ASSESSEMENT ON USE OF ICT IN BUSINESS PROCESSES FOR VISUALLY IMPAIRED PERSONS IN TANZANIA

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION IN MARKETING MANAGEMENT OF THE OPEN UNIVERSITY OF TANZANIA

2013

CERTIFICATION

The undersigned certifies he has read and hereby recommends for acceptance by the Open University of Tanzania a dissertation entitled "Assessment on the use of ICT by the visually impaired persons (VIPs) in business processes in Tanzania" in partial fulfillment of the requirements for Masters of Business Administration in Marketing Management of the Open University of Tanzania.

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DECLARATION

I, ***Mloyi Peter Newa***, hereby declare the report on the use of ICT by the visual impaired persons (VIPs) in business processes in Tanzania is my own original work. This work has not been presented and will not be presented to any other University for a similar or any other degree award. All the sources I have used or quoted have been indicated and acknowledged.

……..

Signature

……

Date

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This dissertation is dedicated to my late father, Alfred Magurumbasi Newa, for leading and directing us (his children) in academically.

ABSTRACT

This study assessed the use of ICT in business processes for visually impaired persons in Tanzania. The study was descriptive in nature. A sample of 50 respondents, 41 sighted and 9 visually impaired persons participated in the study. Data were collected using both questionnaire and interview.

Findings of this study indicated 82.9%, of organizations surveyed did not consider visually impaired persons on use of ICT in business processes with reasons that it is more costly, have less contribution in business, unavailability of technology, unavailability of ICT training institutions, inability of persons with visual impairment to use ICT and not being required by law to support them. Of the VIPs interviewed the findings indicated that 89%, can use mobile phones, 78% can use landline telephones, 67% can use personal computers and Internet, and 22% can use fax machines. Those indicated ability to use computers said had training at the Open University of Tanzania.

The study was at a small scale and was only in Dar es Salaam but it is likely that the study would form a basis for assessing use of ICT in business processes for visually impaired persons and other business related services in Tanzania and beyond.

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LIST OF ABBREVIATIONS

BP	Business Processes
CCBRT	Comprehensive Community Based Rehabilitation in Tanzania
CD – ROM	Compact Disc Read Only Memory
DSS	Decision Support System
EAC	East African Community
EAPT&TC	East African Post and Telecommunications Corporation
ERP	Enterprise Resource Planning
GUI	Graphical User Interface
HCI	Human Computer Interaction
HTML	HyperText Markup Language
ICT	Information and Communication Technology
IDP	Innovation Diffusion Process
IT	Information Technology
MIS	Management Information System
NICHCY	National Information Center for Handicapped Children and Youth

NICTP	National ICT Policy
NPD	National Policy on Disability
NSGRP	National Strategy of Growth and Reduction of Poverty
OTF	On The Frontier
PC	Personal Computer
PDA	Personal Digital Assistant
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
SME	Small and Medium Enterprises
TAM	Technology Acceptance Model
TBS	Tanzania Broadcasting Services
TCRA	Tanzania Communication Regulation Authority
TPTC	Tanzania Posts and Telecommunications Corporation
TTCL	Tanzania Telecommunications Company Limited
UK	United Kingdom
URT	United Republic of Tanzania

USA	United States of America
VI	Visual Impairment
VIP	Visually Impaired Persons
VUI	Voice User Interface
WHO	World Health Organization
WIMP	Windows, Icons, Menus and Pointers

CHAPTER ONE

1.0 BACKGROUND INFORMATION

1.1 Overview

In this chapter, some background information about businesses, Internet, disabilities, use of Internet in businesses, have been discussed. Also the research problem, an overall purpose of the research, and specific research questions and significance of the study were also discussed.

1.2 Context of the Study

Information and Communication Technology (ICT) is playing a vital role in business. It improves the efficiency and effectiveness of the business processes, managerial decision making, and workgroup collaboration, thus strengthening their competitive positions (Obrien, 2001) through adding extra value to existing products and services or to providing the foundation for new products and services (Laudon & Laudon, 2007). In Tanzania, a number of organizations are offering their products and services through varieties of ICTs (Bakari *et al.*, 2011; Mushi *et al.*, 2011; Nielinger, 2003; Kijo-Ringo, 2005; Ng'wandu, 2008 and Mbwafu, 2011) including bank services and online shopping which are at its infancy stages.

Use of ICT in business processes causes problems for people with disabilities, especially visually disabled persons, to access products and services provided as the interactions between people and available ICTs are mainly based on sight (Anshel, 2005; Hollier, 2007). Hence, denying individual with visual impairments participation in productive work and utilization of available resources and services.

Information and communication technology (ICT) advances since the end of 20th century has led to multiple convergences of content, computing, telecommunications, and broadcasting resulting restructuring of economies and society (Henten et al., 2003). Information and communication technology applications provide many benefits across a wide range of intra- and inter- firm business processes and transactions. Among the benefits are improved information and knowledge management inside the firm and reduced transaction costs and increases the speed and reliability of transactions for a business (URT, 2003; Bakari *et al.*, 2011). Every business is serving five constituencies that include owners/shareholders, employees, customers, suppliers, and the community at large. Each of these constituencies affects the organization and is affected by it (Thompson & Strictland, 2003).

These constituencies have different capabilities which are affected by several factors including disabilities. Thus, businesses have to keep on designing and delivering products and services that are usable by people with widest range of functional capabilities (CCBRT, 2008; URT, 2004). Functional capabilities include physical and mental capabilities required for human to participate in social and economical activities. The World Health Organization (WHO) estimates that 10 percent of the global population is disabled; this is approximately to 650 million individuals. Visual impairment (VI) is a significant disability. Globally about 314 million people are visually impaired, of who 45 million are blind (WHO, 2010). In the United Republic of Tanzania (URT) the prevalence of disability is estimated between 7.8 to 10 percent, which translates to 2.4 million people (Mwakyusa, 2009; CCBRT, 2008). Vision impairment (VI) is the leading cause of activity limitation including use of ICT (Shepherd, 2006).

The government of Tanzania recognizes ICT as key facilitator of the development in the country. It has spearheaded several important reforms on ICT in an attempt to accelerate adoption and diffusion of ICT in various development sectors such as health, education, government, infrastructure and agriculture (URT, 2003; URT, 2005). Therefore, the government has been investing in various ICT initiatives.

Tanzanian firms begin improving their strategies and operations through use of ICT. This is evident as ICT is deployed and integrated in education systems through electronic learning (e-learning), use of automatic teller machines (ATMs) in banking, mobile money services, micro-finance sector, marketing campaigns, booking for events and services, and buying and selling (Ngeleja, 2008; OUT, 2010). ICT gives industries and businesses the ability to consume information and communicate—both internally and externally and hence strengthen its position in the economy (OTF Group, 2005; Deakins and Freel, 2006, and Kijo-Ringo, 2005).

1.2.1 ICT in Tanzania

Diffusion of ICT in Tanzania can be traced back to 1933 when the East African Post and Telegraph Company was incorporating Postal, Telegraph and Telephone providers in the region. In 1967, the East African Community (EAC) was founded and in the aftermath, the East African Post and Telecommunications Corporation (EAP&TC) was established. In 1951, a small radio station was established, known as Sauti (Voice) ya Dar es Salaam. In 1955, it was upgraded to cover not only Dar es Salaam, but also other regions. At that time the name Sauti ya Dar es Salaam changed its name to Tanganyika Broadcasting Services (TBS). On the side of computers, the first computer in Tanzania, an ICL 1500, was installed in the Ministry of Finance in 1965. Up to 1974

there were seven computers in the country and the Ministry of Finance had already acquired a new computer, an ICL 1900 (Mgaya, 1994). The applications of computers were in the following areas; processing of accounting data, processing research and survey data, teaching and specialized applications. This indicated a good beginning for ICT diffusion in the country, but was affected in 1974 when the government of Tanzania banned the importation of electronic computers and television. It affected both public and private organizations. In the late 1970s, organizations were still using computers bought in the 1960s (Mgaya, 1994).

Up to 1977, Tanzania along with Kenya and Uganda, was a member of the East African Community (EAC). When the EAC broke up in 1977, each country had to set up its own organizations to take over the services that EAC had been carrying out among them was Tanzania Posts and Telecommunications Corporation (TPTC). For most organizations formed in Tanzania, there was a problem because they were taking over computerized systems during the EAC and were now reverting to manual operation. The government was therefore under pressure to buy computers for these new organizations. The ministry had to give in and buy new computers. It also gave permits to several other organizations to replace their old computers with new ones and new organizations were allowed to install computers (Mgaya, 1994). This ban was lifted completely in 1984. Telecommunication sector liberalization process in 1993 in Tanzania again causes the splitting up of the TPTC into three separate entities, namely the Tanzania Posts Corporation, the Tanzania Telecommunications Company Limited (TTCL), and the Tanzania Communication Commission (TCC), with the later being responsible for the regulation of postal and telecommunication services. The Tanzania Communications and the Tanzania Broadcasting Commissions were merged into a

Regulatory Body (Tanzania Communications Regulatory Authority - TCRA) in 2003. Further liberalization of the Telecommunications sector resulted into opening of markets and liberalization of the info-communications sector in order to encourage private participation in investment and provision of info-communication services and attract foreign direct investment (FDI) into info-communications sector. This resulting into having two private operators for the country's basic services (TTCL and ZANTEL) and six mobile phone operators (MOBITEL(TIGO), VODACOM, CELTEL (AIRTEL), ZANTEL, SASATEL and BENSON), and over seventy data communication operators and Internet Services Providers (ISPs) as well as Internet cafes increasingly emerging in all major towns. The country formulated national ICT policy (NICTP) in 2003 that identifies the development of infrastructure as key in the development and use of ICT in the country.

The policy also recognizes the strategic input that ICT can have in enhancing social economic development and accelerated poverty reduction both nationally and globally. It also encourages beneficial ICT activities in all sectors of the economy. In 2009 the first of three or four competing submarine cables landed on Tanzania's coast, which will greatly increase international telecommunications (and Internet) capacity and should substantially reduce the cost (which inhibits the use of telephones and Internet in Tanzania) of telephone and Internet use. Tanzania has very limited ICT production capacity, and is entirely dependent on imported hardware. There is a small local software industry, and an increasing range of local content, although the scale and capability of local websites is limited. Researches suggest tremendous increase in businesses using ICTs in their business processes (TCRA, 2010). Like other countries

in sub-Saharan Africa, Tanzania has experienced a tremendous upsurge in telephone ownership and use since the advent of mobile phones, ICTs and Internet.

Table 1.1: A snapshot of the state of ICT infrastructure in the Tanzania

Indicators	1961	1993	2002	2005	2007	2008	2009
Fixed line providers	1	1	2	2	2	2	2
Fixed line subscribers	11,300	125,703	161,590	154,420	236,493	123,809	179,849
Mobile Operators	-	1	4	5	5	6	6
Mobile subscribers	-	1,500	606,589	2,963,737	8,252,281	13,006,793	14,723,175
Tele-density (lines per 100 people)	0.0010	0.0032	0.0122	0.10	0.21	0.32	0.39
Number of ISP/Data operators	-	-	20	23	34	60	62
Internet subscribers (dialup accounts and wireless)	-	10	14,000	333,000	500,000	3,563,732	4,378,392

Source: Tanzania Communication Regulatory Authority: http://www.tcra.go.tz/publications/telcom.html

1.2.2 Business Processes and Information and Communication Technology

A business (also known as enterprise or firm) is an organization designed to provide goods, services, or both to consumers. Main divisions of businesses include agriculture, mining, financial, information, manufacturing, real estate, retailing and distributing, Service, Transportation and Utilities (May, 2003). Businesses are fundamentally systems that convert inputs to certain outputs and hopefully, in the process, add value. Inputs could be anything from people, to materials, to money to information, while the outputs could be products, services, waste, or even intellectual property. Each product that a company provides to the market is the outcome of a number of activities performed. Business processes are the key instrument to organizing these activities and to improving the understanding of their interrelationships (Weske, 2007).

