

**INFORMATION COMMUNICATION TECHNOLOGY INCEPTION;
AN AID TO BANKING INDUSTRY DEVELOPMENT IN
UGANDA**

By

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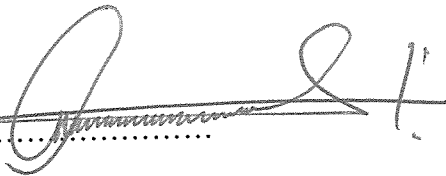
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DECLARATION

I, **Korie Malachy C.** hereby declare to the best of my knowledge that; this masterpiece is my effort and original piece of work and that this thesis has never been submitted for an award in any other university or for publication as a whole or in part. However, other documents that were consulted have been acknowledged in the references.

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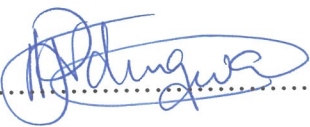
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Korie Malachy Chidi

APPROVAL

This is to affirm that the thesis titled "**Information Communication Technology inception, an Aid to Banking Industry Development in Uganda**" was conducted by Korie Malachy Chidi under my supervision as a university academic, and submitted with my endorsement.

Date.....23/10/.....2009

Signature

Mrs. Paschalia Ouma M.

DEDICATION

I dedicate this academic prowess to my entire family, my wife and my son 'Prince Chidi Destiny Junior' and especially to God almighty

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My people believe that ‘when ever the eye cries the nose cries along with it’. Therefore considering the enormity and the swinish procedure behind the rigorous journey to success, I however realized that academic success can not be achieved single handedly, hence I have to recognize people who were en masse with me within the accomplishment period of this academic prowess.

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LIST OF ACRONYMS

ADCG: African Development Consulting Group Ltd

ABSA: Amalgamated Banks of South Africa

ATM: Automated Teller Machine

BACS: Bankers' Automated Clearing Services

BI: Banking Industry

B2B: Business-to-Business

B2C: Business-to-Customer

B o U : Bank of Uganda

CVI: Content Validity Index

CVR: Content Validity Ratio

EDI: Electronics Data Integrity

EFT: Electronic Funds Transfer

EFTPOS: Electronic Funds Transfer at Point of Sale

FICA: Financial Intelligence Bill

FNB: First National Bank

ICT: Information Communication Technology

MICR: Magnetic Ink Character Reader

RTGS: Real time gross settlement

SPSS: Statistical Package for Social Scientist

WAN: Wide Area Network

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ABSTRACT

This project is a comprehensive evaluation of the response of Uganda banks to the adoption of Information Communication Technology (ICT). It focuses on how the banking industry in Uganda has applied ICT to improve on their operations; and the future application of ICT to meet new technology innovations in the banking industry. Three categories of variables relating to the adoption and implementation of information communication technology devices were used for this study. These include the nature and degree of adoption of innovative technologies; benefits and barriers for ICT adoption; and the impact of the ICT development on banks operation. The study covered 15 Banks out of 20 registered banks in Uganda as at the end of 2008. A total of 30 questionnaires returned out of 34 which were administered to the selected bank employees, including Head of IT and Marketing departments of the 15 responding banks. Out of these, 86% were respectively retrieved. In addition to questionnaires the researchers personal previous and current observation was used for primary data collection. Data collected through questionnaire were analyzed quantitatively using SPSS.

From the researchers observation and the results of the study, it was discovered that Uganda Banking Industry has a high uptake of computers use, and a high application rate of the internet, LAN and Intranet and many banks apply security measures like firewalls and encryption systems to secure data.

It was further discovered that ICT represents great potential for business process reengineering of Uganda Banks as it has improved banking services, facilitated accurate records, provides for home and office Banking services, ensures convenient business hour, prompt and fair attention, and enhances faster services. However, lack of IT specialist, inexperienced customers and huge investment was found to be the biggest obstacle to ICT development in Uganda Banking Industry.

The adoption of ICT improves the banks' image and leads to a wider, faster and more efficient market. With the development of technology, alternative delivery mechanism such as ATM and others becomes available. Indeed, ICT is an enabler, but without sufficient capabilities of the human workforce to use it efficiently, the costly investments become ineffective. It therefore recommended that Banking Industry should support training and skills development among bank staff and customers by arranging training courses or facilitate networks for exchange of best practice so as to implement new ICT innovation in Uganda Banking Industry.

CHAPTER ONE

INTRODUCTION

1.1 introduction

This chapter presents the historical, conceptual and contextual background of the study; it highlights the problem at hand which needs to be solved, the objectives to be achieved, the research questions to be answered and the purpose of the study. The chapter also presents the scope of the study and highlights parties to benefit from this study and how they will benefit.

1.2 Background of the Study

According to (Holdsworth, 2009) various commodities have been used as money in different stages of economic development. In early times, barter was the primary medium of exchange. An individual possessing a material object of value, such as a measure of grain, could directly exchange that object for another object perceived to have equivalent value, such as a small animal, a clay pot or a tool (Beattie, 2008). However, the capacity to carry out transactions was severely limited since it depended on a coincidence of wants.

Ranjit, (2008) asserts that the nature of money has changed over time and continues to evolve. (Holdsworth, 2009) concurs with (Ranjit, 2008) that money came into being thousands of years ago as a superior alternative to barter (trading goods and services directly for other goods and services). The old type of money was commodity money - money made up from precious metals or other commodities that have intrinsic value (are valuable in their own right). Examples of commodity money could include gold, cows, and pretty shells. From commodity money, to fiat money which was introduced in early 1970s and credit cards, debit card and e-banking which characterize this era of technology mark the history of money and banking.

Contextually, (Shuangtian, 2008) argues that Information and Communications Technology (ICT) play an important role in the development of banking industry. In fact ICT has made the banking sector more competitive, because of advancements of information and communications technologies. ICT allows the banks to effectively cater for the needs of the consumers by strengthening internal control systems which are backed by the effective communications mechanisms. Indeed, the wide spread use of smart cards, ATMs, mobile banking, electronic banking, telephone banking, twenty four hours service, the overall quality of services, expanded portfolio of products and services, better customer relationship management with the use of

advanced tools and variety of products has enabled banks to better serve their customers with the advent of ICT (Ackerman, 2008).

Now a day's online banking is getting very popular. Online banking makes things extremely convenient for people and saves their precious time. It allows you to quickly manage your bank account and see where your balance is. A large number of national and statewide banks are offering online banking services to their customers. One can now enjoy the benefit of paying the bill online. Most banks offer online banking free of charge.

Today's business environment is very dynamic and undergoes rapid changes as a result of technological innovation, increased awareness and demands from customers. Business organisations, especially the banking industry of the 21st century operates in a complex and competitive environment characterized by these changing conditions and highly unpredictable economic climate. Information and Communication Technology (ICT) is at the centre of this global change curve (Shuangtian, 2008). Relatedly, Laudon and Laudon, (1991) as cited by (Ackerman, 2008) contend that managers can not ignore Information Systems because they play a critical role in contemporary organisation. Indeed, the application of information and communication technology concepts, techniques, policies and implementation strategies to banking services has become a subject of fundamental importance and concerns to all banks and a prerequisite for local and global competitiveness. In addition, ICT directly affects how managers decide, how they plan and what products and services are offered in the banking industry. It has continued to change the way banks and their corporate relationships are organized worldwide and the variety of innovative devices available to enhance the speed and quality of service delivery.

Harold and Jeff (1995) as cited by (Milligan, 2004) assert that financial service providers should modify their traditional operating practices to remain viable. They claim that the most significant shortcoming in the banking industry today is a wide spread failure on the part of senior management in banks to grasp the importance of technology and incorporate it into their strategic plans accordingly.

Prior to Uganda's independence in 1962, Government-owned institutions dominated most banking in Uganda. In 1966 the Bank of Uganda, which controlled the issue of currency and

managed foreign exchange reserves, became the Central Bank. Uganda Commercial Bank, which had fifty branches throughout the country, dominated commercial banking and was wholly owned by the government. The Uganda Development Bank was a state-owned development finance institution, which channeled loans from international sources into Ugandan enterprises and administered most of the development loans made to Uganda (Wikipedia, 2009).

In the late 1990s and early 2000s, the Ugandan banking industry underwent significant restructuring. Several indigenous commercial banks were declared insolvent, taken over by the central bank and eventually sold or liquidated. These included Cooperative Bank, Greenland Bank, International Credit Bank, Teefe Bank and Gold Trust Bank which were closed or sold. Uganda Commercial Bank was initially privatized through a sale of its majority shares to a purported company from Malaysia. However it later came to light that the actual buyer was a partnership between Greenland Bank (which itself was insolvent) and some politically connected individuals. A second privatization sale was conducted, with the Standard Bank emerging as the winner. In 2008 and 2009, several of the existing banks went on an accelerated branch expansion either through mergers and acquisitions or through denovo branch openings. As of March 2009, there are twenty two (22) licensed commercial banks in Uganda. Twenty one (21) of these banks are fully operational. There are nearly 340 bank branches. The number of bank accounts in the country is estimated at three (3) million. This represents a 10% penetration, given Uganda's population of 30,000,000 (Wikipedia, 2009).

For decades, the ICT sector in Uganda has been revolving around the Telecommunications, Postal and Broadcasting services. This has been mainly voice, very limited data handling and mail deliveries. The 1996 policy framework that liberalized telecommunication sub-sector resulted into radical changes that have given birth to an ICT service sector. The sector has been growing at a phenomenal rate over the last decade, especially in the areas of mobile devices, computer applications, information processing, storage and dissemination (Broadcasting and Internet Points of Presence at district levels). The growth changes have had a profound impact on the whole Ugandan economy or the ICT sector has become an important part of the economy (Uganda Communication Commission, 2007).

As far as finance sector is concerned, during the past decade, commercial banks have witnessed dramatic change in information and telecommunications technologies (called ICT hereinafter).

With a recent directive from the Bank of Uganda that stopped all banks from honoring cheques above 20 million Uganda shillings, Ugandan banks have introduced electronic means of transferring large sums of money from one bank to another or a clients account. Real time gross settlement (RTGS), electronic funds transfer (EFT), and internet banking have been introduced to save banks and clients from unscrupulous persons bent on fleecing banks and clients. However, not all clients appreciate these efforts. Some still prefer the good old cheque and cash to electronic wizardry (Abaasa, 2007, p. 2). In line with international banking standards, the Bank of Uganda (BoU) and all commercial banks are trying to provide their clients with tailor made services to improve delivery of services and cut out a niche in the nearly exhausted Ugandan banking market. Standard Chartered Bank, Stanbic Bank, Crane Bank and a few others have introduced electronic Visa cards. Some have even gone a step further by introducing SMS and internet banking methods, which clients can conduct in the comfort of their homes.

Indeed, the marketing accessibility of financial institutions is extended and increased to remote areas or countries via the new telecommunications technology. Hence, the role of ICT investments becomes more important in the banking industry and the quest for survival, global relevance, maintenance of existing market share and sustainable development has made exploitation of the many advantages of ICT through the use of automated devices imperative in the industry.

This study is divided into five chapters. The first chapter is concerned with the introduction, the second chapter is the literature review, the third chapter looks at the methodology used in conducting the study; the fourth chapter presents data collected from the field and the final chapter is concerned with discussions of findings, conclusion and recommendations.

1.3 Problem Statement

ICT developments in recent years have had a profound impact on the Banking Industry all over the world. Some of the emergence and development, for instance includes; e-security, e-banking and e-marketing, has been topics of increasing interest in recent years for both academics and practitioners, However, the growing interest in the ICT area has not been matched well enough with relevant studies that would give insight into the processes and behaviors in Uganda, this has

triggered this study; ‘ how the increasing use of ICT can improve and foster new business models which will be useful for business processes in the Banking Industry in Uganda’.

1.4 Purpose of the Study

The aim of this study is to evaluate the response of Ugandan banks to this new technology trend (ICT) and examines the extent to which they have adopted modern technologies (ICT) in their operations, the resultant effects and the possible innovations.

1.5 Objectives of the Study

This study was guided by the following objectives:

1. To evaluate how banks in Uganda apply ICT in their operations,
2. To identify benefits and barriers of ICT adoption in Uganda banking industry
3. To assess impacts of ICT development on Uganda banking industry

1.6 Research Questions

1. What is the current state-of-play concerning ICT uptake and usage?
2. What are the benefits and barriers for ICT adoption on banking industry in Uganda?
3. What are the effects of ICT development on banking industry in Uganda?

1.7 Scope of the Study

Literature related to the use of Information Communication Technology in banking industry in Uganda; benefit and barriers of ICT adoption, impact and innovation of ICT development on banking industry were the area of interest for this study. The study was conducted in Uganda for a period of six months (February to July 2009), targeting all registered commercial banks (both local and international) in Uganda. The registered commercial banks as at the end of 2008 includes.; Bank of Africa, Bank of Baroda, Barclays Bank, Cairo International Bank, Centenary Bank , Citibank Uganda, Crane Bank, Diamond Trust Bank, DFCU Bank, Housing Finance Bank, National Bank of Commerce, Orient Bank, Stanbic Bank, Standard Chartered Bank, Tropical Bank, KCB Bank, United Bank for Africa, Fina Bank, Global Trust Bank and also newly licensed banks Eco Bank &Equity Bank

1.8 Significance of the Study

The research results will further enable the government of Uganda, banks, the public (customers) to embrace and appreciate the use of ICT. This is because the whole world is undergoing revolution to the era of technology.

Government through central bank will be informed on ways to monitor e-banking operations;

The results of this study will inform banks about opportunities and barriers to overcome and new innovations to take advantage of in order to expand and compete internationally;

The results of this study will be of a great value to further researchers as it will be used as source of secondary data for those interested in researching on the same or related fields.

CHAPTER TWO

LITERATURE REVIEW

2.1 introduction

This chapter reviews the existing literature on the topic under study. It highlights ICT uptake and usage in banking industry; benefits and barriers to ICT adoption in banking industry and impact of ICT development in banking industry.

2.2 Conceptual Framework

It is observed from figure 2.1 that banking industry development depend on the ICT infrastructure in place; the benefits of ICT adoption, the barriers encountered and positive and negative impact ICT has on banking activities as argued by (Sudhindra, 2005).

ICT infrastructure includes internet, internal networks; software systems; security measures and authentication. Some of the benefits of ICT development comprise of cost reduction; value addition; meet customers' needs faster and leads to a better flow of information and communication; improvement in services. On the other hand, crucial barriers to ICT development include substantial investment and lack of skilled labor as argued by (Shuangtian, 2008).

In addition, (Ackerman, 2008) concurs with (Shuangtian, 2008) the effects of ICT application in banking industry results on market structure; sector value chain; innovation; productivity; and capital investment and total factor productivity growth among others.

Independent variables

1. ICT infrastructure used by banks

- Internet access;
- Use of internal networks;
- Use of ICT software systems;
- ICT security measures;
- Authentication

2. ICT in exchanges with customers

- e-Marketing and sales
- Offer of e-banking services
- Customer interaction via the Internet
- Interaction with the public sector

Dependent variable

Banking industry development

- Productivity
- Employment
- Innovation
- Market structure
- Organisational structure

Benefits of ICT development

- Cost reduction
- Value addition
- Meet customers' needs faster and leads to a better flow of information and communication
- Improvement in services

Barriers to ICT development

- Substantial investment
- Lack of skilled employees

Effects of ICT on BI

- Stiff competition
- Increased process efficiency;
- Innovation
- Productivity
- Regulation
- Reputation

Figure2. 1: Conceptual framework of the study

Source: Amended from (Shuangtian, 2008)

2.3 Information Communication Technology (ICT) Uptake and Usage in Banking Industry

2.3.1 ICT Uptake in Banking Industry

Innovation in technology and world-wide revolution in information and communication technology are perceived to be the catalyst of productivity growth. The relationship between IT and Banking is fundamentally symbiotic. It is expected to reduce costs, increase volumes and facilitate customized products. Technology adoption is a dire necessity for the public sector banks to complete with new generation private sector and foreign banks. It is a 'compulsion' rather than a 'choice'. Retention of existing customer is the primary concern of majority of the banks today.

