to my request.
Find attached the completed form. I have tried to complete it as much as I can and even sought assistance from university of Salford library.

I want to re-use survey questionnaires stated in the form for collecting data for my research work where I am looking at productivity problems in public service of Botswana.

Let me know if I have missed any thing in the form.

Again many thanks

Tiroyamodimo Mogotlhwane

Quoting Ruth Lake <R.Lake@cipd.co.uk>:

> Dear Tiroyamodimo
>

> Nala Bhaumik is away at the moment and I am dealing with queries in
> her area.
>
> Please complete the attached form and return it to me to allow me to
> assess your request appropriately.
>
> Best Wishes
>
> Ruth
>
> Commissioning Manager
>
> CIPD Publishing
>
> Tel: 020 8612 6563
> Fax: 020 8612 6700
> r.lake@cipd.co.uk
>
> Original Message-----
>
> From: Tiroyamodimo Mogotlhwane
> [mailto:T.M.Mogotlhwane@pgr.salford.ac.uk
> <mailto:T.M.Mogotlhwane@pgr.salford.ac.uk>]
>
> Sent: 26 September 2006 11:33
>
> To: Nala Bhaumik
>
> Subject: Request for permission to use survey material
>
>
>
> Good day Nala Bhaumik
>
> I contacted CIPD library today and was given your name and email to
> address my request to.
>
> My name is Tiroyamodimo Mogotlhwane, I am currently doing my PhD at
> the University of Salford.
>
> My research is looking at productivity problems in Botswana. During my
> literature review I came accross your publication report 'Fairness at
> work and the psychological contract' by David R. Guest & Neil Conway,
> IPD, 1998.
>
> I hereby apply for your permission to use some of the survey questions
> in this report so that I can compare the state of psychological
> contract in Botswana and the UK. If permission is granted, they will
> be appropriately referenced in my work.
>
> Thank you and looking forward to your reply
>
> Tiroyamodimo Mogotlhwane
>
> PhD Research Student
>
>
>
>
>
> ---
>
> Concerns about content should be sent to abuse@salford.ac.uk
>

> Ensure your organisation's success at the CIPD Annual Conference 2008
> www.cipd.co.uk/ace
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> Chartered Institute of Personnel and Development, 151 The Broadway,
> London, SW19 1JQ.
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> CIPD Enterprises Limited is wholly owned by the CIPD, incorporated in
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> The Broadway, as above.
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> www.blackspider.com
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Concerns about content should be sent to abuse@salford.ac.uk

Appendix D: Approval letter to participants

University of Botswana

Department of Computer Science

Private Bag UB 00704 Gaborone Botswana
Telephone: (267) 355 2130 Fax: (267) 3185100

27th March 2007

Dear participants

REQUEST TO TAKE PART IN SURVEY

I am currently collecting data as part of my research for PhD studies. I would like you to complete the attached questionnaire. Only your views are required. Your privacy will be maintained hence information that can reveal your identity such as name will not be asked. Information that you provide will only be used for academic purposes only.

This research is looking at why despite fairly good information technology infrastructure in government departments there continue to be some believe about problems related to service delivery by government departments in Botswana. It is only when such problems are known that appropriate intervention measures can be developed to avoid wasting national resources.

The questionnaire is fairly short and should not take more than 30 minutes to complete. If you so wish you can let me know if you want to have access to any publication from results of this research.

Thank-you

Tiroyamodimo Mogotlhwane

Omang No. 155016502

UK Contact details
PhD Research student
University of Salford
The Crescent, M5 4WT, UK
t.m.mogotlhwane@pgr.salford.ac.uk

Botswana Contact details
Department of Computer Science
University of Botswana
P/Bag 0022, Gaborone
mogotlhw@mopipi.ub.bw

Customer Satisfaction Survey

Please answer the following questions by placing ONE tick ✓ in the appropriate box for each question.

The purpose of this survey is to find out your level of satisfaction with the quality of service you receive from Botswana government employees.