A business process consists of a set of activities that are performed in coordination in an organizational and technical environment. These activities jointly realize a business goal. Each business process is enacted by a single organization, but it may interact with business processes performed by other organizations (Weske, 2007). Portougal and Sundaram (2006), defined business processes as "the self-contained, temporal and logical order (parallel and/or serial) of those activities that are executed for the transformation of a business object with the goal of accomplishing a given task." A business object may be an inquiry from a customer, an order from a customer, a quotation prepared for a customer, delivery note from a supplier, and so forth accomplished task may result in Goods and/or Services. Every process has a customer, a customer maybe internal (employee) or external (organization). The business process is a collection of clearly identifiable tasks executed by one or more actors (person, or

organization, or machine, or department). The business process enables us to understand the dynamism involved in the delivery of value by an organization (Portougal and Sundaram, 2006).

As ICTs are making organizations quite capable of supporting their business processes successfully and in a targeted manner. a number of businesses are offering their products and services using varieties of ICTs in Tanzania, (Nielinger, 2003; Kijo-Ringo, 2005; Ng'wandu, 2008 and Mbwafu, 2011). ICTs such as landline phones, mobile phones, faxes, photocopying machines and computers are used to carry out activities which constitute business processes.

1.2.3 ICTs and Disabled Persons

Disabilities make it harder to take part in normal daily activities for disabled people. They may limit what people can do physically or mentally, or they can affect the senses that people need to conduct the compulsory tasks to continue their lives (Shepherd, 2006). Disability groups include wheelchair users, people who cannot walk without aid, people who cannot use their fingers or arm, reduced strength, reduced coordination, speech and language impairment, dyslexics, intellectual impairment, hearing impairment and vision impairment. These ranges of disabilities groups have some level of difficulty in using technologies because of their disability (CCBRT, 2008; Clear, 2000). In this information era, the importance and contribution brought by Information and Communication Technologies (ICTs) is evident in all aspects of society worldwide. The disabled population is denied from full and equal access to ICT, as most ICTs are designed for the usage of the general population in that there are few and unequal distribution of ICT learning institutions among disabled and non-

disabled population (Paciello, 2000; WHO, 2011). There is a clear need to discuss involvement of disabled people in utilizing ICTs and how ICT is affecting them.

Many people with disabilities need specialized devices to help them use technologies including ICT. These devices may be referred to as assistive technology (AT), access systems, adaptive technology and adaptive computing (Paciello, 2000; Hollier, 2007). In ICT, Assistive technologies include hardware and software utilizing other user interfaces apart from graphical user interface, personnel and specialized trainings on those ATs. In most countries especially developing world, the availability of ATs is affected by their costs which when combined with lack of regulations enforcing use of accessible ICTs, qualified personnel, and lack of training on their usage worsen their availability (Petty, 2005; WHO, 2011).

1.2.4 Visual Impairment and Information and Communication Technologies

Impairment is a characteristic and condition of an individual's body or mind which, unsupported, has limited, does limit or will limit that individual's personal or social functions in comparison with someone who has not got that characteristic or condition. Impairment relates to a physical, intellectual, mental or sensory condition; as such it is largely an individual issue (CCBRT, 2008). Visual impairment (VI) is a significant type of impairment. Different scholars have defined visual, some include blindness and others exclude blindness on their definitions. Some of the definitions are; Visual impairment is the term used for people who have some degree of sight, but who have, for example, a limited range of sight and focus that cannot be easily corrected with spectacles, who are squint, who need special lighting to be able to see, who have blurred vision or who have tunnel vision (Howell & Lazarus, 2003). Also, NICHCY, 2004 on their description of persons with vision impairments included terms such as partially sighted, low vision,

legally blind, and totally blind are used in the persons with visual impairments. These terms are defined as follows:

- "Partially sighted" indicates some type of visual problem has resulted in a need for special education;
- *Low vision:* Vision loss that cannot be corrected by ordinary glasses, contact lenses, medication or surgery.
- "Legally blind" indicates that a person has a very limited field of vision; and
- Totally blind person, who has no vision at all and depends on other non-visual media.

In this study, people with visual impairment are considered to involve both with limited visibility and complete blind persons. Like other people with disabilities, visually impaired people normally need some assistive devices and services which take into account the level of needs. Some people require specialized spectacles, Braille or large print and other equipments to assist them to compensate for their low vision (Etheridge and Mason, 1994). These are refered to as assistive technologies (ATs). An assistive technology (AT) is defined as any product, instrument, equipment or technical system used by a person with a disability, which prevents, compensates for, supervises, alleviates or neutralises the effects of the disability when using ICT. Such ATs facilitate processes of interaction and access to page content and also help to get the most out of the interface utilities used (ibid.).

1.3 Statement of the Problem

Several policies such as National ICT Policy (URT, 2003), and National Disability Policy (URT, 2004) and the disability act (URT, 2010) provides equal opportunity to individuals with disabilities enjoying their human rights, including use of ICT. In the same line of thinking TCRA which was established by act number 12 of 2003 is

addressing issues of creating a level playing field. One of its duty is to promote the availability of regulated services to all consumers including disadvantaged consumers. Yet little is known about how visually impaired persons (VIPs) are benefiting from the expanding use of ICT infrastructures available for business processes.

In Tanzania literatures in digital divided focuses more on infrastructure, socio-economic, demographic, and cultural dimensions, leaving aside impairments especially the visual impairment. To this extent there is a need to engage researchers in assessing the use of ICT by the visually impaired persons (VIPs) in business processes in Tanzania. There is a growing use of ICT in teaching and learning, business transactions through mobile phones and ATMs, and use of ICT in management functions in different offices. The question is how and to what extend visually impaired persons participate and benefit in use of ICT in business processes.

1.4 Objectives of the Study

The overall objective of this study was to assess the use of Information and Communication Technologies in business processes for persons with visual impairment.

1.4.1 Specific Objectives

The specific objectives of this study were;

i. To identify forms of business processes related with information and communication technologies applications.
ii. To assess level of competence to ICT for individuals with visual impairment.
iii. To determine involvement of persons with visual impairments in business processes.

iv. To assess compatibility of information and communication technologies used in business processes for visually impaired persons.

v. To assess benefits of having compatible information and communication technologies to visually impaired persons in business processes.

vi. To determine factors hindering use of information and communication technologies compatible to visually impaired persons in business processes by organizations.

1.5 Research Questions

To reach the purpose of this study the following research questions were asked:

a. In which business processes is information and communication technologies applied?
b. What is the level of competence to ICT for VIPs?
c. How persons with visually impairments are involved in business processes?
d. To what extent are information and communication technologies used in business processes accessible to visually impaired persons?
e. What are benefits of using information and communication technologies compatible to visually impaired persons in business processes?
f. Which factors hinders use of accessible information and communication technologies to visually impaired persons in business processes by organizations?

1.6 Significance of the Study

This study is meant to increase understanding of ICT related business processes are and competence of VIPs in using them. In doing so the study is earmarked to create

awareness of and opportunities to the employment in ICT industry among VIP persons. For VIPs to use ICTs compatibility of software and equipment need to be determined.

The knowledge about ICT, business processes and the competence of VIPs will enhance our capacity to take actions toward using ICTs that are compatible to VIPs thus resulting in full inclusion of ICT related business processes that are increasingly depending on ICTs. Furthermore, findings of this study will help authority in implementing policies that are aimed at bringing equality and empowerment to the VIPs to participate in ICT based business processes and removing barriers that VIPs are facing while using ICT.

1.7 The Conceptual Framework of the Study

A conceptual framework is a graphic narrative form of the main composition of the study. It simplifies the research proposal preparation task as it gives the general focus of the study. The conceptual framework for use of ICTs by VIPs in business processes involves three components. These components are; ICT in business processes, ICTs for VIPs and consequents of accessible ICTs to VIPs in business processes. ICTs are required in business processes such as business management, communications, marketing, and e-commerce that allow organization to use ICTs in their business processes. For visually impaired persons to be involved in business processes, these processes have to be designed such that they consider involvement of VIPs in business processes. These considerations include use of assistive technologies that enables VIPs to participate on ICT based business processes and competences of VIPs on using ICTs. Factors that led to considering VIPs during design of business processes are background factors of the organization such as attitude to VIPs, availability of ICTs

relevant to VIPs and country's policies on VIPs. Another category of variables concerns consequences of the use of ICTs by VIPs in terms of solutions, improved performance, organizational changes, e.t.c. Those consequences are the outputs of the group's activities and constitute the objectives of a group.

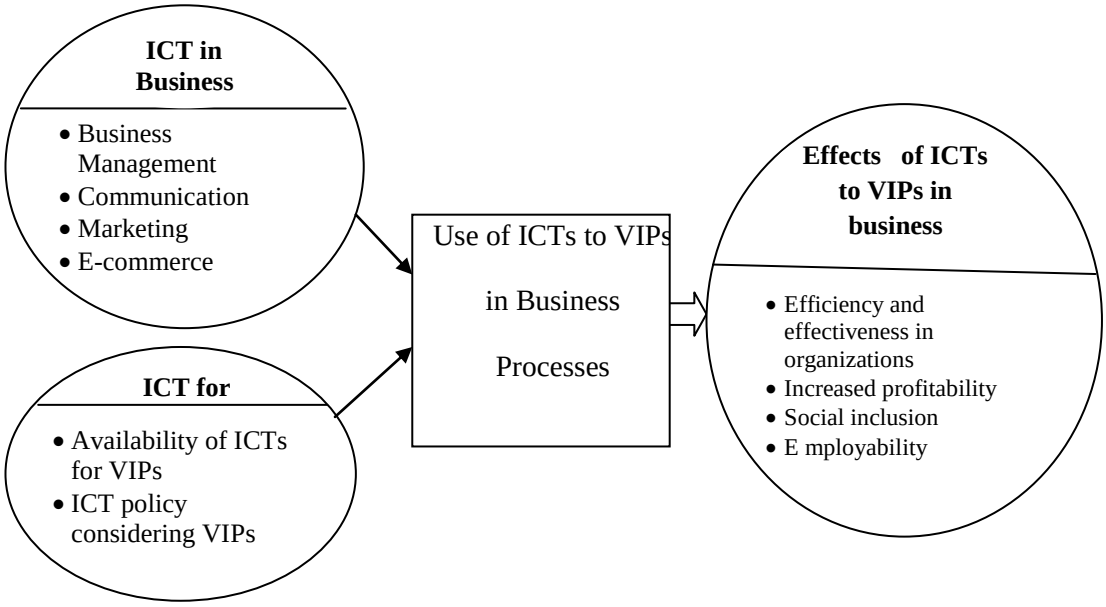

Figure 1.1: Model for studying use of ICTs for VIPs in business processes

(Researchers own developed)

1.8 Organization of the Study

The study is organized into five chapters. The first chapter introduces the background to the problem and the general chapter arrangement. Chapter two comprises the review of related literature to the current research topic. Chapter three deals with research methodology for data collection and analysis procedures. The presentation, analysis and discussion of the findings have been covered in chapter four. Lastly chapter five gives the summary, conclusion and recommendations of the study.