The major challenge for banks is to fall in line with the emerging scenario and adopting the require technology to provide state-of-the-art services to the customers. Introduction of on-line, inter-connected automatic teller machines (ATM), telephone banking, on-line bill payment and Internet banking are some of the high tech facilities. Banks have to provide in order to survive in the competitive scenario. Technology should ultimate results in better service, low cost and quick delivery.

Information and Communication Technology

Information & Communication Technology (ICT) can be defined as a computer hardware and software used in telecommunications technology. ICT is the World's fastest growing economic activity; a sector which has turned the globe into an increasingly interconnected network of individuals, firms, schools and governments, communicating and interacting with each other through faster variety of channels and providing economic opportunities transcending borders, languages and cultures. ICT has opened new channels for service delivery in areas such as e-banking, e-commerce, e-government, education, e-health, information dissemination etc.

Information Technology (IT) is the automation of processes, controls, and information production using computers, telecommunications, software and ancillary equipment such as automated teller machine and debit cards (Khalifa 2000) as cited by (Agboola, 2007, p. 3). It is a term that generally covers the harnessing of electronic technology for the information needs of a business at all levels. Communication Technology deals with the Physical devices and software that link various computer hardware components and transfer data from one physical location to another (Laudon & Laudon, 2001).

ICT on the other hand, is an umbrella term that encompasses a wide array of systems, devices and services used for data processing plus telecommunications equipment and services for data transmission and communication. Companies use ICT in their business processes mainly for three purposes as argued by (D'Costa, 2006): to reduce costs, to better serve the customer, and to support growth (e.g. by increasing their market reach). Understanding one's business processes and having a clear vision of how they could be improved (be it to save costs or to improve service quality) are therefore critical requirements for firms to effectively use ICT. The increasing competitive pressure on companies, many of which operate in a global economy, has been a strong driver form ICT adoption. Firms are constantly searching for opportunities to cut costs and ICT holds great promise in this respect as it increases the efficiency of a firm's business processes, both internally and between trading partners in the value chain.

While cutting costs continues to motivate electronic activities, (European Commission, DG Enterprise and Industry, 2008, p. 32) observes that innovative firms have discovered and begun to exploit the potential of ICT for delivering against key business objectives. They have integrated ICT into their production processes, quality management and most recently, in marketing&customer services. However, competing in mature markets requires not only optimized cost structures, maximal efficiency, and products or services of excellent quality but also the ability to communicate effectively and cooperate with business partners.

In the Banking Industry (BI), the main purpose for the use of ICT is highly relevant, as companies in the BI use ICT to reduce costs by increasing process efficiency, to serve the customers better by developing new products and services which could meet customer's needs, and enabling growth by increasing market reach, either by acquiring companies with innovative ICT skills or by using ICT to smoothen mergers and acquisitions (Ackerman, 2008).

Information Technology has basically been used under two different avenues in Banking. One is Communication and Connectivity and the other is Banking operation Reengineering. Information technology enables sophisticated product development, better market infrastructure, implementation of reliable techniques for control of risks and helps the financial intermediaries to reach geographically distant and diversified-markets.



To this regards, technology has changed the contours of three major functions performed by banks, i.e., access to liquidity, transformation of assets and monitoring of risks. Further, Information technology and the communication networking systems have a crucial bearing on the efficiency of money, capital and foreign exchange markets. For most banks throughout the world, ICT have become the back bone of financial service delivery and finance networks have shifted from paper-based to the digital mode (Grace, 2004).

Irechukwu, (2000) lists some banking services that have been revolutionized through the use of ICT as including account opening, customer account mandate, and transaction processing and recording. Information and Communication Technology has provided self-service facilities (automated customer service machines) from where prospective customers can complete their account opening documents direct online. It assists customers to validate their account numbers and receive instruction on when and how to receive their cheque books, credit and debit cards.

In the case of Nigeria, adoption of ICT has influenced the content and quality of banking operations. From all indications, ICT presents great potential for business process reengineering in Banks. Investment in information and communication technology should form an important component in the overall strategy of banking operators to ensure effective performance. The banking industry in Nigeria presents ICT providers with great opportunity to market their innovations. Success in this area however depends on how they can customise their services to appeal to the ready minds of various stake holders in the industry.

The use of Computerized Credit Rating, Smart Cards and Electronic Data Interchange EDI, could also be found in the bank headquarters and very few branches. Other ICT products such as ATM, Electronic Home and Office Banking, Telephone Banking and Make Cheque Available Programs could only be found in the headquarters of most banks. In line with our findings in the period of adoption, ATM still ranked least in its spread while Telephone Banking, Make Cheque Available Program and Electronic. Home and Office Banking follow in that order. Low rate of spread of these technologies might be due to cost, fear of fraudulent practices and lack of facilities necessary for their operation. Increase in the rate of adoption and the spread of ICT products, especially the use of cards has reduced the influence of cash on financial transactions. Some payments are now being automated and absolute volumes of paper transactions have declined under the impact of electronic transaction brought about by the application of ICT to the

payment system in Nigeria, for example; at some strategic places in Nigeria, someone can purchase a commodity of his choice just by slotting in his ATM card into the delivery machine and selecting from the list of article, the transaction will be done automatically by the machine, recently customers of some banks in Nigeria do not need to go to the banks to seek for their account balance, immediately any transaction is made the details will be sent to the customers mobile phone automatically.

ICT products in use in Nigeria banking industry include Automated Teller Machine, Smart Cards, Telephone Banking, MICR, Electronic Funds Transfer, Electronic Data Interchange, Also .

(i) Bankers Automated Clearing Services: This involves the use of Magnetic Ink Character Reader (MICR) for cheque processing. It is capable of encoding, reading and sorting cheques.

(ii) Automated Payment Systems: Devices used here include Automatic Teller Machine (ATM), Plastic Cards and Electronic Funds Transfer.

(iii) Automated Delivery Channels: These include interactive television and the Internet.

Indeed, electronic Banking has tremendously improved the services of some banks to their customers in Nigeria. Woherem, (2000) states that Nigeria banks since 1980s have performed better in their investment profile and use of ICT systems, than the rest of industrial sector of the economy. An analysis of the study carried out by African Development Consulting Group Ltd. (ADCG) on IT diffusion in Nigeria shows that banks have invested more on IT, have more IT personnel, more installed base for PCs, LANs, and WANs and a better linkage to the Internet than other sectors of the Nigerian economy.

Banking industry in Nigeria has witnessed tremendous changes linked with the developments in ICT over the years. The quest for survival, global relevance, maintenance of existing market share and sustainable development has made exploitation of the many advantages of ICT through the use of automated devices imperative in the industry.

In South Africa, integration of Information Communication Technology (ICT) into financial service delivery in South Africa has gained momentum. The rapid growth of ICT use in banking has brought a major focus on how it can be used to extend financial services to previously excluded poor communities. The emerging digital financial services such as Supermarket Banking, Mzansi Account and Portable Branch networks in the development of a more socially inclusive financial service sector in South Africa. The ultimate success of South Africa's financial service sector depends on how banks will adapted the new ICT products to penetrate previously untapped markets in poor communities and reduce the digital divide in financial service delivery (PricewaterhouseCoopers, 2005).The South African banking industry is facing several strategic changes with significant consequences for untapped markets. The industry stands at the cross roads of rapid economic growth, structural changes arising from new acquisitions, mergers and electronic communication technology (ICT) innovations,

The use of ICT in financial service delivery has illuminated the debate on closing the "financial divide" in underserved communities. ICT offers a source of hope to improve their access to finance at the lowest possible cost. Although digital financial service (for instance using interchangeably with electronic banking) delivery has gained some interest in South Africa (Singh, 2004).

PricewaterhouseCoopers, (2005) observes that South Africa has one of the leading ICT banking infrastructures compared to the rest of Africa (four major banks namely Standard Bank, Amalgamated Banks of South Africa (ABSA), First National Bank (FNB) and Nedbank; 31 million retail accounts, 2, 500 branches and 12, 500 Automated Teller Machines (ATM) (PricewaterhouseCoopers, 2005). The banking service market share is highly concentrated as the top four banks occupy approximately 98 percent of the sector assets while the remaining 2 percent is attributed to 11 other small banks.

A number of key changes are taking place as banks position themselves to enter new markets and Serve, Firstly, the industry has experienced a wave of acquisitions the latest one being Barclays Bank's take-over of ABSA. Also, South African banks have made inroads into regional African markets. ICT innovation has helped South African banks to extend cheaper forms of banking to the public. For example, Pick'n Pay Supermarkets have established a strategic partnership with NedBank to provide digital retail banking services through the "Go Account" which enables

clients to bank in the supermarket on their routine shopping visit. Direct benefits of the “Go Account” includes saving time on frequent ATM cash withdrawals, lower bank charges and conduct of transactions even on Sundays (Maumbe, 2008). Such a “one stop” POS service is available at all Pick ‘n Pay hypermarkets in South Africa. The “Go Account” targets “poor to middle income” earners (average monthly income of R5, 000) and it allows clients to conduct banking at the checkout counters. Similarly, ShopRite and Checkers in partnership with TEBA Bank offer POS services to their customers (Maumbe, 2008). The trend towards “supermarket banking” is driven by the rising tide in consumerism in South Africa, but broad-based involvement of the poor people remains unclear.

Secondly, South African banks face a plethora of new regulations aimed at promoting financial business ethics and preventing financial fraud. These include the Consumer Credit Bill, amendments to the Competition Act, and the Financial Intelligence Bill (FICA). The National Consumer Credit Bill is aimed at improving credit accessibility, regulate credit bureaus and determine a ceiling on interest rates charged on micro-loans (Business Times, 2005 as cited by (Maumbe, 2008).

Like ICT trends elsewhere, most South African banks offer other standard e-banking channels such as ATMs, mobile banking, Internet banking, and electronic funds transfer. The diffusion of ATMs, Internet and mobile banking services throughout South Africa especially in big cities and shopping malls offer customers greater satisfaction and convenience as they are able to save time and money travelling to their branches to conduct transactions. Moreover, the decline in the cost of ATMs and POS devices allows for scale economies in digital financial service provision (Cracknel, 2004).

Thirdly, Despite the benefits arising from diversified access to, and enhanced utility from digital banking services, some clients still prefer face to face interactions and the personal touch characteristic of traditional banking. Besides, the near absence of computer literacy in rural areas in Africa coupled with low Internet penetration raises the fear that digital services will be appropriated by urban elite thereby widening rural-urban income disparities. Of concern is the risk that ICT use in banking could perpetuate social exclusion, and thus threaten social cohesion (Maumbe, 2008).

In the study conducted by (European Commission, DG Enterprise and Industry, 2008), it was revealed that in the previous decade the Europe BI had experienced structural changes, such as the launch of the Euro and the deregulation of traditionally protected markets, and that the ICT uptake in the industry had increased, especially for medium-sized banks. However, there was also evidence that the banks were not likely to change from traditional brick and mortar banks to entirely Internet-based banks in the foreseeable future. The internet-only model is still not dominant, but an integrated model with the combination of branch- and online based banking (dual-combination banking) has become more and more common. This can be seen in the growth in the usage and uptake of ICT in the BI from 2002-03, where the only 1 in 10 (11.6%) offered their banking products online, compared to the current 6 in 10 banks providing financial services online (according to the Eurostat Community Service). Moreover, the case studies illustrates that customers are increasingly becoming familiar with online banking, together with other kinds of remote banking opportunities. Mobile banking, for instance, is among other things performing balance checks, account transactions, payments etc. via a mobile phone, normally via text messages.

In the EU, where mobile phone penetration is high, there is a great potential for mobile banking. However, a recent study by Forrester Research as cited by (Cracknel, 2004) shows that mobile banking is still in its very early days, but at the same time, US-based Celent consultants as cited by (European Commission, DG Enterprise and Industry, 2008) believe that it is a product with great appeal to the clients, especially the younger segment (18-25 year-olds). Celent predict that by 2010, 35% of online US-based households will be using mobile banking. In any case, mobile banking is one of the remote banking opportunities that could gain ground in the nearby future and that should be kept an eye on.

Gone are the days when one had to join long queues, carry bulk cash, keep large sums of money in socks or in pillows for safety reasons or to avoid tedious journeys to the bank.

However, Europe technology understand that the introduction of ICT to the BI also calls for an increased focus on data protection and fighting the misuse of the BI services, negatively ICT has also made it possible for instance to hack into other people's bank accounts, rapid increase in ATM card theft and the risk of pin number misplacement. The above-mentioned trends and challenges are to be reduced by introduction of biometrics system.

With the new electronic banking systems, one can bank at their own convenience and also access their accounts at their own accord and convenience through the new advanced Point Of Sale Terminals and the Automated Teller Machines (ATMs). Speaking of ATMs, they have also evolved with time, in a bid to scrap the use of ATM cards as a result of increased insecurity, theft and cost of production of ATM cards, there has been an introduction of a biometric option which are currently functional in Europe and Asia. Biometric authentication is an automated method whereby an individual's identity is confirmed by examining a unique physiological trait or behavioral characteristic, such as a fingerprint, iris, retina, or signature. This type of measurement is essentially unalterable (O'Sullivan, 2009).

Although behavior-based biometrics can be less expensive and less threatening to users, physiological traits tend to offer greater accuracy and security. In any case, both techniques provide a significantly higher level of identification than passwords or smart cards alone. No more forgotten passwords, lost cards or stolen pins. You are now your own password. Research has been made on the use of the biometric ATM and it has been found out that since the biometric option is basically about using thumbprints to access accounts, some people have fear that what if their fingers are cut off by thieves in order to access their accounts as they see in some movies (Writer, 2005). Biometric ATMs are sensitive to blood flow, and I am quite sure if your finger was cut off there would not be any blood flow. It has the following Advantages

This Bio-Metric ATM is equipped with Bio – Metric sensor which has finger print authentications as a standard feature and it is possible for the illiterate or semi literate folks to use just thumb impression on a touch screen which will allow the beneficiaries to withdraw their money. The ATM accepts finger prints as the means of authentication instead of PIN numbers only as used by other ATMs. This ensures that the Bio metric ATM is very easy to use.

Banks and others who have tested biometric-based security on their client tells, however, say consumers overwhelmingly have a pragmatic response to the technology. Anything that saves the information-overloaded citizen from having to remember another password or personal identification number comes as a welcome respite. Adding a statistical footing to this anecdotal evidence, a nationwide survey by Columbia University reported that 83% of people approve of the use of finger imaging, and do not feel it treats people as criminals.

Likewise, retina scans need perfect alignment of the eye to reach the retina, a point at the back of the eye. Conversely, iris scans do not require contact between the subject's eye and the biometric device in order to video the eye's colored area (the iris). Consequently, Miller as cited by (O'Sullivan, 2009) says "iris parts are the big area of excitement." Although the Japanese already use retina scans for ATM access, Miller predicts iris scans may become standard on Japanese ATMs. "Sensar (a Morristown, Pa., supplier of iris scanners) has just received more than \$25 million in funding from Oki Electric Industry, one of the largest suppliers of ATMs in the Pacific Southwest".