1. Gender:

Male	Female
☐	☑
1	2

1.1 What is your highest Education qualification?

Below PSLE	1 ☐	COSC	4 ☐	Degree	7 ☐
PSLE	2 ☐	Certificate	5 ☐	MSc	8 ☐
JC	3 ☐	Diploma	6 ☑	PhD	9 ☐

1.2 Employment status

Employed	Self employed	Unemployed	Retired	
☑ 1	☐ 2	☐ 3	☐ 4	Student 5

2. How satisfied are you overall with the quality of service you receive from government departments you visit most?

Extremely satisfied	Very satisfied	Fairly satisfied	Neither/ Nor	Fairly dissatisfied	Very dissatisfied	Extremely dissatisfied
☐	☑	☐	☐	☐	☐	☐
-3	-2	-1	0	1	2	3

3 How satisfied are you that government employees?

	Extremely satisfied	Very satisfied	Fairly satisfied	Neither/ Nor	Fairly dissatisfied	Very dissatisfied	Extremely dissatisfied
Are friendly and helpful when attending to you	☑	☐	☐	☐	☐	☐	☐
Are knowledgeable about their products and services	☐	☑	☐	☐	☐	☐	☐
Give quality advice	☐	☑	☐	☐	☐	☐	☐
Give you 100% of their attention	☐	☐	☐	☐	☑	☐	☐
Efficiently process your request or enquiries	☐	☑	☐	☐	☐	☐	☐
	-3	-2	-1	0	1	2	3

4 How satisfied are you with?

	Extremely satisfied	Very satisfied	Fairly satisfied	Neither/ Nor	Fairly dissatisfied	Very dissatisfied	Extremely dissatisfied
How often you have to queue	☐	☐	☐	☐	☐	☑	☐
The length of time you have to queue	☐	☐	☐	☐	☐	☑	☐
The effort staff makes to reduce queues	☐	☐	☐	☐	☐	☑	☐
Staff thanking you or apologising when you have to queue	☐	☐	☐	☐	☐	☐	☑
	-3	-2	-1	0	1	2	3

Please continue overleaf>>>>

Customer Satisfaction Survey

Please answer the following questions by placing ONE tick ✓ in the appropriate box for each question.

5. How long in hours do you normally have to queue?

< 1	≥1 but ≤2	>2 but ≤ 3	> 3 but ≤ 4	> 4
☐	☑	☐	☐	☐
1	2	3	4	5

Complaints

6. How often are you told to come the following day or next time?

Rarely	Sometimes	Often	Always
☐	☐	☐	☐
1	2	3	4

7. Do you complain if you feel you are not being attended to?

Yes	No
☐	☑
1	2

8. If you have ever complained, how satisfied were you with the following:

	Extremely satisfied	Very satisfied	Fairly satisfied	Neither/ Nor	Fairly dissatisfied	Very dissatisfied	Extremely dissatisfied
The way the complaint was acknowledged	☐	☐	☐	☐	☐	☐	☐
taking responsibility for sorting out your complaint	☐	☐	☐	☐	☐	☐	☐
The time taken to sort out your complaint	☐	☐	☐	☐	☐	☐	☐
The resolution of the complaint	☐	☐	☐	☐	☐	☐	☐
	-3	-2	-1	0	1	2	3

Please continue overleaf>>>>

Please answer the following questions by placing ONE tick ✓ in the appropriate box for each question.

Contribution of Computers to quality of service

Regarding your contact with government employees within the last 3 months, answer the following:

9. Did they have a computer?

Yes	No
☒	☐
1	2

10. Did they use a computer to deal with your request?

Yes	No
☐	☒
1	2

11. What do you think of the contribution of computers towards the service you receive from government employees?

They are source of the problem	1	☐
They are not used to serve you	2	☐
They are being used for unofficial matters	3	☒
They contribute to facilitate improved service delivery	4	☐

12. Which of the following age groups in years do you belong to?

< 21	≥21 but ≤30	>30 but ≤ 40	> 40 but ≤ 50	> 50 but ≤60	>60
☐	☐	☒	☐	☐	☐
1	2	3	4	5	6

Internet at Homes

13. If you are aware of the Internet, select only one place out of the following where you access the Internet most in a week

At Home	At Work	At Internet Cafe	At College	None
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

14. Do you have a home computer?
If YES go to 15 otherwise stop here

Yes	No
☒	☐
1	2

15. Is your home computer connected to the internet?

Yes	No
☐	☐
1	2

16. Select among the following the single most important reason for low internet use in homes

Associated cost	Lack of skills	Lack of electricity	Other
☒	☐	☐	☐
1	2	3	4

Thank you for participating in this survey

Employee Satisfaction Survey

Please answer the following questions by placing ONE tick ✓ in the appropriate box for each question.