CHAPTER TWO

2.0 LITERATURE REVIEW

This chapter presents literature review on issues related to Internet and visually impaired persons. It also explain concepts related to use of Internet by visually impaired persons, reviews supporting theories, shows the empirical analysis, conceptual analysis and the underlying theories.

2.1 Business Processes

A business (also known as enterprise or firm) is an organization designed to provide goods, services, or both to consumers. Main divisions of businesses include agriculture, mining, financial, information businesses, manufacturing, real estate, retailing and distributing, Service businesses, Transportation and Utilities (May, 2003). Businesses are fundamentally systems that convert inputs to certain outputs and hopefully, in the process, add value. Inputs could be anything from people, to materials, to money, to information, while the outputs could be products, services, waste, or even intellectual property. Each product that a company provides to the market is the outcome of a number of processes performed (Weske, 2007).

Organizations' processes are categorized into material processes, information processes, and business processes. The scope of a material process is to assemble physical components and deliver physical products. That is, material processes relate human tasks that are rooted in the physical world. Such tasks include, moving, storing, transforming, measuring, and assembling physical objects. Information processes relate to tasks that create, process, manage, and provide information. Database and

transaction processing systems technologies provide the basic infrastructure for supporting information processes. Business processes are market-centered descriptions of an organization's activities, implemented as information processes and/or material processes. A business process is a series of activities, involving humans and systems that must be executed in a particular order and governed by specific business policies to achieve desired objectives. Each business process is engineered to fulfill a business contract or satisfy a specific customer need. Each business process is enacted by a single organization, but it may interact with business processes performed by other organizations.

Business processes are valuable organizational assets. They enable the creation and delivery of business values as defined by organizational goals. Business processes have significant impact on the performance of the overall business hence enhance the competitiveness both at the organizational and the national level. We can see business processes more easily when they deal with tangible or physical objects, but many business processes involve intangible goods or only information about goods. And of course, business processes do not operate in isolation. They form part of the overall business activity that defines the existence of the organization. (Djankov et al., 2006; Harmon 2007; Medina-Mora et al., 1993; Portougal and Sundaram, 2006; Weske, 2007). Businesses today are realizing that the ICT systems are important in improving their business operations to meet customer and shareholder expectations at a rate faster than our competitors (Jeston and Nelis, 2006). Organizations in all sectors use ICT, but they do so in different ways. Use of ICT make organizations automated. Business processes can diverge in the level of automation. There are business processes that are fully automated, meaning that no human is involved in the enactment of such a

business process. An example is ordering an airline ticket using Web interfaces. While the process is fully automated on the side of the airline, the customer is involved with manual activities, such as providing address information via Web browser interfaces. Enterprise application integration is another area where automated business processes can be found.

A business object may be an inquiry from a customer, an order from a customer, a quotation prepared for a customer, delivery note from a supplier, and so forth accomplished task may result in Goods and/or Services. Every process has a customer, a customer maybe internal (employee) or external (organisation). The business process is a collection of clearly identifiable tasks executed by one or more actors (person, or organisation, or machine, or department). The business process enables us to understand the dynamism involved in the delivery of value by an organisation (Portougal and Sundaram, 2006).

2.2 Information and Communication Technology

A number of authors have written useful literature on ICT. All are talking of ICT as hardware, software and networks by which information is retrieved, recorded and displayed. On their literatures, ICT is referred to as a technology which is used for the input, processing, storage, and transfer of data and the output of information.

The Tanzanian National ICT policy defines Information and Communication Technologies (ICT) as *"a generic term used to express the convergence of information technology, broadcasting and communications. One prominent example is the Internet* (URT, 2003)." Other definition of ICT is given by Hamelink (1997) says that: *"Information and Communication Technologies encompass all those technologies that enable the handling*

of information and facilitate different forms of communication among human actors, between human beings and electronic systems, and among electronic systems." Baltzan and Phillips (2008) defined ICT as the tool that people use to work with information and support the information and information processing needs of an individual or organization.

Further, Hamelink (1997) divides ICTs into the following groups:

> ***Capturing technologies***, with input devices that collect and convert information into digital form. Such devices include keyboards, mice, trackballs, touch screens, voice recognition systems, bar code readers, image scanners and palm-size camcorders.
>
> ***Storage technologies***, producing a variety of devices to store and retrieve information in digital form. Among these are magnetic tapes, floppy disks, hard disks, RAM disks, optical disks (such as CD-ROMs), erasable disks and smart cards (credit-card sized cards with memory and processing capacity for financial transactions or medical data).
>
> ***Processing technologies***, creating the systems and applications software that is required for the performance of digital ICTs.
>
> ***Communications technologies***, producing the devices, methods and networks to transmit information in digital form. They include digital broadcasting, integrated services digital networks, digital cellular networks, local area networks (LANs), wide area networks (WANs, such as the Internet), electronic bulletin boards, modems, transmission media such as fibre optics, cellular phones and fax machines, and digital transmission

technologies for mobile space communications (the new Low Earth Orbit satellite voice and data services).

Display technologies, which create a variety of output devices for the display of digitized information. Such devices include display screens for computers, digital television sets with automatic picture adjustment, set-top boxes for video-on-demand, printers, digital video discs (which might replace CD-ROM drives and audio CD players), voice synthesizers and virtual reality helmets.

2.3 Information and Communication Technologies in Business Processes

Technology constitutes an inseparable part of business transactions and activities for every enterprise and not just a luxury commodity or a fad that will soon be outdated. The use of the respective technologies by organizations is deemed necessary for their viability in the future. The effective use of ICTs by enterprises constitutes a crucial factor of success both for the innovation and for the competitiveness and the development of organizations. The first appearance of ICT in enterprises was in the form of card processing machines which were especially used in the accounting departments and focused on historical information reporting.

At the end of the 1950s and at the beginning of the 1960s, appears the mainframe computers that were, in processing power, miniscule compared with today's desk top computers or even Personal Digital Assistants (PDA's). In the next decades, technology increasingly gains ground resulting in the transaction processing, management reporting, forecasting, and decision support enabled by information technology to participate in practically every activity of the modern organizations.

Most recently, ICTs transcended departmental, divisional and organizational boundaries in order to link the firm electronically, often instantaneously, to its customers, suppliers, and distribution partners. Many types of business software can improve information and knowledge management within the firm, leading to more efficient business processes and better firm performance. At firm level, ICT and its applications can make communication within the firm faster and make the management of the firm's resources more efficient. Seamless transfer of information through shared electronic files and networked computers increases the efficiency of business processes such as documentation, data processing and other back-office functions (for example organizing incoming orders and preparing invoices).

Increasingly sophisticated ICT applications such as DSS (Decision Support System) and ERP (Enterprise Resource Planning) allow firms to store, share and use a variety of models to analyze their data or condense large amounts of data into a form in which decision makers can analyze them. At inter-firm level, the Internet and e-commerce have great potential for reducing transaction costs and increasing the speed and reliability of transactions. They can also reduce inefficiencies resulting from lack of co-ordination between firms in their value chains (Baltzan and Phillips, 2008; Mgaya, 1994; and Weske, 2007).

2. 4 Human Interaction with Information and Communication Technology

To utilize ICT human needs to interact with machines such as computers. For the case of this interaction is called Human-Computer Interaction (HCI). These interactions between users and computers occur at the user interface, often simply called the interface. The goal of interfaces is to produce usable and safe systems, as well as

functional systems. The interface includes both software and hardware (Dix et al., 2004; Laudon and Laudon, 2007; Preece et al., 2002).

2.5 Types of User Interfaces

Paradigms, metaphors, mental models and personas are driving forces behind the user interface and design employed in a particular system. There are three commonly recognized user interfaces in use today. The Graphical User Interface, which is possibly the most familiar to most users; the Voice User Interface, one that is rapidly being deployed in many aspects of business; and the Multi-Modal Interface, a relatively new area of research that combines several methods of user input into a system (Dix et al. 2004).

2.5.1 Graphical User Interfaces

Graphical user interfaces (GUIs) make computing easier by separating the logical threads of computing from the presentation of those threads to the user, through visual content on the display device. This is commonly done through a window system that is controlled by an operating system's window manager. The WIMP (Windows, Icons, Menus, and Pointers) interface is the most common implementation of graphical user interfaces today. The appeal of graphical user interfaces lies in the rapid feedback provided by the direct manipulation that a GUI offers (Dix et al., 2004).

2.5.2 Voice User Interfaces

Voice User Interfaces (VUIs) use speech technology to provide people with access to information and to allow them to perform transactions. VUI development was driven by customer dissatisfaction with touchtone telephony interactions, the need for cheaper and more effective systems to meet customer needs, and the advancement of speech

technology to the stage where it was robust and reliable enough to deliver effective interaction. With the technology finally at the stage where it can be effectively and reliably used, the greatest challenge remains in the design of the user interface. A Voice User Interface is what a person interacts with when using a spoken language application. Auditory interfaces interact with the user purely through sound. Speech is input by the user, and speech or nonverbal audio is output by the system (Cohen et al., 2004).

2.5.3 Multi-modal User Interfaces

Multi-modal interfaces attempt to address the problems associated with purely auditory and purely visual interfaces by providing a more immersive environment for human-computer interaction. A multi-modal interactive system is one that relies on the use of multiple human communication channels to manipulate the computer. These communication channels translate to a computer's input and output devices. A genuine multi-modal system relies on simultaneous use of multiple communication channels for both input and output, which more closely resembles the way in which humans process information (Dix et al., 2004).

2.6 Usability of ICT

Usability of a system with a certain functionality, the set of actions or services that it provides to its users, is the range and degree by which the system can be used efficiently and adequately to accomplish certain goals for certain users. The actual effectiveness of a system is achieved when there is a proper balance between the functionality and usability of a system (Nielsen, 1994 and Shneiderman & Plaisant, 2004). Designing usable interactive products requires considering who is going to use them and where they are going to be used. A main reason for having a better

understanding of users is that different users have different needs and interactive products need to be designed accordingly (Preece, *et al*., 2002). Dix, *et al*., (2004) wrote that vision, hearing and touch play important roles in this Interaction.

In ICTs of all kinds the screen serves as interface with the user. Feedbacks on the user's actions are always conveyed visually. For a user with visual impairment a visual interface is not always suitable. Assistive technologies based on audio or touch may be needed to make it usable. For the visually impaired persons to take part in this wonderful world, we need to ensure that both hardware and software are usable to them. Various approaches have been suggested, and technologies developed, via which VIPs can interact with ICTs. These technologies enlarge text or convert the information to audile or tactile media. These approaches are presented by King et al., 2008; Meyers and Schreier (1991); Zetie (1995); Kay (1984); Leventhal *et al.*, (1991) and Lightowler (1994) as follows;

i. **Screen magnifier application:** Such as Zoom Text, magnifies a small area of the display, potentially filling the entire computer screen. The user can move the area being magnified around the desktop. This allows the user to control the computer interface directly, and is a good solution for people with gradually-degrading vision, especially those who are already familiar with their computer interface but are starting to have trouble seeing it.

ii.

iii. **Text Browsers:** To avoid problems of using the mouse and hypermedia, most visually impaired persons use text-based Web browsers (e.g. Lynx) that will ignore graphics on the screen and allows the use of the keyboard to command the computer.

iv. **Screen Readers:** “Screen readers” enables blind people to access most text-based computer displays using speech generated by screen readers by reading the text and converting it to human speech.

v. **Braille Printout and Braille Devices:** A Braille device is another alternate output device for the blind. Computer output can be printed on the paper specially indented with a pattern of raised dots or a small part of the image of a computer screen can be generated on the device; a visually impaired person can read it quickly by touching the device and does not have to wait for the generation of the Braille paper.