The most recent technology is voice biometrics developed by The National Australia Bank, the bank has deployed a voice biometrics system for phone banking, allowing customers to enroll via speech recognition and dispense with the need to remember PINs and passwords. The National Australia Bank has deployed a voice biometrics system for phone banking, allowing customers to enroll via speech recognition and dispense with the need to remember PINs and passwords (Writer, 2005).

2.3.2 Usage of ICT in Banking Industry

During the past decade, commercial banks have witnessed dramatic change in information and telecommunications technologies (called ICT hereinafter). For instance, the use of electronic communication, such as electronic bill paying, home banking, and internet transaction, has been altering the relationship of business-to-business (B2B) and business-to-customer (B2C). The marketing accessibility of financial institutions is extended and increased to remote areas or countries via the new telecommunications technology. Hence, the role of ICT investments becomes more important in the banking industry. This trend is also called e-banking.

The impacts of ICT in banking are categorized into three categories, namely: globalization, deregulation, and consolidation (Nieto, 2001) as cited by (D'Costa, 2006).

First, commercial banks can outreach remote clients via electronic communications devices to the extent that foreign customers are able to process transactions across national borders. Thus, the banking markets are marching toward globalization. Second, accompanying globalization, deregulation in the banking industry prevails in many countries in order to improve the competitive strength of the financial industry of a nation. Third, new technologies also enlarge

the capacities of financial institutions and thus improve their cost efficiency. Therefore, more and more commercial banks have merged together to attain a higher level of efficiency than before.

These issues on e-banking are international. Since the consolidation of financial institutions may take place across countries with different regulatory rules, the international supervision on the banking regulation is urgent. In other words, proper international banking regulations must be set up in order to satisfy the needs of the international e-banking. Via the efforts of international regulations such as the Basel Accord, (1) customers can be securely protected, transactions can be smoothly processed, and operations are tightly monitored by the supervisory bodies who join this Accord. The Basel Accord requires commercial banks in member countries to maintain adequate capitals and disclose related information to the public. Consequently, commercial banks become more transparent across countries and thus, more efficient than ever before (Fasan, 2008).

2.3.1.1 ICT Infrastructure

Internet Access

An important indicator of the general uptake of ICT in the Banking Industry (BI) relates to the use and availability of Internet. Internet access is a precondition for e-Business, as this is the main channel for e.g. e-banking. The general availability of Internet allows for the analysis of overall ICT-readiness in the BI (Fasan, 2008). However, the different broadband connections used to access the internet are not only used as the basis for advanced e-business applications, but also to support internal and external collaboration and to provide customer services over the Internet (European Commission, DG Enterprise and Industry, 2008).

Use of Internal Networks

According to (Shuangtian, 2008), the application of networks is a vital part of an effective ICT-enabled system, which is especially true in the case of banks with a branch network. Local Area Network (LAN) may also be seen as a basic indicator of the minimum infrastructure required to enable companies to conduct e-banking at a substantial level.

In his view, (Fasan, 2008) asserts that Wireless LAN is a relatively new technology in the BI, and one of its uses is to permit bank employees to access network resources from nearly any

convenient location. Relatedly, the fact that LAN is a relatively low-tech and easily attainable ICT solution, would to some extent explain the wide coverage of this technology. The BI is often compared to the telecommunications sector in terms of ICT uptake, which makes this difference in uptake of W-LAN interesting. However, the reason for the lower uptake of wireless LAN in the BI may be related to data security concerns (Ackerman, 2008). Indeed, security is an important topic in the BI, as the continuing digitalization of information means that bank processes are increasingly becoming dependent on reliable ICT operations. The application of wireless LAN may hence be limited by concerns about the secure application of this technology.

Whereas, Hannan, Rahman, & Uddin, (2007) define intranet as a private network that uses internet protocols and network connectivity to securely share part of a banks' information or operations with its employees, (D'Costa, 2006) views extranet as a system by which banks can provide Internet/Intranet access to customers and suppliers. Indeed, intranets are among other things used by banks to facilitate collaboration across functions or to advance productivity and efficiency by supporting business operations and decisions across the inter-networked enterprise. Extranets on the other hand are not as commonly used as Intranets, instead, they are considered as a safer way of conducting e-banking services compared to communicating over the Internet, as it is a closed data network between a bank and its customers (D'Costa, 2006).

Substitution of Postal Mail

The BI is currently being renewed in many areas. One of these areas relate to the digitalization of formerly paper-based processes. Electronic mail is increasingly being applied for especially non-legal correspondence like account statements, marketing and sales (European Commission, DG Enterprise and Industry, 2008).

ICT Security Measures

IT Fraud is a major problem of the banking industry especially where plastic cards are concerned. The increased IT knowledge of the general public and proliferation of cheap computer technology mean that weaknesses in card payment systems are exploited fraudulently. Millions of pounds are lost to plastic card fraud every year. This is simply because the cards are not secure enough.

As a result of the increased ICT integration in the global financial industry, increased misuse of the BI has been observed in recent years. These include the use of banking services for activities

like financing of terrorist activities, drug trafficking and money laundering. In countries where a comprehensive legislative system and well defined enforcement mechanism do not exist, credit institutions and banks are exposed to reputational, operational, and legal risks. Risks include having to pay possible investigation or penalty charges, decline in stock value, assets seizures, or temporary termination of banking services. Handling this issue requires a coordinated effort of the banking institutions, regulators and law enforcement agencies. Investigation or penalty charges, decline in stock value, assets seizures, or temporary termination of banking services. Handling this issue requires a coordinated effort of the banking institutions, regulators and law enforcement agencies.

The security issue is of special concern in the BI, as banking is highly based on trust from its customers. Hence, the risk of hackers, denial of service attacks, technological failures, breach of privacy of customer information, and opportunities for fraud created by the anonymity of the parties to electronic transactions all have to be managed (Hannan, Rahman, & Uddin, 2007). In a related insight, (D'Costa, 2006) asserts that depending upon its nature and scope, a breach in security can seriously damage public confidence in the stability of a financial institution or of a nation's entire banking system. Therefore, by introducing the appropriate security measures and putting security concerns at ease, the BI might be able to attract the segments among consumers who previously were not inclined to use e-banking. In the researcher's view, it is in the banks' own interest to improve security, as digital fraud can be costly both in financial losses, and in terms of the damage it does to the brand of the bank in question.

Authentication

The common concern among users of e-banking is related to the authentication of users and data connections. The results of the study conducted by (European Commission, DG Enterprise and Industry, 2008) indicate that 36% of European banks use digital signatures, compared to 28% of the companies in the insurance industry. The use of digital signatures is interestingly enough not as widespread as the application of PIN codes (68%) or encryption (61%) (European Commission, DG Enterprise and Industry, 2008, p. 46). The use of digital signatures is however increasingly being introduced, especially in the countries where national standards have been developed and implemented as a result of government-sponsored digital signature projects (Nsouli & Schaechter, 2002).



2.3.1.2 ICT in Exchanges with Customers

E-Marketing and Sales

E-marketing involves moving elements of marketing strategies and activities to a digitalized environment such as the bank's homepage (Shuangtian, 2008). Marketing has in this sense moved on to the Internet, and has become an important strategic tool for creating, distributing, and promoting goods and services to the consumers over the Internet or through other digital tools. E-Marketing is often performed through websites, which makes the availability of websites and usage of these in relation to marketing a good indicator of the extent to which a bank is using e-marketing (Jordan & Katz, 2000). Indeed, effective e-Marketing might be very helpful for the small and medium-sized banks with limited resources available for advertisement. In support of this, (European Commission, DG Enterprise and Industry, 2008) realised that in Europe, small banks with a working website in a given period experienced improved financial performance compared to small banks that had not yet launched their websites.

e-Business and e-banking security

Although e-banking is considered an inexpensive way to reach clients, its accessibility is hindered by a number of factors including poor Internet penetration, lack of e-banking awareness and customer inflexibility to new technology (Sohail and Shanmugham, 2002) as cited by European Commission, DG Enterprise and Industry, (2008).

- E-banking: "is an umbrella term for the process by which a customer may perform banking transactions electronically without visiting a brick-and-mortar institution." European Commission, DG Enterprise and Industry, 2008).
- E-banking is also the use of electronic means to deliver banking services, mainly through the Internet. The term is also used to refer to ATMs, telephone banking, use of plastic money, mobile phone banking and electronic funds transfers.

Customer data protection is an important aspect when discussing the increased use of ICT in the BI. According to a recent study by Deutsche Bank Research as cited by European Commission, DG Enterprise and Industry, 2008), realized that there are still a relatively large amount of offline bank customers (customers that have not yet used e-banking) that refrain from using online banking services as they do not perceive online banking to be safe. The study claims that

“The positive trend of online-banking adoption glosses over clients’ underlying security concerns”. It should be highlighted that online banking users in general are confident of online security while offline customers doubt the safety of online banking. This means that offline customers’ resistance towards e-banking is not based on bad experiences, but rather on a general perception that e-banking is risky. This further indicates that the insecurity perceived by offline customers presents a real barrier to the expansion of online banking. This reluctance by especially offline customers has been felt by the Swedish supermarket bank ICA Banken, which is primarily an online bank. Despite competitive interest rates the bank had difficulties attracting customers. These differences were partly attributed to the online concept, as the customers preferred the larger, “safer”, Swedish banks which offered both online and offline services.

Interaction with the Public Sector

Another important element of ICT uptake in the BI is the banks’ interaction with public authorities via the internet. There is no significant difference between size bands, but it is evident that banks are slightly more likely to contact public authorities via the Internet compared to the insurance industry as argued by (Fasan, 2008). The simpler online interactions like information gathering are more frequent than the more advanced interactions like e-tendering or e-filing, which is rather normal in almost any industry. The low share of banks engaging in e-tendering could however be explained by the mere fact that banks seldom engage in public tenders for financial services (Shuangtian, 2008).

According to (Srivastava, 1999) banks have made extensive use of ICT for many years. The introduction of ICT has had a dramatic effect on the banking industry and employment patterns within it. Some of the ICT related services in banks comprise of:

- Bankers' Automated Clearing Services (BACS)
- Automated Teller Machines (ATM)
- Electronic Funds Transfer at Point of Sale (EFTPOS)
- Electronic Funds Transfer (EFT)
- Smart Cards
- Internet banking

The first applications of ICT within banking were the use of mainframes, and later minicomputers, to process data such as customer accounts, bank inventories, personnel records, and accounting packages (Srivastava, 1999, p. 2).

❖ **The Bankers Automated Clearing Services (BACS)**

BACS have used computers to carry out most financial transactions between banks. These include: clearing cheques; paying in salaries; and payment of standing orders or direct debits

The BACS does its processing by batch processing, in which all transactions from the previous day are processed at one time. The processed data is passed between banks on magnetic tapes. Logs are kept off all the transactions. Banks were among the first organisations to use mainframe computers. Many of these are still at work today, as they are very good at this routine number-crunching. It still takes up to a week for a cheque to clear (Sudhindra, 2005).

❖ **Automatic Teller Machines (ATM)**

Stamoulis, (2000) argues that the next stage was the offering of direct customer services with the invention of the ATM (Automatic Teller Machine). Automatic teller machines are familiar to most bank customers. They insert a card in the wall, type in a PIN number and, withdraw or deposit there money.

They are connected to the bank via telephone lines and pass the details of each transaction to a transaction file. This is updated at the end of the day to debit the customers' bank accounts with the appropriate sums of money. The ATM allows the customer to: get cash out, find out the balance in their account, change their Personal Identification Number (PIN), and request a statement.

Advantages of the ATM:

For the customer,

- It is more anonymous.
- It provides a 24-hour a day service, seven days a week; ideal for customers who work irregular hours.
- It causes fewer queues since the transactions are quicker.

For the bank:

- It frees up staff from performing routine transactions so that more profitable sales-orientated work can be done.
- It reduces the number of staff, since the computer does the work.
- It provides a continuous service outside normal hours.
- It prevents customers withdrawing money that is not in the account.

How the ATM works:

- ATM's are linked by a **wide-area network** and can communicate **encrypted** data.
- The customer inserts their plastic card into the ATM.
- The ATM reads the data held in the magnetic strip or chip on the card.
- The customer **verifies** their identity by entering a **PIN** (*Personal Identification Number*) of four or more digits.
- Upon successful entry of the PIN, the customer keys in the amount of cash to be withdrawn.
- The cash is then counted and issued from the machine.
- An instruction is then sent to the customers bank account and the amount is deducted from their account via **EFT** (*Electronic Funds Transfer*).

ATM Security:

- If the **PIN** is entered incorrectly several times in a row then the ATMs will attempt to retain the card to prevent an unauthorised user from discovering it by guesswork.
- Because the data transferred between the ATM and the bank computers is **encrypted**, there is little risk of it being intercepted.

However, most fraud involves a criminal getting hold of the PIN number in some way and copying the information held on the magnetic strip onto a fake card.

The renewal of automated teller machines

When it comes to the renewal of ATMs, there are several technologies in the pipeline that have not yet reached worldwide acceptance, but are expected to influence the development of ATMs in the near future. Examples include biometrics found in Asia, where authorisation of transactions is based on the scanning of a customer's fingerprint, iris or face; Cheque/Cash Acceptance, where the ATM accepts and recognize cheques and/or currency without using

envelopes; Bar code scanning; On-demand printing of "items of value" (such as movie tickets, Travellers Cheques); Dispensing additional media (such as phone cards); Co-ordination of ATMs with mobile phones; Customer-specific advertising; and Integration with non-banking equipment(European Commission, DG Enterprise and Industry, 2008, p. 46).

These upcoming technologies force the banks to invest in renewal of the ATMs to align with customer expectations and to decrease the reliance of customers on bank branches for standard banking interactions such as account balancing and cash withdrawal/payment.

Electronic Funds Transfer at the Point Of Sale (EFTPOS)

The next step in direct customer services was the payment for goods or services by debit and credit cards through the EFTPOS (*Electronic Funds Transfer at the Point Of Sale*) system.

How the EFTPOS system works:

- The amount due is entered by the retailer into the EFTPOS terminal (basically a computerized till).
- The customer checks the amount due then:

The magnetic strip on the customer's card is swiped through a card reader so their account details can be read.

- The customer signs a receipt to prove their identity.
- or (*using the Chip and PIN system*):
 - A ROM chip on customer's smartcard is read by a chip reader so the account details can be read.
 - The customer enters their PIN using the keypad (*this can have a cable or wireless link to the EFTPOS terminal*)
- The EFTPOS terminal then contacts the computer network of the bank or credit card company (*usually over a phone line*) to verify the PIN and authorize the transaction.
- The funds are transferred from the customer's bank or credit card account to the bank account of the retailer.

❖ Smartcard technology

The latest step is the development of smartcard technology so that funds can be transferred at an ATM or an EFTPOS terminal from a customer's bank account directly onto the smartcard ROM

Chip (Hannan, Rahman, & Uddin, 2007). These funds can then be used to purchase goods and services from devices not directly connected via the EFTPOS system such as car parking ticket machines etc. The funds are deducted from the smartcard directly but transferred to the retailer's bank account at a later date.

These are cards which have a chip built in. These will soon contain not just the account details of the customer, but also: thumb print and iris pattern. These are unique to the card owner, and will make it much harder for the fraudulent user (Fasan, 2008).

❖ Internet Banking

Many customers now use the internet for their banking. They can access their account to get a balance; pay bills; transfer funds; and manage the account. Paying in money is not so easy; cash cannot be stuffed down a phone line. The internet is a playground for hackers and fraudsters. Security on such accounts has to be rigorous (Fasan, 2008).