The purpose of this survey is to establish your satisfaction level with your work environment

1. Gender:

Male	Female
☑	☐

1.1 What is your highest Education qualification?

Below PSLE	☑	COSC	☐	Degree	☐
PSLE	☐	Certificate	☐	MSc	☐
JC	☐	Diploma	☐	PhD	☐

2. Employee Satisfaction

Below are set of questions designed to establish the state of the psychological contract within your department. Please respond to each question by ticking the appropriate box next to your chosen response.

2.1 Perceptions of Fairness of Treatment

	Always kept them	Kept them to a large extent	Kept them to some extent	Not kept them	Don't know
2.2 To what extent has the department kept its promises and commitments to ensure fair treatment by managers and supervisors?	☐	☐	☑	☐	☐
2.3 To what extent has the department kept its promises and commitments to provide you with fair pay for the work you do?	☐	☐	☐	☑	☐

2.4 Do you feel that you are fairly rewarded for the amount of effort you put into your job?

Yes – definitely	Yes – probably	No – probably not	No – definitely not
☐	☐	☑	☐

Please turn overleaf >>>>>>

Employee Satisfaction Survey

Please answer the following questions by placing ONE tick ✓ in the appropriate box for each question.

3. Employee Direct Participation

How does each of the following best describe your participation in your job?

	Most of the time	Some of the time	Rarely	Never	Don't know
3.1 I carry out my work in the way I best think	☐	☑	☐	☐	☐
3.2 I plan my own work	☑	☐	☐	☐	☐
3.3 I vary how I do my work	☐	☑	☐	☐	☐
3.4 I choose the assignments I work on	☐	☑	☐	☐	☐

4. Employee Trust and Fairness

	A lot	Somewhat	Only a little	Not at all
4.1 In general, how much do you trust your department to keep its promise and commitments to you and other employees?	☑	☐	☐	☐
4.2 To what extent do you trust management to look after your best interest?	☐	☑	☐	☐

4.3 Do you feel that you are fairly rewarded for the amount of effort you put into your job?

Yes – definitely	Yes – probably	No – probably not	No – definitely not
☐	☐	☑	☐

Please turn overleaf >>>>>>

Employee Satisfaction Survey

Please answer the following questions by placing ONE tick ✓ in the appropriate box for each question.

5. Employee commitment to department

	A lot of loyalty	Some loyalty	Only a little loyalty	No loyalty at all
5.1 How much loyalty would you say you feel towards the department you work for, as a whole?	☑	☐	☐	☐

5.2 Are you proud to tell people who you work for? Would you say you are?

Very proud indeed	Quite proud	A little proud	Not at all proud	Don't know
☐	☐	☑	☐	☐

6. State of employee relations

6.1 Overall, how would you rate relations between employees and management in your department?

Excellent	Good	Only fair	Poor	Very poor
☑	☐	☐	☐	☐

6.2 Overall, how satisfied are you with the influence you have in department decisions that affect your job or your working life?

Very satisfied	Somewhat satisfied	Not too satisfied	Not satisfied at all	Don't know
☐	☐	☑	☐	☐

Please turn overleaf >>>>>>

Appendix G: User Satisfaction + data codes

User Satisfaction Survey

Please answer the following questions by placing ONE tick ✓ in the appropriate box for each question.