2.7 Theoretical Analysis

This section will discuss different theories and models about VIPs and use of ICT in business processes. The first theories/models will give us perceptions of disabilities and the next categories of theories/models will indicate how VIPs can use ICT in business processes.

2.7.1 Disability Theories

Disability can be described based on models developed over past three centuries. These models are the charity model, the medical model, the rights-based model and the economic model.

The charity model: The charity model emerged in the nineteenth century categorizing people with disabilities as in need of charity, it defined disability as a “tragedy, or loss”. This model depicts people with disabilities as those needing help, objects of pity, personally tragic, dependent, eternal children and low achievers by ideal standards. In the charity model, people with disabilities are positioned as unalterably different;

people with disabilities are thought incapable of becoming self-sufficient and therefore need support from the able-bodied population (Coloridge, 1993; Wilson & Wilson, 2001). This model ignored incorporation of people with impairments in business processes. Organizations influenced by this model do not consider VIPs while designing their business processes and are likely not to invest in usable ICT technologies to VIPs. It is assumed that VIPs will be assisted by other visual persons.

Medical Model: In the early to mid-twentieth century a new model emerged to guide the general social construction of disability, based on advances in medical practice. This medical model focused purely on how a person with a disability compared to what might be perceived as a 'normal' individual (Coloridge, 1993). Price and Shildrick (2002) noted that, the medical model shifted the focus away from the charity model's moral implications of disability, redefining disability as a failure of the body while there are many other dimensions that contribute to disability.

This approach allowed for a distinction between a person with a disability and an able-bodied individual. This approach allowed disability to be treated scientifically instead of being the subject of purely emotional responses (Wilson and Wilson, 2001). This model emphasis the inferiority of disabled persons to able bodied persons, that is, It sees people with disabilities as people with bodies that are impaired, don't work and cannot be productive. This approach focuses on particular groups such as visually impaired persons.

Rights-based model: This model began to emerge in the mid 1970s, a new model, based on the rights of people with disabilities to have equitable treatment in society (Clear, 2000). In this model, people with disabilities were not just held to be capable of

effective interaction with the rest of society but it was assumed that any impairment resulting from an individual's disability should no longer have meaning in the pursuit of equity and independence (Parsons, 1994). This model was implemented by demanding the society, including organization, to include disabled persons. This gave organizations to begin using usable technologies to disabled persons including VIPs.

The economic model: In recent times, disability has also come to be constructed in a manner that is best termed the economic model, based on the idea that people with disabilities, as with the able-bodied population, can be understood as consumers who, by buying goods and services, stimulate a nation's economic growth. The provision of products to such a large percentage of the population has the potential to be highly beneficial to people with disabilities and highly profitable to corporations providing the necessary goods and services. In particular, people with disabilities often have special needs for products and services to support their independence (Clear, 2000). This model lured organizations to treat disabled persons as customers/clients to their businesses. Hence disabled persons, including VIPs, are accommodated on their services. These models indicate how impaired persons, such as visually impaired persons, are considered in the society. These considerations are influenced by policies and attitudes towards disabilities. From being treated as dependants to be treated as persons with need that are beneficial to the economy. Each of these models effect participation of impaired persons, including visually impaired persons, on business processes differently. Thus, products produced by these organizations are considering impaired persons differently, hence effecting their adoption of accessible ICTs in business processes.

2.7.2 The Principles of ICT

The business uses of IT are governed by following principles;

The first principle of information and communication technology describes the purpose of ICT. It states; “information technology’s great usefulness is as an aid in solving problems, unlocking creativity, and making people more effective than they would be if they did not apply ICT to their activities.” Principle of high-tech/high-touch says; the more “high-tech” the information technology you are considering, the more important it is to consider the high-touch aspects of the matter- that is, “the people side” or always fit information technology to people rather than asking people to adjust to information technology (James, 1998). These two principles indicate the need of using ICTs that are useful to all of its users in order to harness its benefits effectively. Business using ICTs on its processes should select ICTs that are compatible to their users, including VIPs, and beneficial to the business.

2.7.3 Diffusion of Innovations Theory

Innovation is fundamentally concerned with novelty. The concept of innovation is more involved and embraces the commercial application of inventions (often for the first time). Thus innovations incorporate both creation or discovery aspects, and diffusion or utilization aspects (Deakins and Freel, 2006). The adoption process is the mental process through which an individual passes from first hearing about an innovation to final adoption of technology. This process involves five stages, which are awareness, interest, evaluation, trial, and adoption. The innovation-diffusion process is described as “an uncertainty reduction process”. Attributes of innovations includes five characteristics of innovations: (1) relative advantage, (2) compatibility,

(3) complexity, (4) trialability, and (5) observability. The rate of adoption of innovations is predicted by the individuals' perceptions of these characteristics (Rogers, 2003). The adoption of technology (in this case ICT) can be viewed as an innovation for a firm. ICTs that are accessible to VIPs will be adopted and used by organizations in business processes, if it has those characteristics of innovations mentioned.

2.7.4 Technology Acceptance Model

A well-known and well-employed model in ICT accessibility is the technology acceptance model (TAM). TAM emerged to help address the needs of technology users and how their perceptions affected their acceptance or rejection of a specific technology. TAM posits two particular beliefs perceived usefulness (PU) and perceived ease of use (PEOU) are the primary relevance for ICT acceptance behavior. PU is defined as the degree to which a prospective user believes that using a particular technology is advantageously for intended objectives.

PEOU refers to the degree to which prospective user believes that using the technology will be free of efforts i.e. it will give freedom from difficulty or great efforts. Technology which is perceived to be easier to use than another is more likely to be accepted by users (Davis, 1989). This theory indicates accessible ICTs to VIPs will be adopted by organizations if organizations perceive are beneficial and easy to use by visually impaired users same will encourage VIPs to use it.

2.8 Some Empirical Studies in ICT in Business Processes

This section attempts to relate this study with research works done by others on the same area. These related empirical studies have been grouped into three groups,

empirical studies in the world (general), empirical studies in African countries, and empirical studies in Tanzania.

2.8.1 General Studies

Petty (2005) conducted a research with objective of providing an overview of barriers and solutions to virtual access solutions for persons with visual impairments to workplace technology. Data were collected from interviews and surveys. Findings of this study created compelling argument for improved access by showing how barriers to virtual work frustrated and hampered blind workers. This study found out there is increased use of ICTs at workplaces over the past twenty years. In the future most workers' primary activities will involve information technology.

These facts make it imperative that visually impaired have an effective level and quality of access to ICT that is essential for full participation in new ways of work and learning. VIPs are likely to benefit from specialty assistive technology software and hardware such as screen reading software, Braille and screen magnification. In concluding the author commented that, leaders can develop competencies to incorporate workers with VIs into the workforce at ease. Petty's study was conducted in America a first world country, this study will be conducted in Tanzania, a third world country, were issue of ICT for VIPs is not common.

Bergman and Nygren (2009) conducted a study with the purpose of finding out how websites should be made accessible and designed so that they function as well as possible with the aiding devices of the visually impaired. This study used qualitative methods in a deductive approach. This study found that; there are factors that can make it difficult for the visually impaired to access websites, as well as websites can be

made as accessible as possible for the visually impaired persons by following the standards of HTML and the guidelines for accessibility developed by the World Wide Web Consortium, to create websites that are accessible and user friendly for all users in general, and especially for the visually impaired and their aiding devices.

Pal, et *al*., (2011) conducted a study discussing the state of various technologies in the context of the developing world and propose directions to increase the relevance and access to assistive technologies and accessibility in the developing world. More specifically the study aimed to describe some of the major technologies in each category, and discuss the challenges in building low-cost options for each. This study found that, most prevalent assistive technologies (ATs) are neither at a reasonable price point for widespread access outside of the industrialized world, nor are their functionalities with regard to issues such as infrastructure or language aligned with the contextual needs of the developing world. The authors concluded by commenting that the investment into ATs will both set the stage for international recognition of prevalent lack of accessibility throughout much of the world, and increase access for people with visual impairments. Investment in ATs should take a cross disciplinary nature involving engineering aspects of accessibility and social aspects of disabilities.

2.8.2 Studies in African Countries

Tibenderana and Ogao (2008) studied the levels of acceptance and use of the technologies. The study data were collected from a randomly selected cross-sectional survey sample of 494 library end-users. The survey instrument was a self-administered questionnaire. The findings indicated that availability of the ICTs facilities, such as computers, World Wide Web, Local Area Network, Network Servers and CD-ROM

Reader/Writer in their libraries, is a key pre-condition towards learning, adopting and benefiting from electronic library services. Also university end-users accept and use electronic library services. Further, they indicate application of ICTs in different sectors without analyzing their accessibility and usability. Fuchs and Horak (2006) conducted a study with the aim of discussing the digital divide in Africa and possible solutions. One of the findings of this study indicated that the costs of Internet use in African countries are extremely high as compared to Europe and USA. Other finding indicated that structural inequality in modern society is the reason why there are gaps in access, usage/skills, benefit, and participation concerning ICTs, causing different types of the digital divide such as the global divide, the gender divide, the ethical divide, the age divide, the income divide, the educational divide, and the abilities divide.

People with high income, far-reaching and influential social relationships, good education and high skills are much more likely to have access to ICTs, to be capable of using ICTs, to benefit from this usage, and to be supported in political participation by ICTs than people who are endowed with only a little amount of economic, political, or cultural capital. Further they said that reducing to the digital divide to a technical problem and argue that material access possibilities and the opening of markets will result in a closing of the gap. Also, an alternative network society that is based on alternative principles of production, distribution, and regulation is needed.

2.8.3 Empirical Studies in Tanzania

Lazaro and Bushiri (2011) conducted a study aimed at collect information that will facilitate the planning process for the branch development programme and to establish

the livelihoods and needs of TLB members. The study was done in four (4) TLB district branches in Iringa region which were, Kilolo, Iringa Urban, Njombe and Mufindi. Among the findings of the study indicated almost 20% of VIPs attained no education at all and about only 6% attained education at higher institutions of learning while rest either attained primary or secondary education. Use of IT addressed limited areas like use of email services, use of face book, access to internet and ownership or access to computers. Similarly the findings showed that none of the members owned computers. Also the study found that about 50% do not have any Braille knowledge. Other findings showed that the main source of income for VIPs was employment as government workers (26.5%) and this was equivalent to those who are not employed (26.5 %), 24.5% were owners of small businesses, 18.4% were subsistence farmers and 4.1% were entrepreneurs. Most of employed personnel are teachers.

The study indicated the need of VIPs to be trained in use of computers and other services like use of Internet and facebook as one of the ways of promoting independence in work. This study indicated the participation of VIPs in business processes, which our study aimed to assess how they are considered where ICTs are used. Furuholt and Kristiansen (2007) conducted a study to digital divide at national level and urban-rural in Tanzania. It based on the survey performed in rural, semi-urban and central regions of the country. It investigated if there are any differences in quantity and quality of public Internet access points and their use and users. Towns covered by this research were Iringa, Mbeya, Songea, Morogoro and Dar es Salaam. An estimate of 265 respondents was involved in this study. Some of findings of the study were as follows; a very clear geographical digital divide between urban and rural areas in terms of public Internet access points and access to the Internet. Users are

remarkably uniform with fewer women using Internet cafés. Users' financial statuses are represented by their own stated monthly expenditures on Internet cafés.