2.4 Benefits and Barriers of ICT Adoption in Banking Industry

2.4.1 Benefits of ICT Adoption in Banking Industry

The BI is essentially an information intense industry, and the management in banks may face more demanding times now than in other industries since innovations are regular occurrences in the information age. The study conducted by (European Commission, DG Enterprise and Industry, 2008) shows that European banks, large or small, niche or traditional, have increased their focus on ICT-oriented product and service development in recent years. For instance, the Finnish bank Tapiola Bank, which is primarily an Internet bank, was established as a direct result of the increasing use of ICT among its parent bank's customers. The Internet-only bank Egg was as well acquired by Citibank due to its ICT-skills which could give Citibank a comparative advantage (European Commission, DG Enterprise and Industry, 2008). In a related insight, (Bagchi & Udo, 2007) argue that if large ICT investments are happening on a regular basis, banks must develop a more focused investment-strategy to secure a competitive advantage from their ICT-enabled products and/or processes. This can imply a greater wave of mergers and acquisitions, or a closer cooperation between ICT service companies and banks. If the number of mergers and acquisition increase in the BI, ICT can in this connection actually enable these to be smoother.

In his view, (Fasan, 2008) contends that banks have created new sources of income by offering more sophisticated products and services which would not have been possible without the use of ICT. In general, there exists a strong normative pressure in the BI for banks to remain up-to-date with ICT developments. The benefits, however, also provide strong incentives for banks to keep up with developments as the expenditures in terms of ICT tend to reap long-term savings.

Jordan & Katz, (2000) agree with (Fasan, 2008) that ICT-enabled developments may impact the banks in a variety of ways including savings in personnel and time from automated processes, reduced costs from streamlined and automated process flows, reduced costs from fewer errors, and identification and utilization of economies of scale from lower unit processing costs.

Conceptually, (D'Costa, 2006) asserts that the implementation of ICT allows banks to achieve four main objectives. First of all, banks can expect to reduce costs, especially in the area of labour expenditures. Indeed, there is a shift from labour intensive to capital intensive investments. This is supported by the results of the study conducted by (European Commission, DG Enterprise and Industry, 2008) which indicate that productivity growth in most European countries could be related to a decrease in the number of employees in the BI as well as decreasing working hours per employee. Hence, ICT capital investments are largely substituting labour, particularly in retail banking, which is done by standardizing ordinary financial services and having customers perform basic financial services online, thus rendering the tellers superfluous.

It is also expected in the coming years that the standardization and harmonization will continue, thus contributing to decreasing employment and increased investments in ICT.

Another interesting aspect from the study is that high skilled financial analysts face increasing employment opportunities, which indicates that while the basic financial services are increasingly standardized and performed online by the customers, there is an increased demand for more complicated financial services which can bring value-added to the bank along with the ICT-investments (European Commission, DG Enterprise and Industry, 2008).

Secondly, (Bagchi & Udo, 2007, p. 6) observes that ICT allows for tailor-made services with high added value, such as e-banking combined with the option of face-to-face advisory meetings to a level that satisfies the customers. Third, it allows banks to meet customers' needs faster and

leads to a better flow of information and communication. Lastly, ICT enlarges the portfolio of financial products and services that can be offered, which again can lead to higher customer satisfaction (Shuangtian, 2008).

2.4.2 Barriers to ICT Development in Banking Industry

Regarding barriers to ICT adoption and the impact of ICT and e-business on financial institutions, the reluctance of customers to buy online and the low propensity of financial products to be traded electronically were found to be the most important obstacles to electronic commerce. Customers' reluctance to buy online and their mistrust in online banking is still a challenge, although it can be seen that once the customers start using e banking, their perception of security changes significantly. As mentioned in the previous section, clients need to take reasonable safety measures themselves in overcoming this barrier, as the security measures in banks are already at a high level. Thus, in general, the results of the previous e-banking study suggested that the Internet (and new ICT in general) was a complementary channel to traditional brick-and-mortar banking, but that it was not the predominant channel with respect to banking activities.

The introduction of ICT to increase efficiency may also encounter certain barriers agreed by (Beekhuyzen, Hellens, & Siedle, 2005) together with (Ackerman, 2008). The first barrier as mentioned by (Ackerman, 2008) is that ICT implementation and exploitation often requires substantial investments. This can especially be burdensome for smaller banks which do not have the financial opportunity to invest as heavily as larger banks. ICT is in many banks increasingly replacing personnel as the largest expenditure. The explanation to this is twofold: according to (Sudhindra, 2005) old systems are increasingly outdated, as over 80% of ICT expenditure goes into maintenance of these systems. This means that new investment is required, and these are challenging projects. The second explanation is that traditional brick and mortar banks are increasingly investing in ICT in order to gain or maintain a competitive advantage (Beekhuyzen, Hellens, & Siedle, 2005). In Europe, (European Commission, DG Enterprise and Industry, 2008) observes that the banking industry is very prudent regarding new investments. This may partly reflect caution due to overinvestment in the past), or that there are not enough incentives – such as competition.

Another barrier to implementing of ICT for efficiency gains is the common fear among employees that, ICT is primarily introduced to save personnel cost and to limit errors (Ackerman, 2008, p. 15). The impact of internal resistance against innovation is especially strong for lower qualified employees, such as tellers in the case of the BI. The fear may be justified, as the human factor is increasingly being removed and the future role of the teller in a modern bank is questionable. In addition, (Sudhindra, 2005) notes that e-banking increases banks' dependence on ICT, thereby increasing the technical complexity of many operational and security issues and furthering a trend towards partnerships, alliances and outsourcing arrangements with third parties. On the positive side, (Shuangtian, 2008) contends that ICT-capital contribute positively to overall output growth. This means that banks can expect to reap productivity growth by investing in ICT, which could very well exceed the costs associated with the investment.

While, (Sudhindra, 2005) draws attention to the positive effects of ICT, (Nsouli & Schaechter, 2002) observes that the implications for large and small banks are not the same. Due to the capital intensive nature of ICT investments, large banks may be better equipped for in-house ICT developments, while small banks may be better off with outsourcing or buying off-the shelf. Large banks may be able to use information technology to better personalize their high-volume retail products. Moreover, highly detailed information from consumer databases may allow large banks to better target customer segments and create an illusion of personalised service that softens their one-size-fits-all commodity driven strategy. Large banks can also invest in broad networks of ATMs and Internet banking kiosks to offer greater location convenience for their customers.

Small banks interested in reaping the efficiency benefits from ICT may, however, find the acquisition and maintenance costs too high. However, after interest expenses (which is largely a variable cost), labour is the biggest expense item for small banks (and is more likely to be a fixed cost). Many information technology applications – like ATMs and online banking – substitute for expensive labour inputs and have proven to be economically efficient at relatively small scale. The trick for small banks is to implement innovations like these without reducing the quality of the bank-customer personal relationships. Small banks may consider outsourcing or pooling ICT-development due to the high acquisition and maintenance costs along with the need for highly skilled labour.

Customer data protection is another important aspect when discussing barriers to ICT development in the BI. (Nsouli & Schaechter, 2002) realizes that there are still a relatively large amount of offline bank customers (customers that have not yet used e-banking) that refrain from using online banking services as they do not perceive online banking to be safe. However, it is highlighted by (Shuangtian, 2008) that online banking users in general are confident of online security while offline customers doubt the safety of online banking. This means that offline customers' resistance towards e-banking is not based on bad experiences, but rather on a general perception that e-banking is risky. This reluctance by especially offline customers has been felt by the Swedish supermarket bank ICA Banken, which is primarily an online bank as observed by (European Commission, DG Enterprise and Industry, 2008). Despite competitive interest rates as the report says, the bank had difficulties attracting customers. These differences were partly attributed to the online concept, as the customers preferred the larger and safer,

The growing importance of banking technology

Technology is revolutionizing the banking industry just as it is revolutionizing many other aspects of our lives. The effect on banks is multi-faceted and, inevitably, presents both threats and opportunities. Key aspects of way technology is changing banking include:

Greater and cheaper access to customers: The internet, but also phone banking and ATM services, enable banks to interact with customers outside the confines of a branch network. For example, the Dutch bank ING is trying to expand its retail business in France through its ING Direct internet service, rather than by setting up an expensive chain of physical branches (European Commission, DG Enterprise and Industry, 2008, p. 46). As a result of new technology, it is easier for new entrants to establish themselves than before.

2.5 Impacts of ICT Development on Banking Industry

The increased uptake of ICT in the BI has brought great changes to the banking system by making it easier to integrate banking systems. Examples include an increasing concentration of banks and organisational changes within the banks. Product and process innovation, a redefinition of strategy and a revision of organisation patterns are among the main issues that credit institutions had been dealing with in the previous years as argued by (D'Costa, 2006). Strategic alliances and co-operation agreements between banks on the production side

(development of common standards, sharing of development costs, processing of payments) and on the distribution side (compatible ATMs) had taken place.

According to (Nsouli & Schaechter, 2008, p. 6) electronic banking has been around for some time in the form of automatic teller machines and telephone transactions. More recently, it has been transformed by the Internet, a new delivery channel for banking services that benefits both customers and banks. Access is fast, convenient, and available around the clock, whatever the customer's location and banks can provide services more efficiently and at substantially lower costs. (D'Costa, 2006) observes that to date, most banks in United States of America and Europe have combined the new electronic delivery channels with traditional brick and mortar branches ("brick and click" banks), but a small number have emerged that offer their products and services predominantly, or only, through electronic distribution channels. These "virtual" or Internet-only banks do not have a branch network but might have a physical presence, for example, an administrative office or non branch facilities like kiosks or automatic teller machines.

Economic literature suggests that the ongoing diffusion of ICT and services among firms in the economy at large is a striking example of the possible dynamics of technological change and economic development (Breshnahan and Trajtenberg, 1995, as cited by (Milligan, 2004). The adoption and diffusion of new technologies can be spurred by many different drivers and can have far-reaching consequences. Virtually all economic spheres can be affected by technologically induced changes, including innovation dynamics, productivity and growth, the development of market structures, firm performance, and the composition of the demand for labour (D'Costa, 2006).

As a conceptual framework for the analysis of the interplay between these characteristics, ICT diffusion and innovation, an extended Structure – Conduct – Performance (SCP) paradigm is adopted. Developed by Mason (1939) and Bain (1951) as cited by (European Commission, DG Enterprise and Industry, 2008, p. 74), the paradigm states that firm and industry performance is determined by the conduct of buyers and sellers, which is a function of the market structure.



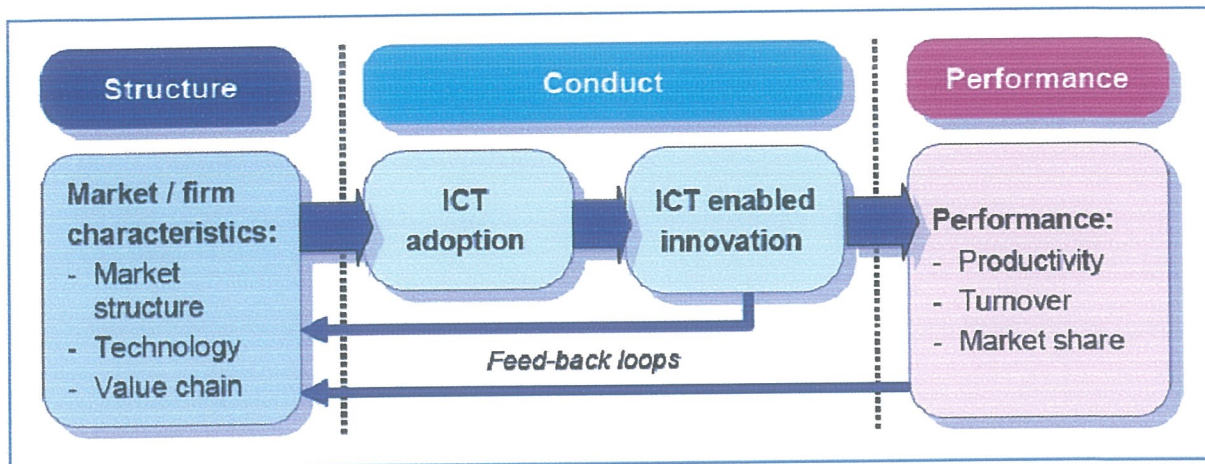


Figure2. 2: Conceptual framework for the analysis of drivers and impact of ICT adoption

Source: Mason (1939) and Bain (1951) as cited by (European Commission, DG Enterprise and Industry, 2008, p. 74)

The term structure is used here meaning “industry structure” which includes but goes beyond market structure characteristics of the original concept (European Commission, DG Enterprise and Industry, 2008). The primary features of an industry’s structure are related to market structure in the conventional sense: the number and size of supplying firms as well as the number and preferences of customers and their size in case of businesses. An important aspect of market structure dynamics is the level of ease of market entry. Further industry structure characteristics are related to products, production and production factors: the degree of product differentiation, the degree of vertical integration of production, such as value chain characteristic, the technologies available to the firms, the firms’ cost structure (such as the relative importance of costs for items such as production facilities, energy, personnel), and finally the workforce composition and the demand for labour, most importantly with regard to knowledge and skills. All these characteristics determine the level of competition in the industry.

These industry structure components influence a firm’s conduct. The conduct aspects most important here are production strategies, particularly with regard to inter-firm collaboration, as well as investments in ICT and in ICT-enabled innovation.

Finally, a firm’s performance is assumed to be the outcome of its conduct. Successful innovations improve firm performance by, for example, reducing production cost, increasing

productivity, improving product quality or enabling it to enter new markets. This may eventually lead to increased sales, turnover and market shares.

In contrast to the standard SCP paradigm, the flow of causality is in fact not one directional Fauchart and Keilbach, (2002) and Nepelski, (2003) as cited by (Ackerman, 2008). As an example of feedback between performance and industry structure, successful and innovative companies are more likely to grow and increase their market share at the expense of less progressive firms, which transforms the market structure (D'Costa, 2006). There may also be feedbacks between conduct and industry structure: For example, depending on the innovation type – such as product or process innovation, ICT-enabled or not –, innovations influence the choice of products manufactured and a firm's cost structure. Innovations may also change the incentives to perform activities in-house versus outsourcing them and, consequently, may influence the demand for labor and its composition. It may also further shape the relationships with suppliers and customers, for example with regard to collaboration intensity.

The extended SCP paradigm identifies market structure and firm characteristics that drive the diffusion of ICT and the process of turning ICT use into marketable products and production processes, it implies ICT-enabled innovations. Second, the paradigm seeks to identify the feedback effects of firms' innovative activity on these characteristics and firm performance.

2.5.1 Increased process efficiency, Productivity, and Innovation

In his view, (D'Costa, 2006) ascertains that investments in ICT result in increased efficiency caused by the digitalization of transactions previously carried out by tellers, making many routine jobs in the organisation redundant. Personnel are in most cases being retrained to perform more financially advanced tasks. Nevertheless, this could in the long run lead to reduced demand for banking personnel as the tellers are gradually becoming superfluous, thus leading to a decrease in the workforce in the BI. The increasing focus on ICT as a driver for efficiency has meant that more and more banks understand the importance of investments in ICT. ICT outsourcing is thus a way for smaller banks to take advantage of ICT-enabled process efficiency gains (Jih, Wong, & Chang, 2005).

In the study conducted by (European Commission, DG Enterprise and Industry, 2008) realised that the introduction of ICT in the European BI has had a significant impact on banks operating

with physical branches. A new distribution channel, the Internet, and mobile terminals along with ATM and payment card networks, have made it possible to reduce the amount of bank branches and achieve savings in operating costs. Likewise, (D'Costa, 2006) ascertains that ICT has productivity increasing effects in both the user sectors and in the ICT producing sectors. In particular, ICT was found to have positive effects on labour productivity and total factor productivity (Pilat, 2005) as cited by (European Commission, DG Enterprise and Industry, 2008). However, ICT-induced productivity effects vary significantly between sectors and among countries.