The purpose of this survey is to determine your satisfaction level with the quality of support you get from your computer support team

1. Gender:

Male	Female
☐	☐

1.1 What is your highest Education qualification?

Below PSLE	☐	COSC	☐	Degree	☐
PSLE	☐	Certificate	☐	MSc	☐
JC	☐	Diploma	☐	PhD	☐

2. How many years have you been using a computer in your job?

>10	>7but ≤10	>3 but ≤7	<3
☐	☐	☐	☐

3 How much time in hours do you spend in a day using a computer?

>7	5 to7	3 to 4	<3
☐	☐	☐	☐

4. Have you undergone any computer training?

Yes	No
☐	☐

5. How would you rate your computer skills?

Very Good	Fairly good	Neither/Nor	Not good
☐	☐	☐	☐

6. When working with a computer, what do you do most?

Access internet/email	Write documents	Prepare spreadsheets	Retrieve information
☐	☐	☐	☐

Please turn overleaf >>>>>>

Please answer the following questions by placing ONE tick ✓ in the appropriate box for each question.

This following set of statements relate to your feelings about computing facilities in your department. For each statement, please show the extent to which you believe your computing section has the feature described by the statement. If you strongly agree that your department computing facilities has that feature mark 7 and if you strongly disagree mark 1. You may mark any of the numbers in the middle that show how strong your feelings are. There are no right or wrong answers- all we are interested in is a number that best shows your perception about computing system within your department.

Please respond to all the statements.

7. Reliability

	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
7.1 When your department's computing services promises to do something by a certain time, it does so	☐	☐	☐	☐	☑	☐	☐
7.2 When you have a problem, your department computing services shows a sincere interest in solving it	☐	☐	☐	☑	☐	☐	☐
7.3 Your departmental computing services performs the service right the first time	☐	☐	☐	☐	☑	☐	☐
7.4 Your departmental computing services provides its services at the time it promises to do so	☐	☐	☐	☐	☐	☐	☐
7.5 Your departmental computing services maintains fully-functional equipment and software	☐	☐	☐	☐	☑	☐	☐

8. Responsiveness

	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
8.1 Employees of department computing services tell you exactly when services will be performed	☐	☐	☐	☐	☑	☐	☐
8.2 Employees of department computing services give you prompt service	☐	☐	☐	☐	☐	☐	☐
8.3 Employees of department computing services are always willing to help you	☐	☐	☑	☐	☐	☐	☐
8.4 Employees of department computing services are never too busy to respond to your requests	☐	☑	☐	☐	☐	☐	☐

Please turn overleaf >>>>>>

Please answer the following questions by placing ONE tick ✓ in the appropriate box for each question.

9. Assurance

	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
9.1 The behaviour of employees of department computing services instil confidence in you	☐	☐	☑	☐	☐	☐	☐
9.2 You feel safe in your dealings with the employees of department computing services	☐	☐	☑	☐	☐	☐	☐
9.3 Employees of department computing services are consistently courteous with you	☐	☐	☑	☐	☐	☐	☐
9.4 Employees of department computing services have the knowledge to answer your questions.	☐	☐	☑	☐	☐	☐	☐

10. Empathy

	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
10.1 Your department computing services gives you individual attention	☐	☑	☐	☐	☐	☐	☐
10.2 Your department computing services has your best interest at heart	☐	☑	☐	☐	☐	☐	☐
10.3 Employees of your department computing services understand your specific needs	☐	☑	☐	☐	☐	☐	☐

11. Which of the following age groups in years do you belong to?

1	2	3	4	5	6
< 21	≥21 but ≤30	>30 but ≤ 40	> 40 but ≤ 50	> 50 but ≤60	>60
☐	☑	☐	☐	☐	☐

12. Do you have a computer at home?
If YES got to 13, otherwise stop here

1	2
Yes	No
☑	☐

13. Is your home computer connected to the internet?

1	2
Yes	No
☐	☑

14. Select among the following the single most important reason for slow internet use in homes

Associated cost	Lack of skills	Lack of electricity	Other
☐	☑	☐	☐
1	2	3	4

Thank you for participating in this survey

3

Appendix H: ICT Inventory

DEPARTMENT:

LOCATION:

Computer Information

To be completed by IT officer in the department

Take 10% of the number of computers available in the department, for example if there are 250 computers then only 25 are required for this survey. For each computer provide the following information:

No. of years that it has been in use:

Type of computer (e.g. Dell Pentium 4 CPU 3.00GHz, 504 MB of RAM)

Size of Hard Disk (Local Disk C:) in GB:

Used space in GB:

Free space in GB:

Does it have access to the internet? (YES or NO)

Appendix I: Semi-structured interview questions

Semi – Structured interview

ICT Inventory

DEPARTMENT:
LOCATION:

No. of computers:

Total No. of employees in the Department:

No. of employees in Senior Management Team:

No. of employees in Middle Management Team:

No. of employees at Operational level:

No. of employees with computers:

No. of IT staff:

COST

Acquisition costs:

Maintenance cost (internal or outsourced):

Life span of a computer in years (how often do you replace computers?):

SKILL

How are computer literacy skills developed within the department employees?

USE

Rate of use of computer facilities

% of instances of abuse of computing facilities:

% of Email use:

Average No. of monthly hits to Department website:

% of website hits from outside Botswana:

% of website hits from within Botswana:

Challenges/Problems with Computers (only 3).

Appendix J: Age and Employment Status of Customers

Employment Status		Age of respondent (years)						Total
		<21	>or=21 but <or= 30	>30 but <or = 40	>40 but < or = 50s	>50 but <or = 60	> 60	
Employed	No	15	96	107	50	19	1	288
	%	5.2	33.3	37.2	17.4	6.6	.3	100.0
Self Employed	No	9	46	69	23	12	2	161
	%	5.6	28.6	42.9	14.3	7.5	1.2	100.0
Unemployed	No	87	160	56	32	27	12	374
	%	23.3	42.8	15.0	8.6	7.2	3.2	100.0
Retired	No	4	1	0	1	5	21	32
	%	12.5	3.1	.0	3.1	15.6	65.6	100.0
Student	No	16	15	0	0	0	0	31
	%	51.6	48.4	.0	.0	.0	.0	100.0
Total	No	131	318	232	106	63	36	886
	%	14.8	35.9	26.2	12.0	7.1	4.1	100.0

Appendix K: Cronbach Alpha Reliability Test Results

Reliability.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.941	.941	5

Inter-Item Correlation Matrix

	Keep Time	Sincere	Perform job Right 1st Time	Service Provision Time	Computer maintenance
Keep Time	1.000	.754	.803	.816	.637
Sincere	.754	1.000	.787	.876	.689
Perform job Right 1st Time	.803	.787	1.000	.881	.623
Service Provision Time	.816	.876	.881	1.000	.757
Computer maintenance	.637	.689	.623	.757	1.000

Responsiveness

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.933	.934	4

Inter-Item Correlation Matrix

	Department IT Services Communication on scheduled service	Department IT Services Provide Prompt Service	Department IT Services Willing to Help	Department IT Services Never too Busy to respond
Department IT Services Communication on scheduled service	1.000	.875	.675	.663
Department IT Services Provide Prompt Service	.875	1.000	.831	.764
Department IT Services Willing to Help	.675	.831	1.000	.872
Department IT Services Never too Busy to respond	.663	.764	.872	1.000

Assurance

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.967	.968	4

Inter-Item Correlation Matrix

	Department IT Services Instil Confidence in you	Departmetn IT Services You Feel Safe Dealing with them	Department IT Services Are Courteous with you	Department IT Servies Are knowledgeable to answer your questions
Department IT Services Instil Confidence in you	1.000	.910	.859	.898
Departmetn IT Services You Feel Safe Dealing with them	.910	1.000	.906	.889
Department IT Services Are Courteous with you	.859	.906	1.000	.837
Department IT Servies Are knowledgeable to answer your questions	.898	.889	.837	1.000

Empathy

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.947	.948	3

Inter-Item Correlation Matrix

	Department IT Service Gives you Individual Attention	Department IT Services has your Best Interest	Department IT Services Understand your specific Needs
Department IT Service Gives you Individual Attention	1.000	.866	.826
Department IT Services has your Best Interest	.866	1.000	.885
Department IT Services Understand your specific Needs	.826	.885	1.000