Also, users' educational level is remarkable similar. The main uses are communication (e-mail and chatting) in urban areas, while information searching activities (information seeking research and reading news) are all together most popular activities. Furuholt and Kristiansen study focused on geographical, gender, income digital divides while this study did not focused on disability divide especially use of ICTs by visually impaired persons in business processes gives information about digital divide which might be experienced by VIPs as well.

Nielinger (2003) took a study with the objective of providing empirical data on the ICT utilization of SMEs in Tanzania. It tries to identify the applications are used for what purpose to what extent, and opportunity. The survey data covers a sample of 150 Tanzanian SMEs that were randomly selected and came equally from the food processing, textile, and tourist sector. Surveys were conducted in Dar es Salaam, Arusha, Mwanza, Zanzibar (Urban West) and Mara regions covering both urban and rural enterprises.

This study found that, ICTs such as Mobile phone, PC and email penetration took off in 1996 in response to new opportunities as ICT services were provided and, therewith, underlined their ability of SMEs to react flexibly and immediately to a changing environment. Mainly of ICT are used as means and channels of communication and mean investment in ICT equals roughly to 1,100 US$ per company. In concluding the researcher indicated that ICT utilization still grows at a good rate and there are still ways of stimulating that growth in both proportion of users and uses. Taking in mind

all attempts to foster applications of ICT in Tanzania, it is expected that the users and uses are far higher than what indicated at that time. Nielinger indicated uses of ICT in businesses will increase, it also explains barriers facing SMEs (businesses) on utilizing ICTs. It did not cover digital divide, especially disability divide which this study will assess. From these empirical studies, we can conclude that there is increased use of ICTs at workplaces and for VIPs to benefit there is a need for using special assistive technologies such as screen reading software, Braille and screen magnification.

The cost and availability of assistive technologies, knowledge and ability/disability also affects their utilization in developing countries like Tanzania. In Tanzania, VIPs are lowly educated associated with a class of low income people. Thus they cannot afford ICTs that satisfy their needs. For VIPs to utilize ICTs in business processes, organizations that are using ICTs in their business processes should be designed considering VIPs will enable them to participate in business processes using ICTs.

2.9 Knowledge Gap

Laws and ethics of the world, and also Tanzania, requires all human beings to be included equally in social economic activities such as business processes of organizations. Organizations are massively adopting ICTs in their business processes. Among groups of participants in business processes are visually impaired persons. The abilities of visually impaired persons to use ICTs are hindered due to their disabilities. For visually impaired persons to use ICTs effectively and efficiently they need special considerations. Thus businesses using ICTs in their business processes are required to include those ICTs which will not deny visually impaired persons access to their ICT

infrastructure and hence services. In Tanzania, here is no literature available on considerations given to visually impaired persons on ICTs used in business processes of organizations.

2.10 Summary

This chapter discussed issues concerning use of ICTs by visually impaired persons in business processes. It also discussed disability principles, ICT principles and reviewed related empirical studies worldwide, in Africa and specifically in Tanzania. All these helped the researcher to develop the knowledge gap.

CHAPTER THREE

3.0 RESEARCH DESIGN

3.1 Overview

This chapter describes how the research was conducted. It covers study area, research design, types of data and sources, methods of data collection, sample size and selection methods, and data processing and analysis.

3.2 Research Strategies

This was a descriptive research study as it attempted to accurately portray the characteristics of a particular individual, group or a situation so that appropriate actions can be taken to that object (Robson, 1993). Both qualitative and quantitative research techniques were considered. Whereas, quantitative approach involve collecting and analyzing numerical data statistically and qualitative involve examining data and reflection on perceptions.

3.3 Survey Population

According to Opie (2007) population is the entire cohort of subjects that a researcher is interested in. It is in this population, the researcher chooses the representative for the whole population. The study was carried out in Dar es Salaam. Data were collect from organizations which are utilizing ICTs and are including VIPs in their business processes as either services providers or services recipients. Also, the study collected data from VIPs concerning their use of ICTs.

3.4 Sampling Design and Procedure

3.4.1 Sampling Procedure

When conducting research, it is often impossible, impractical or too expensive to collect data from all the potential units of analysis included in the research problem. Hence, small number of units, a sample, are often chosen to represent the relevant attributes of the whole set of units, the population. This process is referred to as sampling (Saunders et al., 2003). Sampling can either be probability sampling techniques, where researcher purposely selects the sample or non-probability sampling techniques were sample selection is done randomly without influence of either the researcher or any other person (Kombo and Tromp, 2006). This study employed both probability and non-probability sampling techniques

Dar es Salaam is endowed with many organizations, most of which are utilizing ICTs in their business processes. Selected organizations belong to different sectors and industries were used as sources of data. To meet purpose of the study, multistage sampling was used. This involved firstly, determining organizations which utilize ICTs in their business process. From this group of ICT users, sample was randomly picked. The reason to select this technique was convenient for studying large and diverse populations. This study involved a total of 50 respondents who are ICT personnel's at their organizations.

3.4.2 Variables and Measurement Procedures

The study collected both and use primary and secondary types of data to ensure achievement of the study objectives. Primary data from organizations which are using ICTs in their business processes were collected mainly from unstructured questionnaires. Personal interviews were used to ensure that all material information

from the respondents was collected. Observation was also done. The researcher observed selected organization's business processes and how visually impairments persons participating on those processes. Documentary sources such as different journals, manuals, policies and related reports concerning uses of ICTs for VIPs in business processes were reviewed to collect secondary data.

Collected data consisted of two types of variables;

a. Opinion variable collected to see how respondents feel, know, believe or think about use of ICTs for visually impaired persons in business processes.
b. Behaviour variable collected to see on what respondents did or will do in the future to include VIPs in their business processes which utilize ICTs.

3.5 Data Processing and Analysis

The collected data were analyzed using quantitative data analysis methods. Data analysis was done in both ways; descriptive and analytical using content analysis methods. This was done through presenting data in frequency distributions, percentages, and cross tabulations so that they can be described.

3.6 Validity and Reliability

In the validation of data collection instruments, the issues of validity and reliability were taken into consideration. Validity refers to the degree to which a method, a test or a research tool actually measures what is supposed to measure. Reliability on the other hand, entails the extent to which a test, a method or a tool gives consistent results across a range of settings and if used by a range of researchers (Wellington, 2000). The researcher compiled the literature review to obtain an understanding of the topic investigated in this study and also defined the categories and units of analysis for this

study. Therefore, it would be reasonable to assume that the researcher possessed an adequate understanding of the issues investigated in this study. Before sending out the questionnaire to the relevant persons, we decided to consult several persons in order to make sure that the structure of the questionnaire was clear. Another factor that enhanced the validity of our research was that before issuing a questionnaire to a respondent, they were explained on the issues under study, and get them to understand the purpose of this study.

I tried to describe my questionnaire in order to avoid any misunderstanding later on. Therefore, I can claim that the questionnaires have been filled in by experienced and skilful persons in the area of ICT use in business processes. The data collection methods that were used in this study (interviews and questionnaires) have been applied in similar studies, where they proved to be reliable. In this study, care was taken to ensure reliability by means of pre-testing instruments and by using methodological triangulation.

3.7 Ethical Considerations

Data was collected from organization representatives who were willing to give out data. Also, the researcher observed the right of the respondents to privacy and confidentiality of the information they provided. Lastly, the researcher ensured confidentiality on personal identities of the respondents and those associated with the information they provided.

3.8 Summary

This chapter presented the methodology of the research. The intent of the research was to analyze use of ICT in business processes by visually impaired persons in Dar-

Tanzania. Data were collected through questionnaires, interviews, and document reviews. The participants were representatives of businesses utilizing ICTs in their business processes and visually impaired persons. Sampling procedure use was multistep sampling involving both non-probabilistic and probabilistic sampling procedures so that respondents to meet the requirements of the study, that is from organization utilizing ICTs in business process or visually impaired person. Validity, reliability and ethical issues were considering during this study.

CHAPTER FOUR

4.0 DATA ANALYSIS AND FINDINGS OF THE STUDY

4.1 Introduction

This chapter presents analyses, and discusses the findings of the study which was conducted in Dar es salaam City between April and June, 2012. The data, which have been collected from the survey, is presented and analyzed statistically. Findings for each of the research questions and research objectives investigated in this study are also presented.

4.2 Study Respondents

To conduct this study, a total of 50 questionnaires were supplied to prospected respondents from organizations utilizing ICTs in their business processes. 41 of them responded which is about 82% of the intended respondents. These were ICT managers/personnel of organizations surveyed. Also the study involved 9 visually impaired persons.

The respondent's industry category was distributed as follows: 6 (14.6%) respondents were from finance sector, 4 (9.8%) respondents were from insurance sector and 11(26.8%) respondents were from education and training sector, 2 (4.9%) respondents from retail sector, 7 (17.1%) respondents were from tourism sector, 3 (7.3%) respondents were from health sector and 8 (19.5%) respondents were from other sectors. These findings are represented by Table 4.1 and Figure 4.1.

Table 4.1: Distribution of respondents in terms of industry

Industry	Frequency	Percentage
Finance	6	14.6
Insurance	4	9.8
Education and Training	11	26.8
Retail	2	4.9
Tourism	7	17.1
Health	3	7.3
Others	8	19.5
Total	41	100.0

Source: Field data (2012).

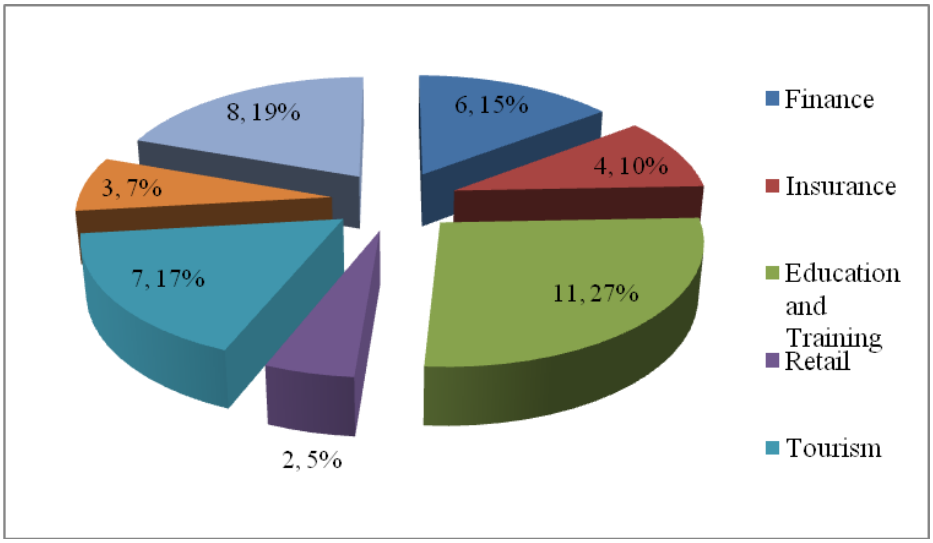

Figure 4.1: Industries of respondents

4.3 Forms of Business Processes Incorporating Information and Communication Technologies Applications

The researcher needed to make sure that all respondents are coming from organizations which are using ICTs in their business processes. To find information concerning business processes related with ICTs applications, respondents were supposed to indicate if they are using ICTs in their business processes. Data collected indicated that all organizations are using ICTs in their business processes. As all respondents are

coming from organizations which are using ICTs in their business processes it indicates that they are qualified for the purpose and design of this study. This is summarized in table 4.2.