In a comparative standing point, (Fasan, 2008) asserts that studies of the impact of ICT on firm-level productivity have shown that ICT investment does not lead to productivity growth at firm-level by itself. It depends on how the technology is actually used in business processes, it means on a company's ability to innovate its work processes and business routines with support of ICT. Thus, only if ICT investment is combined with complementary investment in working practices, human capital, and firm restructuring will it have an impact on performance. These complementary investments and organizational changes are highly sector and firm specific; therefore, returns to ICT investments vary strongly across organisations.

Another important factor that may influence on the extent to which ICT enables productivity growth is the accompaniment between ICT capital and skills. A large body of literature on the "skill-bias" of innovation supports the finding that technical change is biased towards skilled workers, reducing demand for unskilled labour, while increasing wage inequality and polarization (Ackerman, 2008). Indeed, the key drivers to industry growth come from ICT-capital investments plus labour quality changes.

A technological change such as the massive diffusion of ICT represents an interesting case for an analysis with respect to firms' innovation strategies. For example, it is said that industry leaders often reject important inventions and fail to bring them to the market (Arend, 1999, Christensen, 1997) as cited by (European Commission, DG Enterprise and Industry, 2008, p. 95). Entrepreneurial companies are more likely to exploit these opportunities. Entrants frequently introduce products or production processes based on a new technology, which can challenge incumbents or even drive them out of the market. Innovations enabled by ICT change the cost structure of companies. Hence, these innovations thereby have a significant impact on the market

structure in which these companies operate. One of the effects presented in economic literature is an increased rate of asset reallocation. Furthermore, during times of technological change, mergers reflect the process of assets reallocation toward more efficient firms. Technological change forces firms to adopt new modes of production and, consequently, to reorganize its assets. If a company fails to reorganize internally, it will probably disappear from the industry and its assets will be reorganized externally. New technology spreads faster if such asset reallocation works smoothly

2.5.2 Competition

As there is no single internet only bank exist in this world, the current rivalry among the competitor or banks in the banking industry should be considered. Banking institutions are countering their competitors by leveraging E-Commerce technologies and various service offerings online (Morath, 2000) as cited by (Hannan, Rahman, & Uddin, 2007). This is a major shift from the early days of Electronic Funds Transfer (EFT), when large organisations introduced electronic banking to simplify the management of their salary and payroll problems. (Stamoulis, 2000) observes that the internet is increasingly considered as a strategic weapon by banks, which are leveraging it as a distribution channel to offer complex products at the same quality they can provide from their physical branches, at a lower cost, to more potential customers, without boundaries. E-Banking is used to augment their current value chain, offering new product and compete for the customers.

At present, the entry barriers to internet banking appear to be much higher for new entrants than was the case during the early days of this type of banking. The barriers stem from customer attitudes and the very nature of banking services and products. The traditional banks with a strong customer base have a competitive advantage over newcomers. However, Li (1997) as cited by (Hannan, Rahman, & Uddin, 2007) argue that one of the critical factors is that barriers to entry no longer exists in banking. Foster et al (1999) as cited by (Hannan, Rahman, & Uddin, 2007) have also observed that competitors can come from any industry to “disintermediate” banks (i.e., eliminate banks as the interface between customers and suppliers). Product differentiation is very difficult for banks, since most of the products sold in retail banking are constrained by legal or industry regulations and, in any case, are readily imitated. Many countries have de-regulated their banking sector (D’Costa, 2006) so government policies no

longer form an entry barrier to banks' competitors. Technological know-how in banking also provides low protection to existing banks. Indeed, the only significant entry barrier is likely to be the brand name of the service providers in retail banking.

On the other hand, Mishra (2001) as cited by (Hannan, Rahman, & Uddin, 2007) has noted, that the ICT has leveled the playing field: the bargaining power of consumers is increasing, switching costs are becoming lower (with Internet banking gaining momentum), and consumer loyalties are harder to retain. Some specific factors that have conspired to create the new competitive environment for banking include: changing consumer needs and perceptions, globalisation, technological innovations, and competition from non-banking entities (Shuangtian, 2008). Though many banks offered home banking services from a PC during the 1980s and 1990s, the concept was initially a failure due to the lack of a critical mass of PCs and computer literate customers, as well as to the somewhat limited user interfaces initially available (Sudhindra, 2005). Home banking, however, is gaining in popularity with increasingly literate consumers, a wider installed PC base and more generic features together with the user-friendly interface the Web enables (Shuangtian, 2008).

The threat of substitutes to banking in terms of competition from the non-banking, financial, and micro credit sector is increasing rapidly. Using E-Business methods, major retailers and telecom providers are starting to offer financial services to their clients (Agboola, 2007). Increasingly, consumers expect online services from their financial institutions. The trend toward electronic delivery of products and services is particularly important to the financial services industry, where the shift is partly a result of consumer demand, but is also partly a result of the ruthlessly competitive environment. The analysis of the current state of E-Banking as mentioned by (European Commission, DG Enterprise and Industry, 2008) reveals that the field is getting fierce day by day. Every member of this industry is participating to some extent in E-Banking. Substitute products by non-banking sectors, disintermediary issues, brand preference, increased buyer bargaining power, change of preference made the competitive environment unfavorable for the new entrants. However, to survive existing banking sectors, banks must embrace E-Banking.

2.5.3 ICT as a Means for Competitive Advantage

By utilizing ICT successfully, it is possible to offer standard banking services at low cost, with a minimum of fixed costs. However, dual-combination banking, where a bank both offers online

banking and more advanced financial advice in branches, is an increasing trend in the BI (Ackerman, 2008). (D'Costa, 2006) notes that due to economies of scale and the increased number of transactions, the business customers is now able to benefit from lower cost of finance, increased convenience, time saving and operational efficiency. However, to gain full benefits the customer enterprises are required to invest in ICT solutions that are able to communicate electronically with the ICT systems of the bank enabled cross-border credit transfers. The flip side of this technological boom is that electronic banking is not only susceptible to, but may exacerbate, some of the same risks (particularly governance, legal, operational, and reputational) inherent in traditional banking and it poses new challenges.

2.5.4 Challenges

On the other hand, (Fasan, 2008) together with (D'Costa, 2006) observe that the changing financial landscape brings with it new challenges for bank management and regulatory and supervisory authorities. The major ones stem from increased cross-border transactions resulting from drastically lower transaction costs and the greater ease of banking activities, and from the reliance on technology to provide banking services with the necessary security. Because the Internet allows services to be provided from anywhere in the world, there is a danger that banks will try to avoid regulation and supervision.

According to (Speller, 2008, p. 6) electronic banking carries heightened legal risks for banks. Indeed, banks can potentially expand the geographical scope of their services faster through electronic banking than through traditional banks. In some cases, however, they might not be fully versed in a jurisdiction's local laws and regulations before they begin to offer services there, either with a license or without a license if one is not required. When a license is not required, a virtual bank—lacking contact with its host country supervisor—may find it even more difficult to stay abreast of regulatory changes (Jih, Wong, & Chang, 2005). As a consequence, virtual banks could unknowingly violate customer protection laws, including on data collection and privacy, and regulations on soliciting. In doing so, they expose themselves to losses through lawsuits or crimes that are not prosecuted because of jurisdictional disputes.

Additionally, money laundering is an age-old criminal activity that has been greatly facilitated by electronic banking because of the anonymity it affords. Once a customer opens an account, it is impossible for banks to identify whether the nominal account holder is conducting a transaction

or even where the transaction is taking place. To combat money laundering, (Hannan, Rahman, & Uddin, 2007) argues that many countries have issued specific guidelines on identifying customers. They typically comprise recommendations for verifying an individual's identity and address before a customer account is opened and for monitoring online transactions, which requires great vigilance.

Whereas (Stamoulis, 2000) observed that banks initially promoted their core capabilities, such as products, channels and advice, through the Internet, Yerkes (1998) as cited by (Hannan, Rahman, & Uddin, 2007) argues that, due to the relative newness of this rapidly growing industry, banks as well as consumers had serious concerns about the security of Internet access to client accounts, which was the biggest challenge. In support to this, (Jordan & Katz, 2000) ascertain that the reliance on new technology to provide services makes security and system availability the central operational risk of electronic banking. Since, security threats can come from inside or outside the system, banking regulators and supervisors must ensure that banks have appropriate practices in place to guarantee the confidentiality of data, as well as the integrity of the system and the data. Indeed, banks' security practices should be regularly tested and reviewed by outside experts to analyze network vulnerabilities and recovery preparedness. Capacity planning to address increasing transaction volumes and new technological developments should take account of the budgetary impact of new investments, the ability to attract staff with the necessary expertise, and potential dependence on external service providers. Managing heightened operational risks needs to become an integral part of banks' overall management of risk, and supervisors need to include operational risks in their safety and soundness evaluations.

Breaches of security and disruptions to the system's availability can also damage a bank's reputation as observed by (Agboola, 2007). The more a bank relies on electronic delivery channels, the greater the potential for reputational risks. If one electronic bank encounters problems that cause customers to lose confidence in electronic delivery channels as a whole or to view bank failures as system wide supervisory deficiencies, these problems can potentially affect other providers of electronic banking services. Reputational risks also stem from customer misuse of security precautions or ignorance about the need for such precautions. Security risks can be amplified and may result in a loss of confidence in electronic delivery channels.

According to the "E-Commerce beyond 2000" as cited by (Hannan, Rahman, & Uddin, 2007), the banking and finance sector has been a rapid adopter of E-Commerce because its products

could easily be virtualized and the product had priority over place (NOIE, 2000). Yerkes (1998) observes that banks can generate revenue through increased account access fees, and benefit from promotional opportunity to cross-sell products such as credit cards and loans.

Consumers are increasingly looking for services they can access from a single entry point. As Denny (2000) realises that awareness of competition has motivated banks to move aggressively in seeking alliances and establishing joint ventures to maintain their claim to this part of the E-commerce infrastructure. Like there are alliances in the ATM network, Group Network, Money Transfer Network etc. This is also creating segmentation of networks where the customers of this networks sometimes unable access to others' network. Consumer behavior in banking changed partly as a result of changes in the amount of spare time available to individuals. Mobility, independence of time and place, and flexibility has become key words in consumer banking. Fasan, (2008) supports this view, highlighting the key features of the internet – such as hour availability, almost immediate access, and the absence of physical borders. Indeed, the Internet has been one of the key drivers in promoting E-Commerce in the banking sector.

There are user-friendly opportunities for conducting business over the Internet with telephone companies, Energy Company, tax board and other institutions. Demand for those services influences also the usage rates of Internet banks. For example in 2002 in USA, 81867 private individuals submitted electronic tax declarations 79727 of them did it through Internet banks and 2140 through tax board's own home page, (20.3% of declarations were submitted electronically) (D'Costa, 2006). This is increasing the benefits of Internet banks for the consumers and is a win-win situation for the banks and service providers.

Regulatory barriers in many countries are on the wane. As the Internet gains momentum, governments are under pressure to reduce the barriers to competitive activity in the financial sector still further, to allow existing banks to remain competitive with their newer (Ackerman, 2008). It is evident that banks can obtain an advantage by exploiting their existing, E-Commerce-ready infrastructure, through leveraging it on the Internet, but this opportunity must be seen in the context of a highly competitive, rapidly-moving market-place in which new rivals are emerging from many different directions. Security measures that are inconvenient for users may weaken E-Banking prospect, for example because of lack of user acceptance or outright resistance. Speller, (2008) asserts that there is a distinction between theoretical and effective

security. Theoretical security concerns the level of security that is technically possible; whereas effective security concerns the level of security achieved in practice, and is typically lower than theoretical security. Indeed, user adoption of E-Banking is affected by perceived security. This supports a view of security as crucial to the overall usability of E-Banking systems.

The use of ICT, and especially of the Internet, was the other factor that drastically impacted the sector and reshaped the competitive scenario. The increasing use of ICT and e-business in the BI has not only increased competition among banks as well as competition from other actors in the financial markets; Internet banking has also shifted power from banks to their customers, by allowing customers to shop around for the best price for products. Also, branch restructuring (fewer tellers and more advisors), as well as the new business models such as dual banking are changes that have happened in the sector as a result of ICT.

CHAPTER THREE

METHODOLOGY

3.1 introduction

To successfully complete this project, there is a need to indicate in detail how the researcher intends to investigate the inception of ICT (Information Communication Technology) in Uganda Banking Industry. Therefore, this chapter is concerned with the research design and methods. It presents the process followed and the tools utilized to gather and analyze the information needed in the context of this study.

3.2 Research design

A research design provides the conceptual framework for the procedures used in collecting data; it specifies the methods and procedures for the collection, measurement, and analysis of data. As far as the objectives of this study are concerned, the research question, as well as the focus of each chapter dictates the choice of research design.

The main purpose of this study is to investigate the role of ICT in the development of banking industry in Uganda. Considering the purpose of this study and the research questions, this study can be categorized as a descriptive research. Therefore, to achieve the objectives of the study and answer research questions, a deductive approach was used. As far as research strategy is concerned, a survey was preferred.

3.3 Population of the Study

The population of the study consists of all commercial banks operating in Uganda as at the end of 2008. There are twenty two registered commercial banks. 20 Banks in operation were targeted, but 15 Banks participated out of all. The banks includes; Bank of Africa, Bank of Baroda, Barclays Bank, Cairo International Bank, Centenary Bank , Crane Bank, Diamond Trust Bank, DFCU Bank, Housing Finance Bank, National Bank of Commerce, Stanbic Bank, Standard Chartered Bank, Tropical Bank, KCB Bank, United Bank for Africa and Global Trust Bank

3.4 Sample Size

In every bank, the researcher targeted two people. These people were selected purposively, depending on their positions, accessibility and ability to provide needed information. Information Technology and marketing managers of most banks responded. This makes a total of forty respondents.

To prove that the population is representative, the researcher calculated the total response rate together with active response rate. Neumann (2000) as cited by (Saunders, Lewis, & Thornhill, 2007, p. 213) gives a formula of total response rate together with active response rate.

Equation2. 1: Total response rate

$$\text{Total response rate} = \frac{\text{Total number of responses}}{\text{Total number in sample} - \text{Ineligible}}$$

Equation2. 2: Active response rate

$$\text{Active response rate} = \frac{\text{Total number of responses}}{\text{Total number in sample} - (\text{ineligible} + \text{unreacheable})}$$

As far as this study is concerned, out of forty questionnaires which were distributed, only thirty were returned to the researcher. The researcher failed to reach six and there were no ineligible.

$$\text{Total response rate} = \frac{\text{Total number of responses}}{\text{Total number in sample} - \text{Ineligible}} = \frac{30}{40} \% = 75\%$$

$$\begin{aligned} \text{Active response rate} &= \frac{\text{Total number of responses}}{\text{Total number in sample} - (\text{ineligible} + \text{unreacheable})} \\ &= \frac{30}{40 - (6)} \% = 88\% \end{aligned}$$

With 75% total response rate, and 88% active response rate, the researcher is quite sure that the sample is representative. Therefore from the information provided by eighty respondents, an inference can be made to the total population.

3.5 Data collection Instruments and their Reliability

In other to achieve the desired objectives and answer research questions, both primary and secondary source of data were used.

To collect primary data, the researcher used semi-structure questionnaire and complete observers role, playing the complete participant role the researcher attempts to become a member of the group in which he is observing (Saunders, Lewis, & Thornhill, 2007, p. 290), (on this matter, the researcher firstly considered his own behavioral attitude towards using the ATM machine, hence, the researcher collected his data through experiential data collection. To make sure that the questionnaire measures what it intends to measure, the researcher pre-tested its content validity and reliability.

To test the content validity, the researcher used a group of three individuals to evaluate the questions in the questionnaire. These people were given the prepared questionnaire together with the objectives of the study and research questions. They were required to assess the validity of questions by ranking them from one to four against the objectives of the study, and the research questions, One(1) stood for not relevant, two(2) stood for some what relevant, three(3) stood for quite relevant and four(4) stood for very relevant. From there a Content Validity Ratio (CVR) and Content Validity Index (CVI) were calculated. This was calculated by subtracting the total number of items judged to be not relevant & some what relevant, from the total number of items judged to be quite & very relevant, the answer is further divided into the half of the people asked to judge the questionnaire.

$$CVR = \frac{n_{3,4} - n_{1,2}}{N/2}$$

Where $n_{3,4}$: Number of items or questions judged quite relevant and very relevant

$n_{1,2}$: Number of items judged not and some what relevant

N: Number of people asked to assess the questionnaire

As far as this study is concerned, there were one hundred and forty four (144) questions which were judged to be quite relevant and very relevant; and forty eight (48) questions were judged to be some what relevant and not relevant.

$$\text{By Substitution: } CVR = \frac{144-48}{3/2} = \frac{96}{1.5}$$

$$CVR = 64$$

Content Validity Index is calculated by dividing the total number of items judged to be quite and very relevant with obtained content validity Ratio (CVR).

Out of sixty four questions in the questionnaire, 50 questions were judged to be quite relevant and very relevant.

$$CVI = \frac{50}{64} = 0.78$$

$$CVI \cong 0.78$$

According to (Okurut and Aguli 2007) CVI should be greater than 0.5 ($CVI \geq 0.5$). A CVI of 0.78 this implies that the questionnaire is worth to be administered.

For the instrument to be reliable (Okurut and Aguli 2007), assert that the coefficient has to be at least 0.7 and more. In this study, six questionnaires were distributed for pilot test and there were sixty four items in the questionnaire. Data were entered into SPSS and it produced the following information result:

N. of cases = 60

N. of Items = 64

Alpha = 0.78

The Alpha coefficient of reliability resulted to 0.78, which is acceptable

To ensure the validity and reliability of secondary data, the researcher first gathered all necessary information. In doing so, the researcher took into consideration the methodology used in collecting data, how data were analyzed as well as conclusion thereby putting much consideration on documents having similarities and avoiding inconsistent documents. Even though it is difficult to assess the authority, validity and reliability of information from the internet, the researcher paid much attention on those documents having authors, and recognized source in order to obtain more information so as to ascertain reliability of information.

3.5 Data Processing and Analysis

Data collected were of quantitative nature, and they were analyzed quantitatively using SPSS. Answers for closed questions were coded in ascending order. The first answer of every question was given code “1” the second answer was coded “2” and so on. Missing data were coded “999”. As far as open-ended questions are concerned the researcher first edited all answers in order to identify similar answers and establish broad groupings. The researcher subdivided those broad groupings into specific subgroups then allocated codes to all categories.

Data were coded, they were entered into the computer using statistical package (SPSS). Individual labels were given to each variable while ensuring that labels replicate that exact words used in the data collection thereby reducing the number of opportunities for misinterpretation when analyzing data.

3.6 Ethical Consideration

To avoid harm to the participants in the study, the researcher considered the fact that individuals have right to participate or not. The researcher therefore took into consideration the following:

Gain the consent of the respondent. The researcher informed respondents before taking questionnaire to them and giving them time to fill the questionnaire at their convenient time without putting them on pressure.

Due to the high security consciousness of banking industry, the researcher ensured the participants that collected information will remain confidential and will be used only for academic purpose.

CHAPTER FOUR

PRESENTATION OF FINDINGS

4.1 introduction

This chapter presents the information gathered using a semi-structured questionnaire which was addressed to Uganda Commercial Banks. Twenty commercial banks were targeted and two people per banks were interviewed. In total thirty six questionnaires were distributed but only 30 were returned to the researcher, which implies that a total of 5 banks did not participate in the study, the 5 banks decline from giving information for security reasons, this however means that only 15 Banks out of total 20 registered commercial Banks participated in the study.

4.2 Current state-of-play of ICT uptake and usage in Uganda Banking Industry

This section presents the information related to objective one and it was gathered through section A of the questionnaire.

Use of Internet in Uganda Banking Industry

From figure 4.3, it is observed that all 100% of respondent agreed that they do access internet; 70% agreed that they use a computer connected to their website at least once a week; 56.7% said that the connection to the internet is below 144 Kb/s and 33.3% said the contrary; 53.3% said that their connection to the internet is greater than 144Kb/s and less than 2 Mb/s.

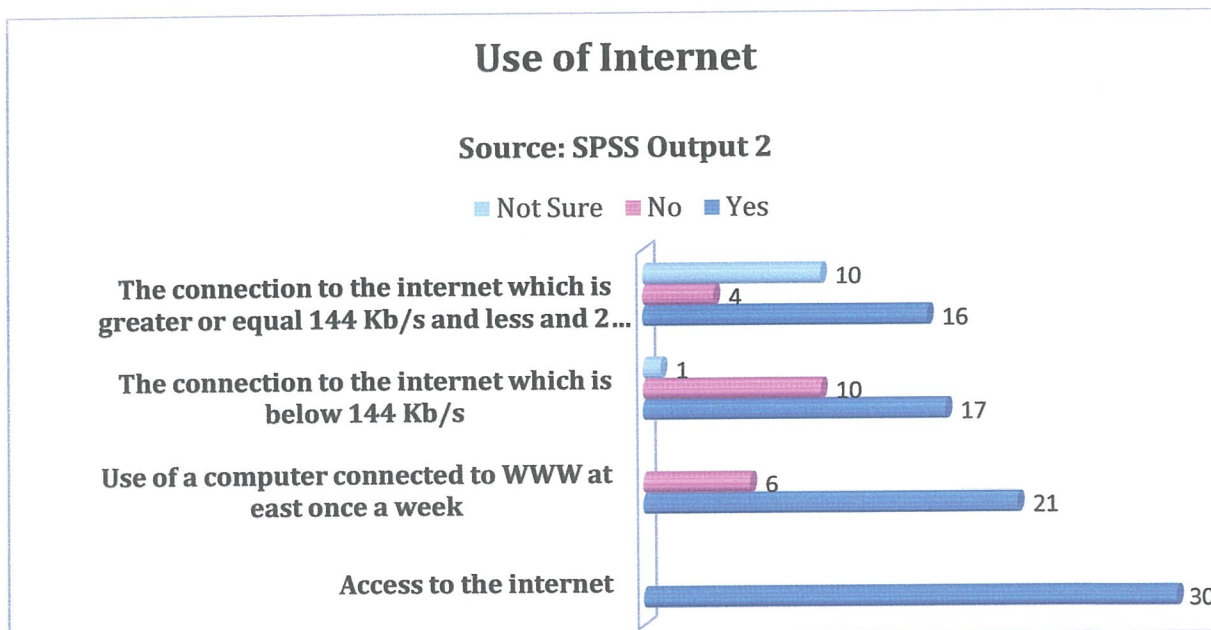


Figure4. 3: Use of internet

Use of networks in Uganda banking industry

It is observed from figure 4.4 that 86.7% said that they use wire based LAN, 60% of participants admitted that they use intranet service; 46.7% said that they use wireless LAN; and 26.7% said that they use extranet.

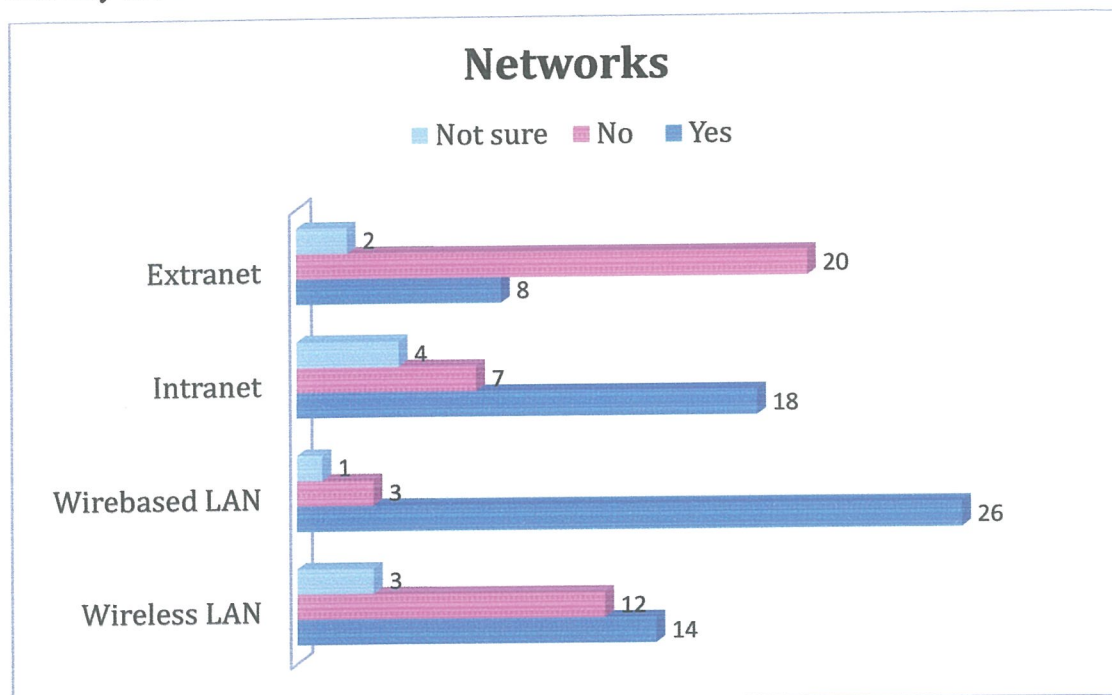


Figure4. 4: Networks

Specific use of IT systems in banking industry

Figure 4.5 shows that 86.7% of respondents said that IT systems are specifically used for transaction links between banks and their customers, 70% said that IT systems are vary useful for interaction between banks and customers or other banks; e.g Bankom services and 40% said that their systems are dedicated for orders and purchases management.

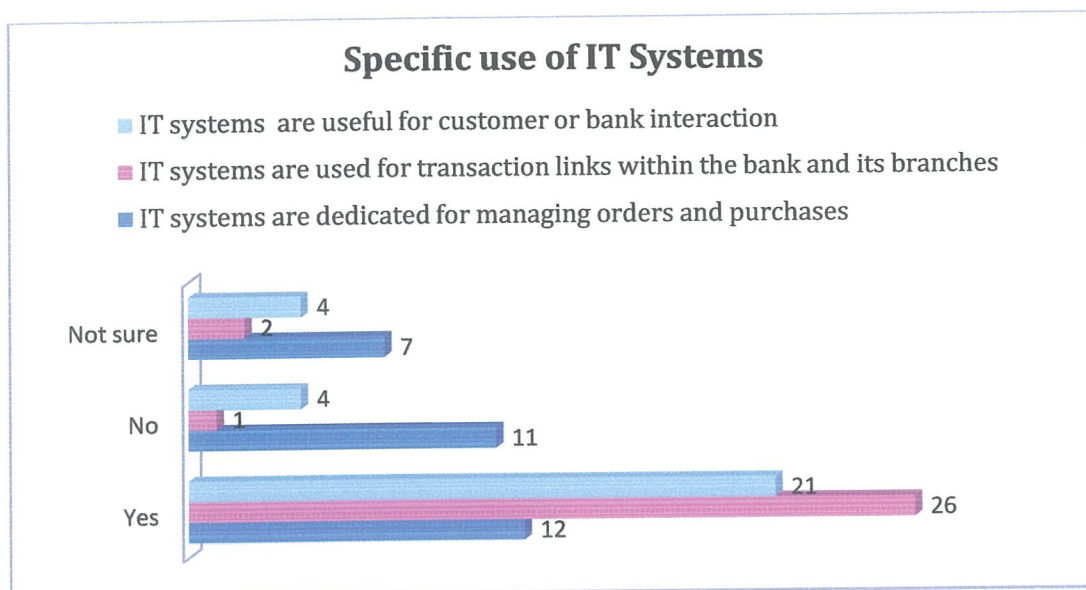


Figure4.5: Specific use of IT systems in Uganda Banking Industry

Use of postal mail and ICT in the BI

It is observed from figure 4.6 that 66.7% said that it's not substituted postal mail by electronic means, 33.3% said they did minor substitution and 20% of participants agreed that their banks have made major substitutions of postal mail by electronic means;.

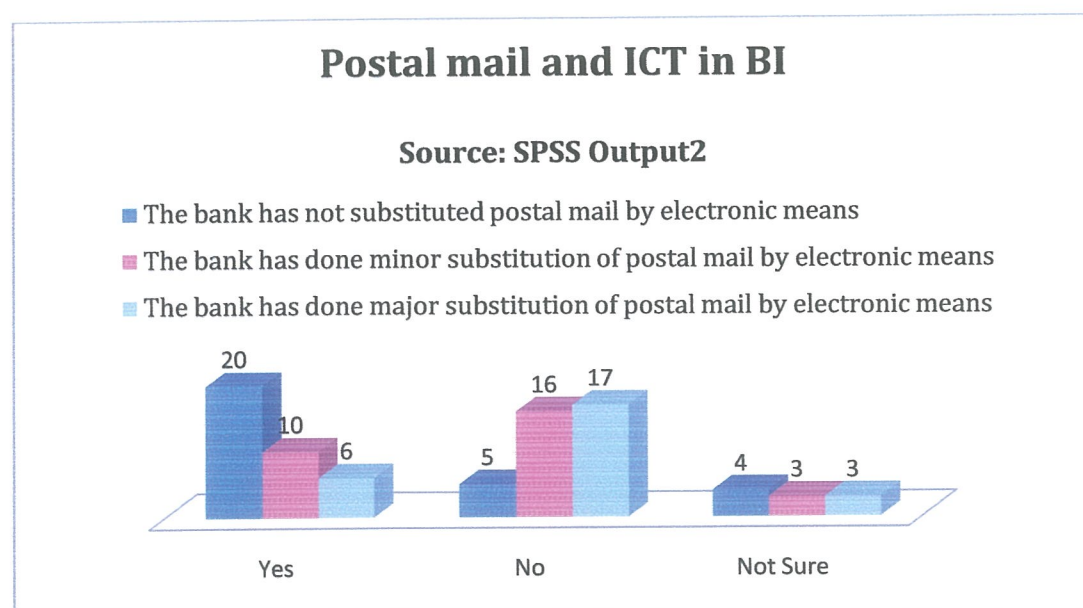


Figure4. 6: Use of Postal Main and ICT in Uganda BI

Security facilities used in Uganda BI

Figure 4.7 shows that PIN codes is the main security measure used by banks as mentioned by 73.3%. Additionally, 70% said that they use firewalls; 63.3% pointed out off-site data backup; 60% said that they protect their software or check viruses; 53.3% said that they use data encryption for confidentiality; and 40% said that they use electronic digital signature as customer's authentication mechanism of respondents as security measure; 26.7% said that they use security servers.