Table 4.2: Organizations using ICTs in business processes

Response	Frequency	Percentage
YES	41	100%
NO	0	0%
Total	41	100%

Source: Field data (2012)

Furthermore, the study asked respondents the purposes of using ICTs in business processes of their organizations. Collected data indicated that organizations are using ICTs for more than one purposes. Among those who, responded to this question by indicating that 27 respondents corresponding to 65% said their organizations are using ICT for business management processes such as records keeping, inventory management, word processing, bookkeeping, and production control. 29 respondents or 70.7% are using ICTs for communications within the organization and also externally with customers, suppliers, clients, partners.

Furthermore, some 11 respondents equivalent to 26.8% indicated that in their organizations ICTs are used for promotion and marketing activities, 8 respondents equivalent to 19.5% said their organizations are using ICTs for information search, 6 respondents representing 14.6% said their organizations are using ICTs for electronic commerce and 30 or 73.2% are using ICTs for other uses such as banking, fun and entertainment. It can be said communications and business management are main uses of ICTs in business processes. These findings are represented in table 4.3 and figure 4.3.

Table 4.3: Uses of ICTs in business processes

Response	Frequency	Percentage
Business management	27	65%
Communications	29	70.7%
Promotion and marketing	11	26.8%
Electronic commerce	6	14.6%
Information searching	8	19.5%
Others	30	73.2%

Source: Field data (2012)

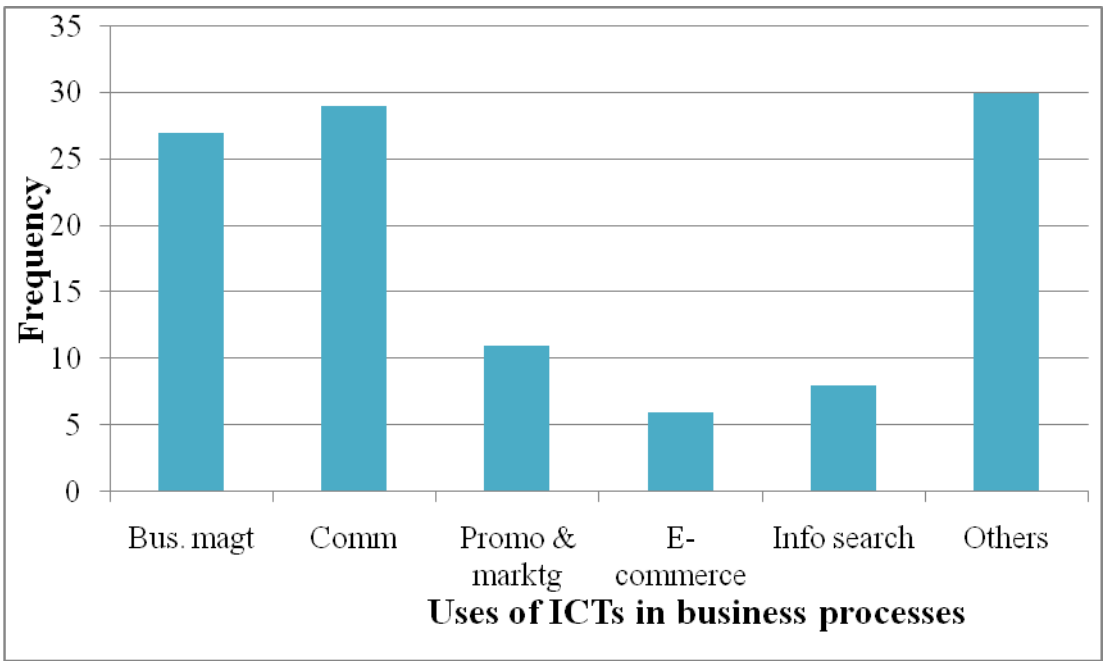

Figure 4.2: Uses of ICTs in business processes

Furthermore respondents were asked to mention ICTs they use in business processes. Following are the responses obtained; 8 respondents equivalent to 19.5% respondents are using fax machines, 10 respondents or 24.4% respondents are using landlines telephones on their business processes, 32 or 78% respondents are using mobile phones in their business processes, 17 or 41.5% respondents are using personal computers on their business processes, also 24 or 58.6% respondents are using Internet

on their business processes. This indicated organizations are depending on more than one type of ICT on their business processes with mobile phones and personal computers are the most widely used ICTs. Table 4.4 and figure 4.4 illustrate these findings. Also nine (9) visually impaired persons were included in this study.

Table 4.4: ICTs used in business processes

Response	Frequency	Percentage
Fax machines	8	19.5%
Landline telephones	10	24.4%
Mobile phones	32	78%
Personal computers	17	41.5%
Internet	24	58.6%

Source: Field data (2012)

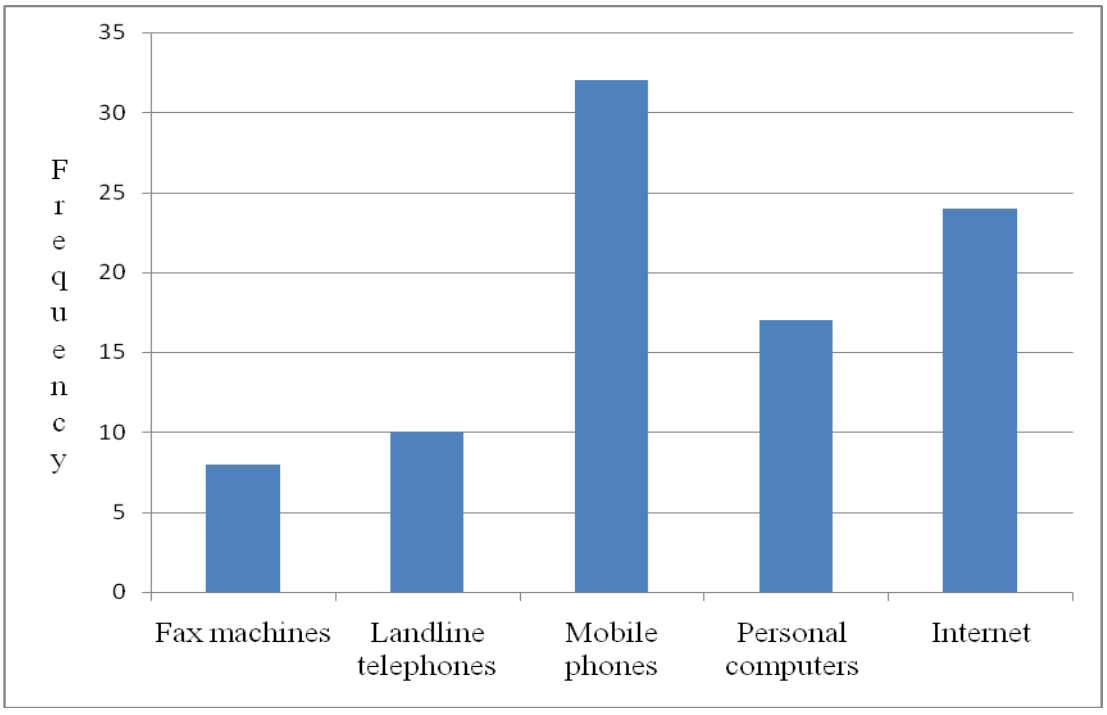

Figure 4.3: ICTs used in business processes

4.4 Competence of Visually Impaired Persons on ICTs

Table 4.5: Visual impairments of respondents

Type of Visual Impairment	Frequency
No vision at all (Total blind)	5
Low vision (Partial blind)	2
Distance vision	1
Near vision	1

Source: Field data (2012)

The researcher was interested to know distribution of impairments among the VIPs in Tanzania. Data were collected 9 respondents the following were findings obtained, No vision at all, Peripheral vision, Peripheral vision, Distance vision, near vision. However, the statistics showed that 5 respondents were totally blind, 2 had low vision, 2 was categorized under low vision or partial blind, 1 had distance vision problem, and another had near vision problem. These prove existence of persons with visual impairments hence organizations should consider them while planning their business processes.

The researcher was also interested with knowing the abilities of VIPs in using ICTs. Respondents were asked to mention ICTs they are capable of using. Results indicated that majority of VIPs, 8 or 89%, can use mobile phones, 7 or 78% can use landline telephones, 6 or 67% can use personal computers and Internet, while only 2 or 22% can use fax machines. Further the researcher asked where did they learn to use those ICT devices most cases were claimed it come from their ‘experience’ or ‘trial and error’ especially for mobile phones and landline phones and fax. Those who were

familiar with computers and Internet said had formal training conducted by institutions such as OUT, University of Dar es Salaam, SCI Systems or from friends who had attended those training.

Table 4.6: VIPs knowledge to ICTs

Type of ICT	Frequency	Percentage
Landline telephone	7	78%
Fax machine	2	22%
Mobile phones	8	89%
Personal computer	6	67 %
Internet	6	67%

Source: Field data (2012)

Also the researcher was interested to know how VIPs accessing services and products offered through ICTs. 1 (11%) respondent said he is using ICT as normal people use it. He went to extent of demonstrating to me how he makes phone calls, using ATM machines. 6 (78%) responding said they need assistive technologies to interact with ICTs interfaces and 2 (22%) respondents requires assistance from other persons to utilize ICTs.

Table 4.7: Ways VIPs use ICTs in business processes

	Frequency	Percentage
Use ICTs normally	1	11%
Need ATs to use ICTs	6	78%
Asks assistance from others	2	22%

Source: Field data (2012)

Respondents were also asked to rank their abilities of using ATs. 6 or 67% of respondents were capable of using screen reader, 4 or 44% were capable of using screen magnification tools and 2 were capable of using monitors with Braille display capability.

Table 4.8: Assistive technologies familiar to VIPs

	Frequency	Percentage
Screen reader	6	67%
Screen magnification	4	44%
Braille display	2	22%

Source: Field data (2012)

4.5 Involvement of Persons with Visual Impairments in Business Processes

The study also aimed at determining involvement of persons with visual impairments in business processes. To determine this objective, respondents were asked if their organizations are working with VIPs on their business processes. Responses indicated that 27 respondents, corresponding to 65.6% of respondents said their organizations are working with VIPs, 4 or 10.3% of respondents said their organizations are not and some 10 corresponding to 23.8% of respondents were not sure if their organizations are working with VIPs. Comparing organizations which are working or expecting to work with visually impaired persons and those which do not, it can be said that more organizations are expecting to involve VIPs in their business processes. Table 4.5 and figure 4.5 illustrate these findings.