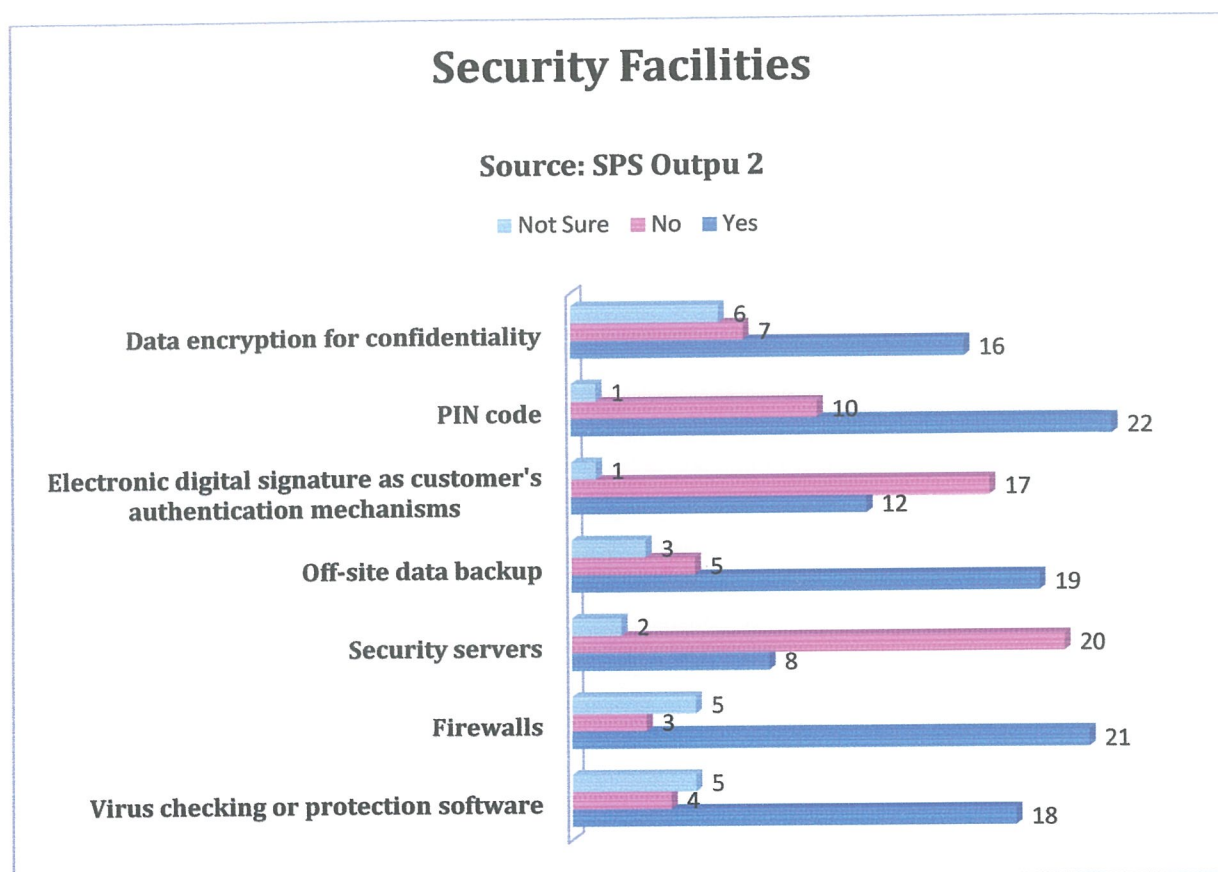


Figure4. 7: Security Measures

Use of websites and Provision of financial services via the Internet in the BI

Participants were asked if they do have a website or homepage. 100% agreed that their banks have a website or a home page. Relatedly, all banks use their websites to market their products and services. As presented on table 4.1.

Table4. 1: Market bank's products and services

		Frequency	Percent	Cumulative %
Valid	Yes	30	100.0	100.0

Source: SPSS output 1

Participants were asked if they offer some of their services via internet. As observed from table 4.2, 33.3% said yes and 36.7% said that they do not offer any of their services via internet.

Table4. 2: Provision of online financial services to customers via the internet

		Frequency	Percent (%)	Valid %	Cumulative %
Valid	Yes	10	33.3	33.3	33.3
	No	11	36.7	36.7	70.0
	Do not Know	6	20.0	20.0	90.0
	999	3	10.0	10.0	100.0
	Total	30	100.0	100.0	

Source: SPSS Output 1

Additionally, the researcher wanted to know the kind of services offered via internet. As observed from figure 4.8, 34% of banks which offers services online provide the facility for loan application; 34% provide payment services and 32% provide investment services.

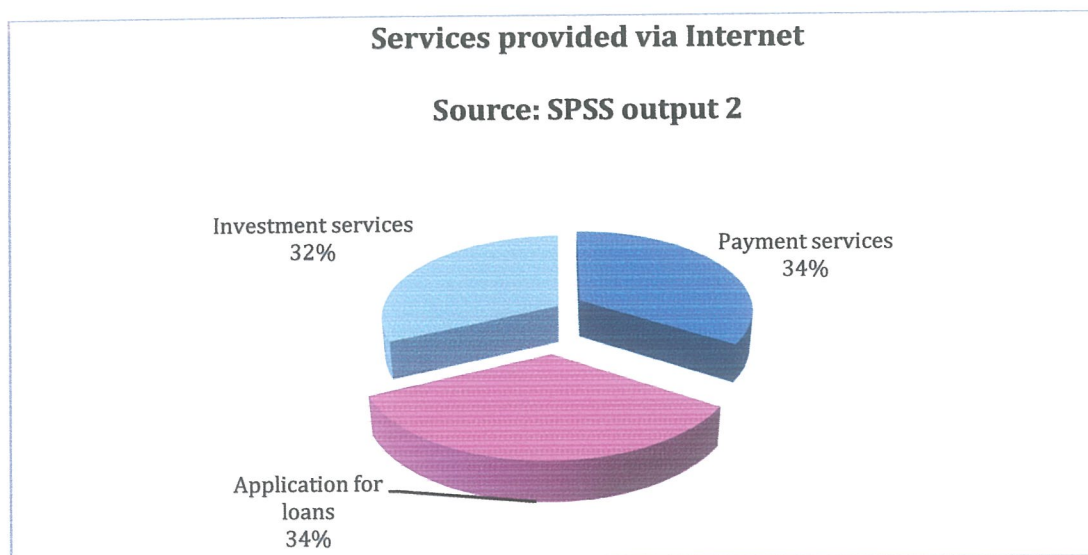


Figure4. 8: Services provided via Internet

It is observed from table 4.3 that 40% of banks have below 1% of clients who use interactive ordering via bank website, 26.8% of banks have 5-10%, and 26.7% have 5-10% clients who interact via bank website.

Table4. 3: Percentage of private account holders who use interactive ordering via bank website

		Frequency	Percent (%)	Valid %	Cumulative %
Valid	Below 1%	12	40.0	40.0	40.0
	1-5%	8	26.7	26.7	66.7
	5-10%	8	26.7	26.7	93.3
	999	2	6.7	6.7	100.0
	Total	30	100.0	100.0	

Source: SPSS Output 1

It is observed from table 4.4 that majority of respondents (66.7%) said that they use internet to interact with public authorities, and 26.7% said no.

Table4. 4: Use of internet to interact with public authorities

		Frequency	Percent (%)	Valid %	Cumulative %
Valid	Yes	20	66.7	66.7	66.7
	No	8	26.7	26.7	93.3
	Do not Know	1	3.3	3.3	96.7
	999	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

Source: SPSS Output 1

It is observed from figure 4.9 that 51% of banks interact via internet with public authorities to get some information; 23% use it to obtain forms and 26% use it to return forms.

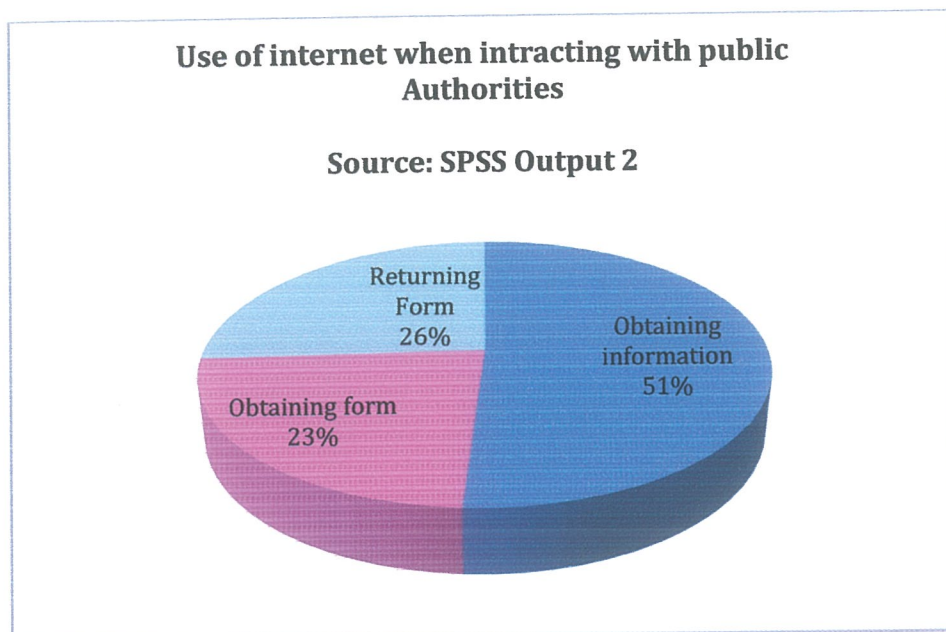


Figure4. 9: Interaction with public Authority

ICT facilities

Figure 4.10 shows that all banks have ATM facilities as agreed by 100%, 66.7% said that they have smart cards facilities; 56.7% said that they have cash point machine; and 56.7% said that they have telephone and internet banking

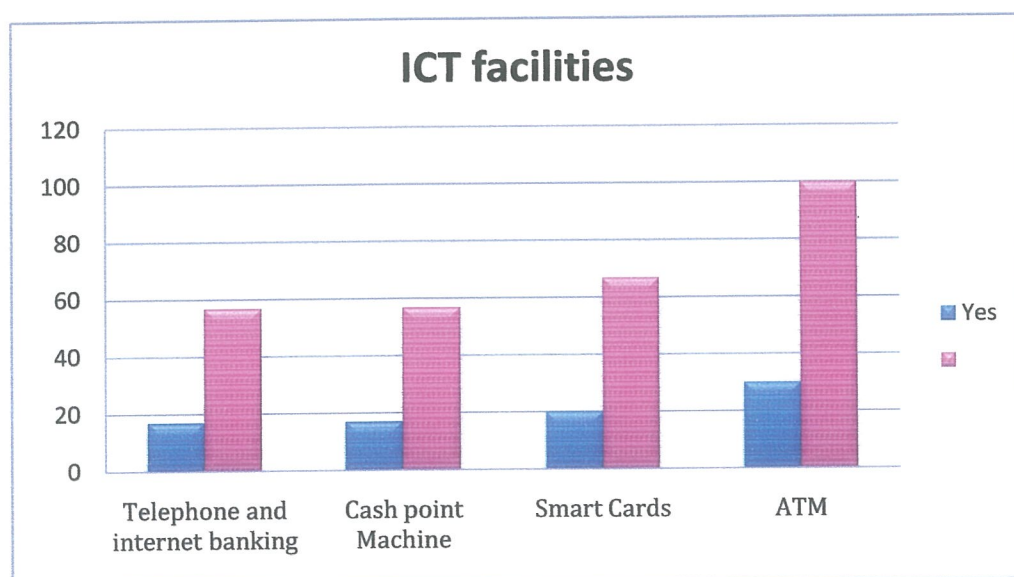


Figure4. 10: ICT facilities

Additionally, participants were asked the above mentioned facilities are as a result of ICT. As presented on table 4.5, 63.3% said yes, 23.3% said no and 6.7% said that they do not know.

Table4. 5: Telephone and internet banking and ATM are as a result of ICT

		Frequency	Percent (%)	Valid %	Cumulative %
Valid	Yes	19	63.3	63.3	63.3
	No	7	23.3	23.3	86.7
	Do not Know	2	6.7	6.7	93.3
	999	2	6.7	6.7	100.0
	Total	30	100.0	100.0	

Source: SPSS Output 1

The researcher wanted to know if customers benefit from ICT. 60% said that clients prefer ATM facilities to normal teller method and 30% said the contrary. On the other hand 76.7% said that ATM facilities reduce long queue in banking hall, and 20% said the contrary arguing that it only helps when customers are withdrawing small money.

4.3 Benefits and barriers for ICT adoption in Uganda banking industry

This section presents the information concerning the second objective of the study and it was gathered through section B and C of the questionnaire.

It is observed from table 4.6 that 80% of respondents agreed that banking system has been improved as a result of ICT, 10% do not see the improvement as they say that they do not know, and 6.7% disagreed.

Table4. 6: Improvement of banking system as a result of ICT

		Frequency	Percent (%)	Valid %	Cumulative %
Valid	Yes	24	80.0	80.0	80.0
	No	2	6.7	6.7	86.7
	Do not Know	3	10.0	10.0	96.7
	999	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

Source: SPSS Output 1

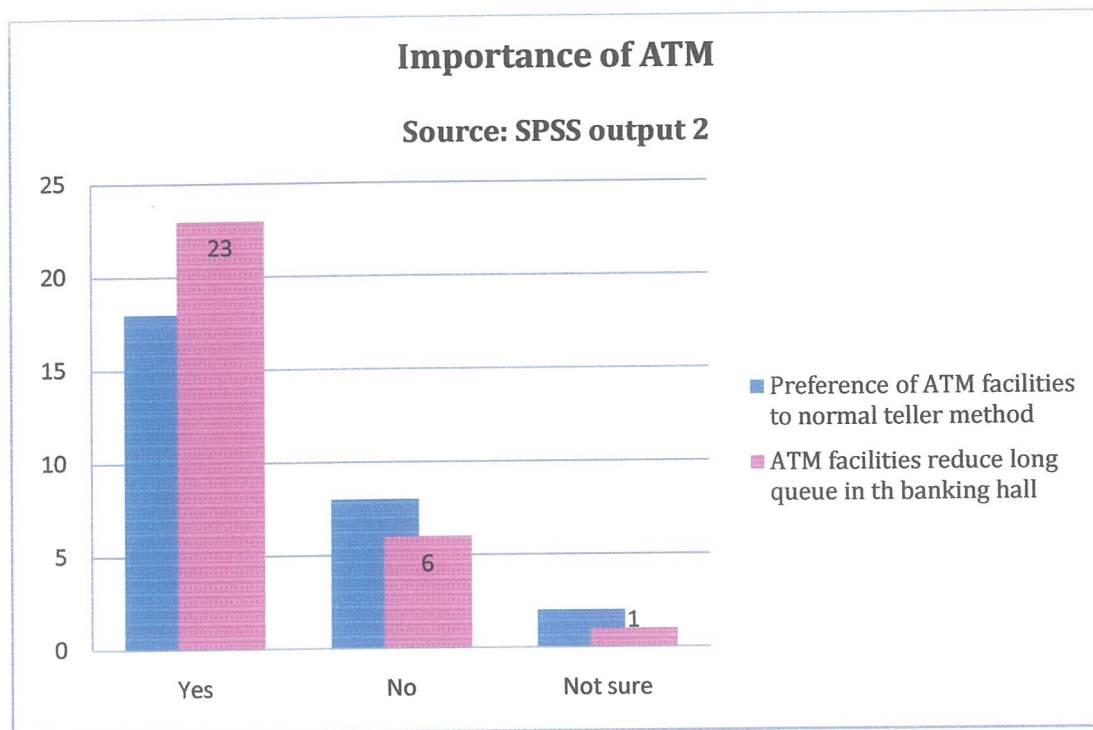


Figure4. 11: Importance of ATM

It is observed from figure 4.12, that the most benefit of ICT inception in banking industry is that people can easily access money 24/7; the second is the facility to bank everywhere instead of travelling to the domicile agent as argued by 12% of respondents; 12% said it reduces country trip money carrying; 11% said that it reduces the number of people to be employed; 13% said that the bank can handle more customers; 9% said it facilitates wide coverage; 9% said it improves productivity; 13% said that it improves customer satisfaction; 8% said that chip and pin secure money; and 6% said that the service is fast