Table 4.9: Involvement of VIPs in business processes

	FREQUENCY	PERCENTAGE
YES	27	65.6%
NO	4	10.3
NOT SURE	10	23.8%
TOTAL	41	100%

Source: Field data (2012)

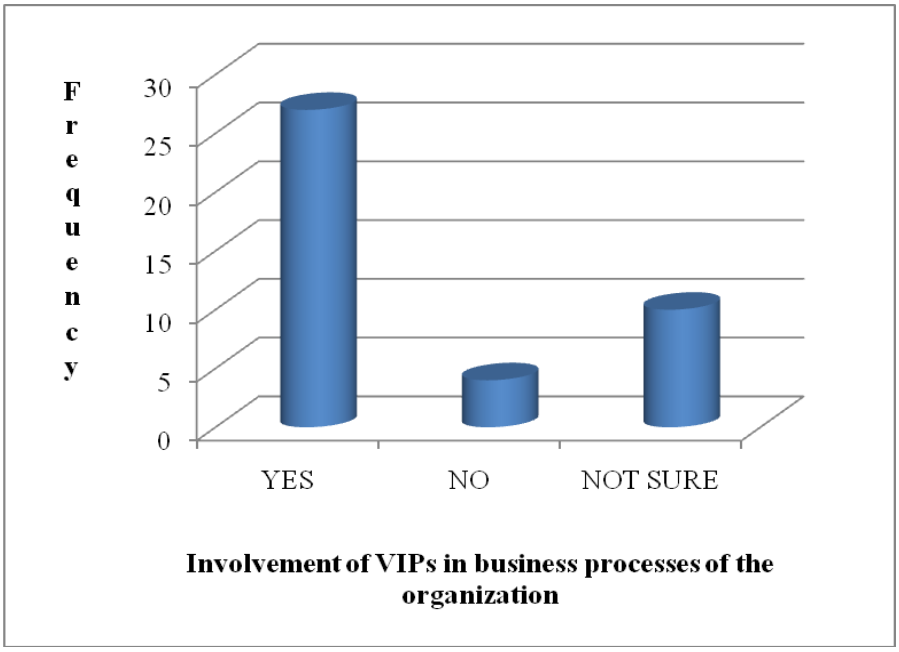

Figure 4.4: Involvement of VIPs in organizations' business processes

For respondents whose organizations are involving or expecting to involve VIPs in their business processes, were asked at what role between employees, clients/customers or both, they are VIPs involved. Total of 37 respondents found this question applicable. 11 corresponding to 29.7% said as VIPs are involved as employees, 19 or 51.4% said VIPs are involved as clients or customers and while 7 respondents corresponding to 18.9% said VIPs are involved in their businesses processes can take either role as employee or customer/client. Comparing these responses, many VIPs are participating in business processes as customers or clients although there is significant participation as employees. Table 4.6 and figure 4.6 illustrate these findings.

Table 4.10: Role played by VIPs in business processes

	FREQUENCY	PERCENTAGE
Employees	11	29.7%
Clients/Customers	19	51.4%
Both	7	18.9%
Total	37	

Source: Field data (2012)

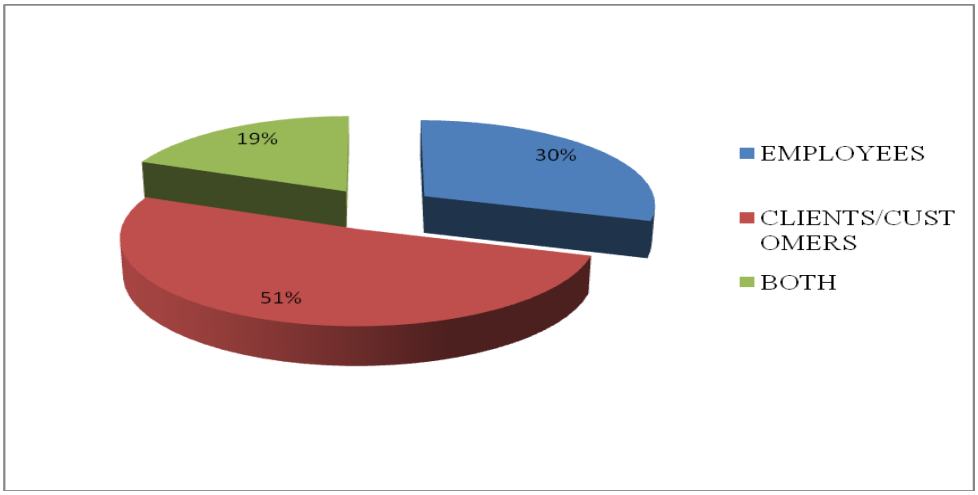

Figure 4.5: Role played by VIPs in business processes

4.6 Compatibility of Information and Communication Technologies to Visually Impaired Persons

For VIPs to use ICTs the interface needs to be designed on their considerations. These considerations are both on software and hardware. To obtain information concerning this objective, respondents whose organizations are using ICTs in their business processes, were asked if their ICT applications are considering VIPs. 5 or 17.2% respondents agreed while 24 82.8% respondents indicated that they are not considering VIPs on their ICT applications in business processes. Out of 5 organizations which are considering VIPs in their business processes 4 are educational and one which deals with supplying ICT hardware and software. This indicates that many organizations are not considering VIPs when designing use of ICTs in their business processes. Table 4.7 illustrates these findings.

Table 4.11: Consideration of VIPs on ICTs used

	FREQUENCY	PERCENTAGE
YES	7	17.1%
NO	34	82.9%
TOTAL	41	

Source: Field data (2012)

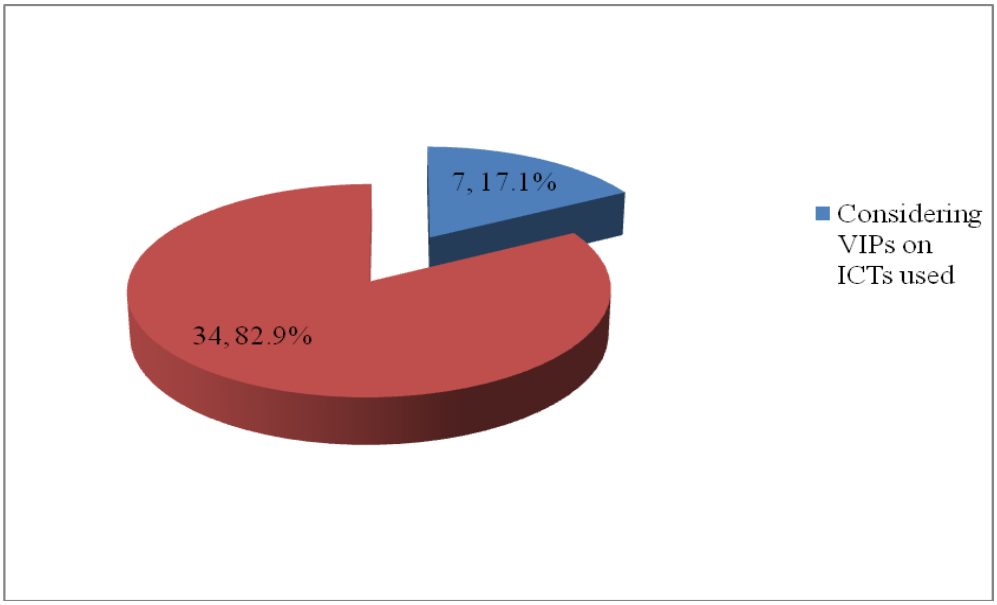

Figure 4.6: Considering of VIPs on ICTs used

Furthermore, for those who are considering VIPs on their ICTs applications were asked how VIPs are considered. Following are respondents obtained; all 5 Uses specialized software recommended for VIPs, 2 or 40% said ICTs they uses are compatible to devices which are relevant to VIPs such as Braille keyboards, 2 or 40% said they switch to ICTs technologies relevant for VIPs on request, while, 1 said they have separate services for VIPs.

Table 4.12: Considerations given to VIPs on ICTs used

	FREQUENCY	PERCENTAGE
Uses specialized software recommended for VIPs	7	100%
Compatible to devices which are relevant to VIPs	2	28.6%
Switched to technology for VIPs on request	3	42.9%
Separate services for VIPs	2	28.6%

Source: Field data (2012)

Also respondents, whose organizations are considering VIPs on their ICTs applications, were asked what motivated them to consider VIPs on their Business processes utilizing ICTs. The following were respondents obtained. 1 respondent or 20% said they are considering VIPs for financial gains, 4 respondents or 80% said their considerations for VIPs in business processes is for ethical considerations, also all 5 respondents said using ICTs which considers VIPs on business processes is based from their organizations business policy/objectives of including visually impaired persons on it's services/products. Table 4.9 and figure summarizes these findings.

Table 4.13: Motivations for considering VIPs in ICTs used in business processes

	FREQUENCY	PERCENTAGE
Financial gains	2	28.6%
Ethical considerations	6	85.7%
Business policy/objectives	7	100%

Source: Field data (2012)

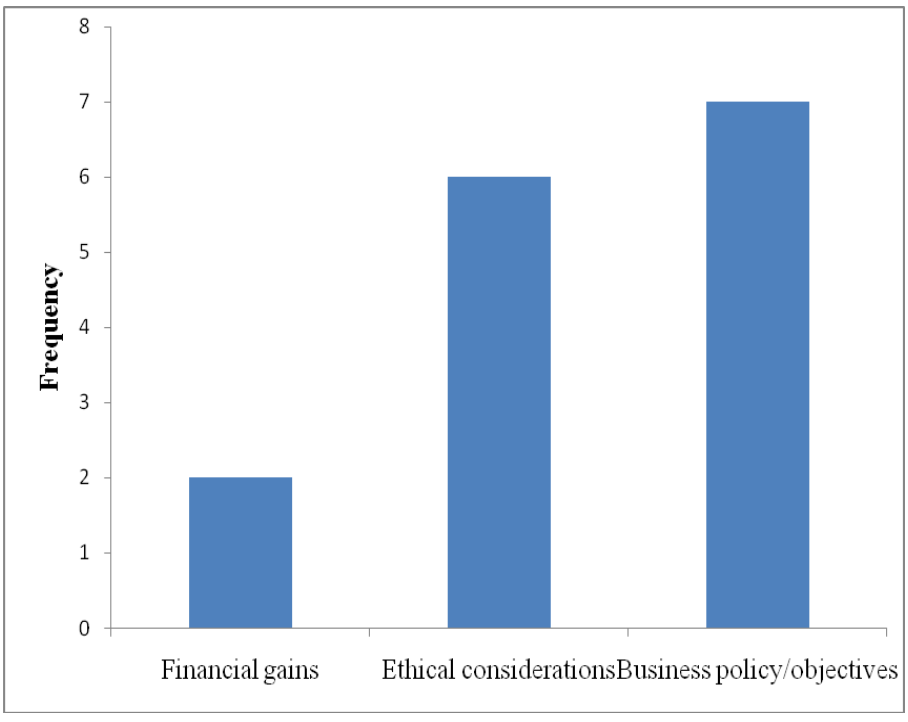

Figure 4.7: Motivations for considering VIPs on ICTs used in business processes

4.7 Benefits of Having Compatible Information and Communication Technologies to Visually Impaired Persons

A question required respondents to mention benefits of having ICTs which are useful to VIPs. Respondents from organizations which do not use compatible ICTs to VIPs found this question not applicable. 5 respondents whose organizations are using ICTs which are considering VIPs responded to this question. The following were the respondents' responses, 3 respondents or 60% said having usable ICTs to VIPs reduce cost of serving VIPs, all 5 respondents indicated that time used to help VIPs is reduced and 4 or 80% respondents said that it improves publicity.

Table 4.14: Benefits of using compatible ICTs to VIPs in business processes

	FREQUENCY	PERCENTAGE
Cost of serving visually impaired persons reduced.	4	57.1%
Time used to help visually impaired persons reduced	7	100%
Improves publicity	6	85.7%

Source: Field data (2012)

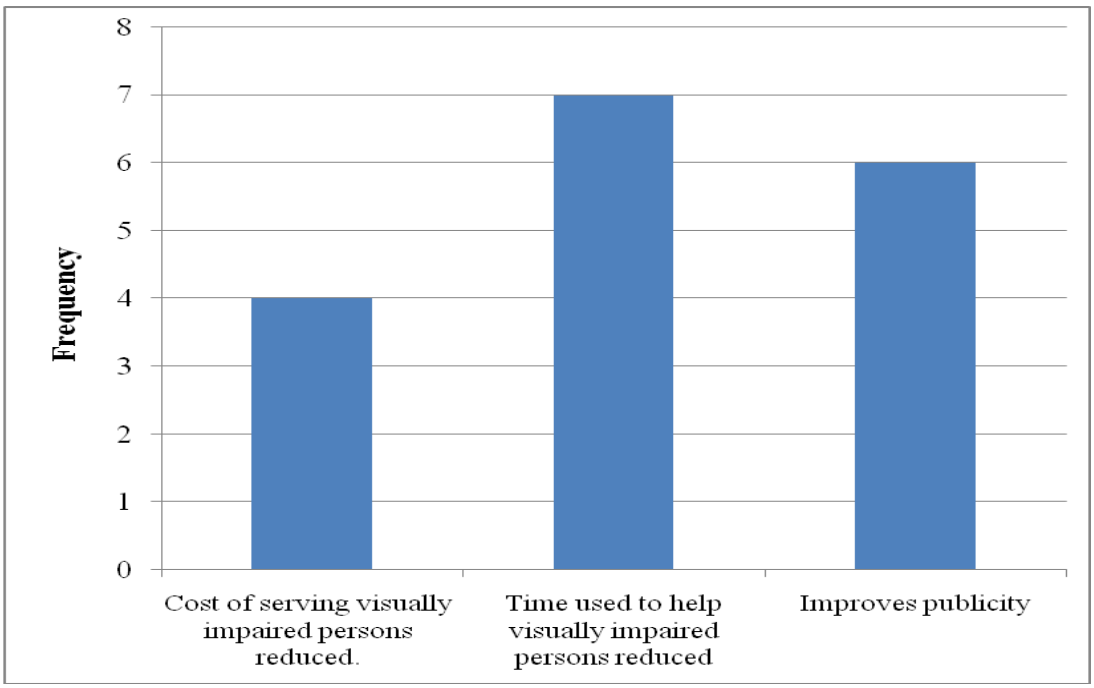

Figure 4.8: Benefits of using ICTs compatible to VIPs

4.8 Factors Hinders Use of Information and Communication Technologies Compatible to Visually Impaired Persons

The researcher was also interested to know factors that hinder use of ICTs that are considering VIP in business processes. To obtain information concerning this objective, respondents were asked to mention factors that are hindering them from using ICTs which are usable by VIPs. The following were responses collected; about 25 respondents representing 73.5% said making ICTs useful to visually impaired persons cost more unnecessarily to their organizations, 19 respondents or 55.5% said the contribution of visually impaired persons to their businesses is negligible, 27 respondents or 79.4% said that inclusive technologies required are not available, 29 respondents or 85.3% said they are not familiar with technology required, 16 respondents or 47.5% said they do not consider them since visually impaired persons cannot use ICTs and some 18 respondents or 52.9% indicated that absence of laws requiring ICTs used to be usable to VIPs is also a course of many organizations not using ICTs which are useful to visually impaired persons.

Table 4.15: Factors hindering use of compatible ICTs to VIPs

	FREQUENCY	PERCENTAGE
Useful ICTs to VIPs costs more unnecessarily	25	73.5%
Contribution of VIPs to business is negligible	19	55.9%
Technologies required are not available	27	79.4%
Not familiar with technology required	29	85.3%
Visually impaired persons cannot use ICTs	16	47.1%
Not required by laws	18	52.9%

Source: Field data (2012)

With these barriers on using ICTs, respondents from organizations which are not using compatible ICTs to VIPs were asked if they are intending to begin using ICTs which

are considering VIPs in their business processes. 5 respondents corresponding to 13.9% of respondents indicated their intentions to use ICTs considering VIPs in their business processes while others 8 respondents or 22.2% do not plan to use ICTs which are considering visually impaired persons on their business processes.23 respondents or 63.9% are not sure if they are planning to use ICTs compatible to VIPs. Although follow up interview indicated they are not sure due to lack of knowledge, and availability of applicable technologies hence there plan to use them in the future will depend on gaining knowledge and availability of those technologies.

Table 4.16: Plans to use compatible ICTs to VIPs in future

	FREQUENCY	PERCENTAGE
YES	5	13.9%
NO	8	22.2%
NOT SURE	23	63.9%
TOTAL	36	100%

Source: Field data (2012)

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECCOMMENDATIONS

5.1 Introduction

This chapter summaries the entire research work, concludes research objectives and give recommendations on the use of information and communication technologies by visually impaired persons in business processes.

5.2 Summary of Key Findings

The study involved 41 organizations which are using ICTs in their business processes represented by their ICT managers/personnels. Organizations are using ICTs in their business processes such as promotion and Marketing, information search, and direct/indirect contact between customers/suppliers/clients/partners. Purchasing or selling online, fun/entertainment. Communications and business management are mostly used at 70.7% and 65%. ICTs mainly used are fax machines, landline telephones, mobile phones, personal computers and Internet with mobile phones being most used ICTs at 78%. This study also found that VIPs are capable of using fax machines, landline telephones, mobile phones, personal computers and Internet where most VIPs are using mobile phones. VIPs have different capabilities of using these ICTs, one respondent indicate to be able to use ICTs normally as non-visual impaired persons, 6 requires assistive technologies and two cannot operate ICT devices by their own so they need assistance from other persons in order to utilize products offered through ICT. Visually impaired persons are involved in business processes as either employees and/or clients/customers. Only seven (17.1%) organizations do consider visually impaired persons on ICTs they use in business processes. These

considerations are in the forms of specialized software and hardware compatible to visually impaired persons, while others are providing special assistance in case there is a client/customer who is visually impaired. These considerations are beneficial to both the business and the VIPs as they create effectiveness and efficiency to organizations.

5.3 Conclusion

This study assessed use of ICTs for visually impaired persons in business processes. According to the findings of this research, it can therefore be concluded that; Information and Communication Technologies are widely applied in business processes. Forms of ICTs used in business processes include fax machines, landline telephones, mobile telephones, computers and the Internet. Information and communication technologies are widely used in business processes but very few are considering visually impaired persons who are also involved in their business processes as employees or customers and clients. Most of organizations which are considering VIPs are from the field of education and training. Use of information and communication technologies compatible to visually impaired persons in business processes has several benefits to the organizations and visually impaired persons. Thus organizations using ICTs on their business processes should consider technologies which are useful to visually impaired persons.

5.4 Recommendations

This study was conducted to determine use of ICTs by visually impaired persons on business processes. From the findings this study is proposing the following recommendations.

- The government through its agencies might set policies which will insure there is availability of ICTs which are recommended for visually impaired persons in the country.
- Policies on ICTs should direct to reduce cost of using ICTs which are considering visually impaired persons.
- Society should be made aware of the country's disability policy, needs of disabled persons and their position in the society to reduce discrimination either intentional or accidental on involving impaired persons in business processes of organizations.
- Policies should give more attention on raising awareness on ICTs which are compatible to visually impaired persons.
- More training should be provided either as short courses or imbedded in ICT trainings on ICTs which are recommended for visually impaired persons.
- Government should set a quota on business processes which are using ICTs which are considering visually impaired persons in their business processes.

5.5 Recommendations for Further Studies

This study based on supply side of services using ICTs on business processes. This study was limited to 50 respondents, majority were from organizations using ICTs, in Dar es Salaam region only. There is a need therefore to include other regions and find out about this topic as Dar es Salaam is very different and special to most of regions of Tanzania in economy and infrastructure. Researcher is recommending for further researches on topics concerning with demand of ICTs compatible to visually impaired persons, role of education and training on integrating visually impaired persons to use

information and communication technologies and development of ICT training modal for visually impaired persons.

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APPENDICES

Appendix A: Questionnaire for businesses/Organizations

Questionnaire to be Answered by Organizations Concerning the Use of ICT by Visually Impaired Persons in Business Processes

I, Mloyi P. Newa, am a student of the Open University of Tanzania. As requirement for MBA degree award, I am supposed to conduct a research whose findings will be represented to the university. I am requesting your cooperation by filling this questionnaire honestly and returning it to me. Information collected by this questionnaire is mainly for academic use but may also be used for otherwise when required. The researcher is guaranteeing privacy of respondents and their enterprises.

1. Please mention the industry your business is in. ……..

2. Does your company use ICT on its business processes? YES [ ] NO [ ]

3. If answer to question two (2) above is YES, what is the purpose of ICT use?
   a. Business management [ ]
   b. Internal communications [ ]
   c. External communications with customers/suppliers/clients/partners e.t.c. [ ]
   d. Promotion and Marketing services [ ]
   e. Information search [ ]
   f. Purchasing or selling online [ ]
   g. Fun/entertainment [ ]
   h. Other: (please specify) …….

4. Which ICTs does your business/firm use in its business processes?

a. Fax machines [ ]

b. Landline Telephones [ ]

c. Mobile phones [ ]

d. Personal computers [ ]

e. Internet [ ]

f. Others (please specify) .....

5. Do you expect to have a customer who is visually impaired?

YES [ ] NO [ ]

6. If answer to question six (6) is YES, what role do they play

a. Employee [ ]

b. Client [ ]

c. Both (employee and client) [ ]

7. Do services you provide using ICTs considering visually impaired persons?

YES [ ] NO [ ]

8. If answer to question seven (7) is YES, how are visually impaired persons considered?

a. Uses specialized software recommended for visually impaired persons [ ]

b. Compatible to devices which are relevant to visually impaired persons [ ]

c. Switching to technology for visually impaired persons on request [ ]

d. Using separate ICTs for visually impaired persons [ ]

e. Ensuring there is always an attendant for visually impaired persons [ ]

f. Other: (please specify) .....

9. What motivated your organization to make ICT applications considering visually impaired persons?

   a. Financial gains [ ]

   b. Ethical considerations [ ]

   c. Government policies [ ]

   d. Industrial pressure [ ]

   e. visual impaired activists/lobby groups [ ]

   f. Business policies/objectives [ ]

   g. Other: (please mention) .....

10. What are benefits of having useful ICT applications to visually impaired persons?

   a. Increased number of customers [ ]

   b. Cost of serving visually impaired persons reduced. [ ]

   c. Time used to help visually impaired persons reduced [ ]

   d. Increase in sales [ ]

   e. Improves publicity [ ]

   f. Other: (please mention) .....

11. If answer to question seven (7) is NO, why are visually impaired persons not considered?

a. Making it useful to visually impaired persons costs more unnecessarily[ ]

b. Contribution of visually impaired persons to the business is negligible [ ]

c. Technologies required are not available [ ]

d. Not familiar with technology required [ ]

e. Visually impaired persons cannot use ICTs [ ]

f. Not required by laws to make them useful to visually impaired persons[ ]

g. Other: (please mention).....

12. If answer to question seven (7) is NO, does your organization plans to make its ICT infrastructure useful to visually impaired persons in a future?

YES [ ] NO [ ]

Thank you for your cooperation

Appendix B: Interview guide to Visually Impaired Persons

1. Describe your vision status.
2. Do you need any assistance to use ICTs?
3. Which assistive technology products are you familiar with?

Thank you