Benefits

Source: SPSS output 2

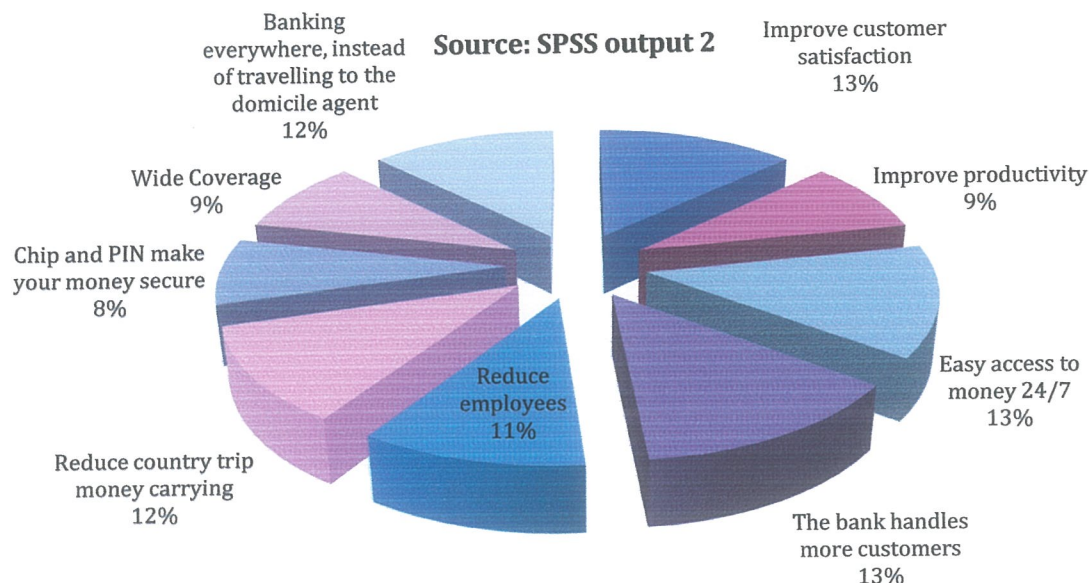


Figure4. 12: Benefits of ICT inception in Uganda BI

Participants were asked if ICT inception in Uganda banking industry has been a success. Table 4.7 show that 73.3% agreed that ICT inception in Uganda BI has been a success; 10% disagreed and 13.3% are not sure.

Table4. 7: ICT inception in banking industry in Uganda is a success

		Frequency	Percent (%)	Valid %	Cumulative %
Valid	Yes	22	73.3	73.3	73.3
	No	3	10.0	10.0	83.3
	Do not Know	4	13.3	13.3	96.7
	999	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

Source: SPSS Output 1

Figure 4.13 shows various reasons why ICT inception in Uganda BI has been a success as advanced by respondents. 19% said that with ICT facilitates constant communication between the bank and customer; 17% said that it is fast in processing information; 15% said that ICT facilitate accurate results; 14% said that they have gained customer's trust, 12% said that it has increased daily performance; 11% said that it facilitates rapid search and combination of information in various ways.

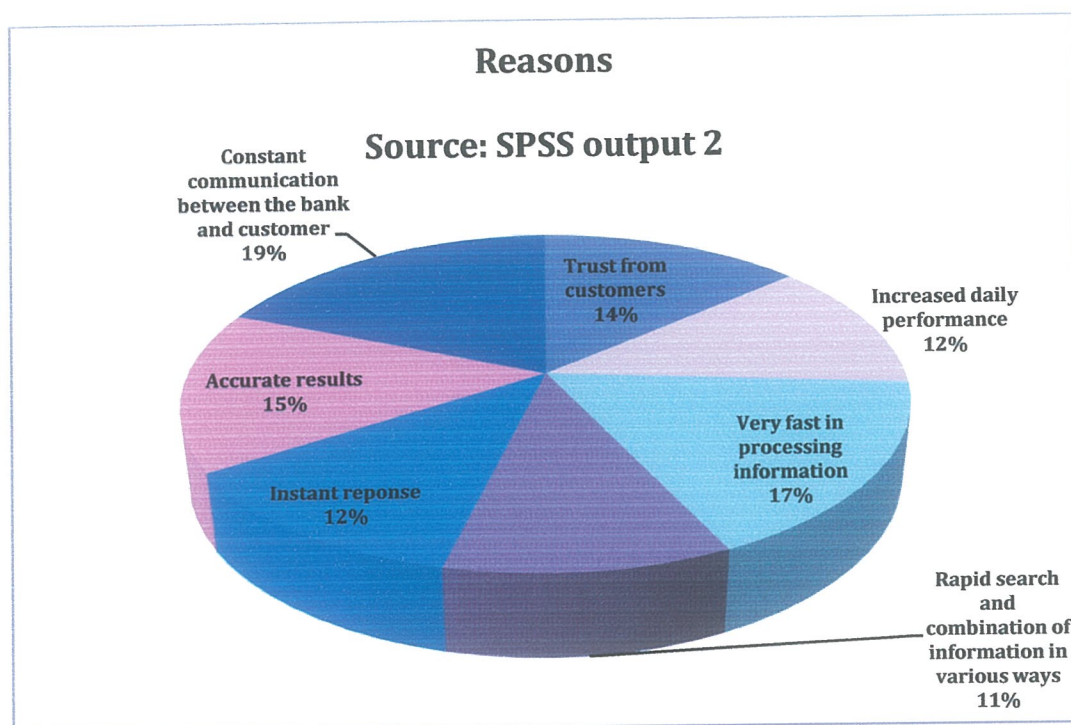


Figure4. 13: Reasons why ICT in Uganda BI has been a success

Table 4.8 shows that 43.3% of respondents said that they found it difficult to recruit personnel with ICT skills, 40% said that they did not face this problem and 6.7% said that they do not know if it is difficult to recruit personnel with ICT skills.

Table4. 8: Difficulties in recruiting personnel with ICT skills

		Frequency	Percent (%)	Valid %	Cumulative %
Valid	Yes	13	43.3	43.3	43.3
	No	12	40.0	40.0	83.3
	Do not Know	2	6.7	6.7	90.0
	999	3	10.0	10.0	100.0
	Total	30	100.0	100.0	

Source: SPSS

Figure4.14 shows various problems that banks experienced in recruiting personnel. 31% said that personnel with required skills is scarce; 29% said that ICT specialists were not available; 23% said that ICT specialist requires high remuneration and 17% said that applications were not available or not entirely suitable.

Problems in recruiting personnel

Source: SPSS output 2

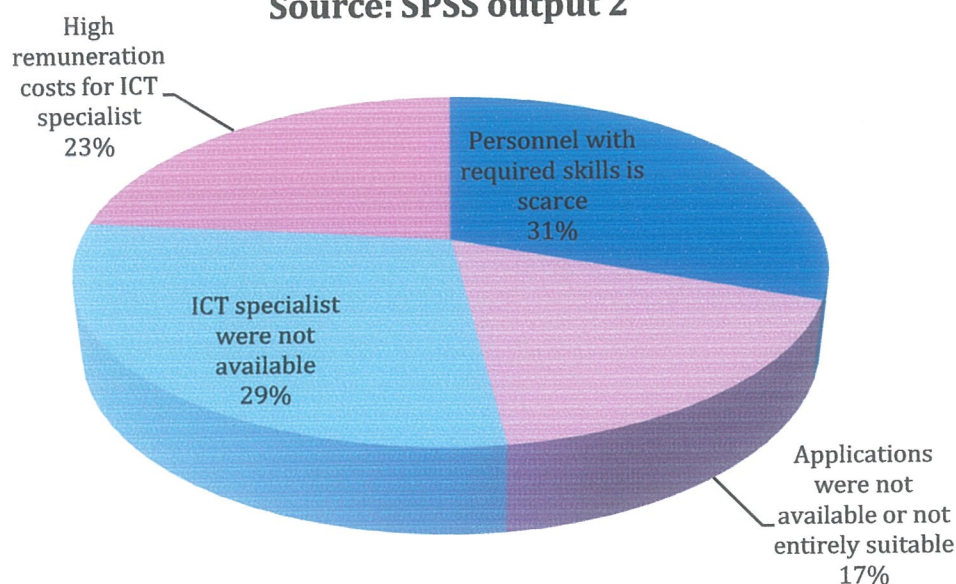


Figure4. 14: Problems in recruiting personnel

It is observed from table 4.9 that 63.3% confirmed that ICT facilities require huge investment; 13.3% said the contrary and 20% said that they do not know.

Table4. 9: Huge capital investment

		Frequency	Percent (%)	Valid %	Cumulative %
Valid	Yes	19	63.3	63.3	63.3
	No	4	13.3	13.3	76.7
	Do not Know	6	20.0	20.0	96.7
	999	1	3.3	3.3	100.0
Total		30	100.0	100.0	

Source: SPSS output 1

4.4 Impacts of ICT development on Uganda banking industry

From figure 4.15, it is observed that 83.3% said that ICT has led to a decline in employment in Uganda banking industry; 76.6% said that ICT support the bank to innovate its processes and business routines thereby increasing productivity; 70% mentioned increased fraud and money laundry; 70% said that technological changes forces banks to adopt new modes of production, and consequently to re-organize their assets; 66% said that ICT capital investment is a key

element in productivity growth in the bank; 63% said that ICT together with skilled labor have a positive impact on labor productivity growth in the banking industry; 60% said that technology influences competition and the degree of contestability; 53% said that innovations enabled by ICT change the cost structure of banks.

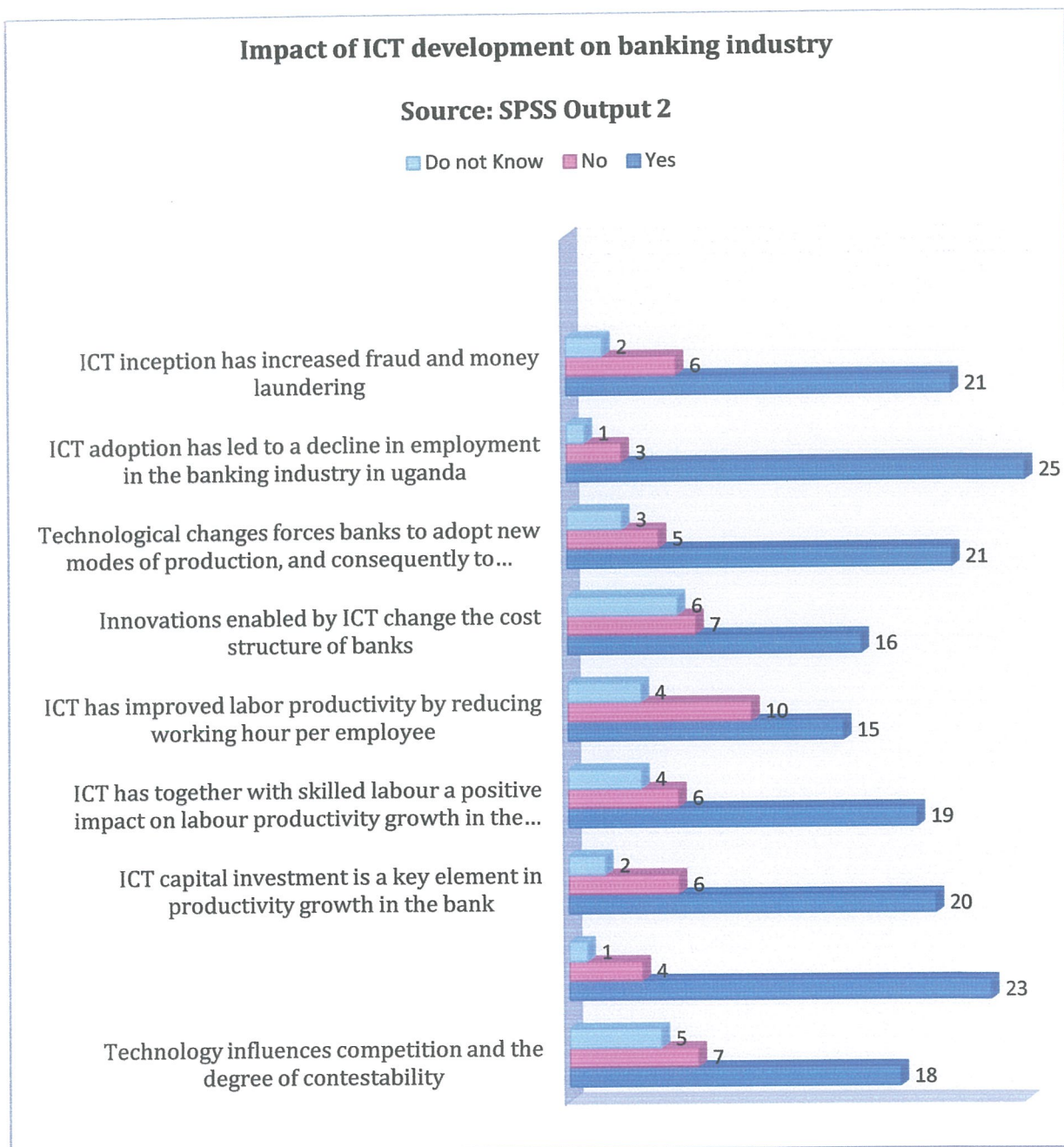


Figure4. 15: Impact of ICT development on Banking Industry

CHAPTER FIVE

DISCUSSIONS OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 introduction

The purpose of this study was to investigate the impact of information communication technology on Uganda banking industry. To be able to achieve this, the researcher had to come up with research objectives which were converted into research questions. This last chapter of the study presents discussions of findings in relation to the existing literature as presented in chapter two. In addition, this chapter provides conclusions of the study which are derived from discussions, it also points out some recommendations and limitations of the study. Finally, it highlights areas for further research.

5.2 Discussions

This section detail confers the discussion of the findings presented in chapter four in relation to the existing literature as discussed in chapter two.

The banking Sector in Uganda has been described as generally sound and well capitalized. The Sector has experienced tighter BOU supervision, more stringent requirements and higher capital requirements with the passing of the Financial Institutions Act in 2004 and the Financial Institutions Regulations in 2005. This has facilitated a quick recovery of the sector following the closing of several domestic banks in 1998 and 1999 (Miliddawa, 2009).

Most banks in the country are foreign owned, including major international institutions such as Stanbic, Citibank, Barclays, Standard Chartered, Eco Bank and UBA Bank. However, a number of locally owned banks have been established including DFCU Bank, Diamond trust, Tropical Bank, Orient bank, Centenary bank, Housing finance bank, Nile bank which later merged with an international bank 'Barclays' and others.

5.2.1 ICT uptake and usage in Uganda Banking Industry

An important indicator of the general uptake of ICT in the Banking Industry (BI) relates to the use and availability of Internet (D'Costa, 2006). Internet access is a precondition for e-Business, as this is the main channel for e.g. e-banking. The general availability of internet allows for the

analysis of overall ICT-readiness in the BI (Fasan, 2008). As far as this study is concerned, it was realized that about 70% of all banks under study have access to the Internet and use a computer connected to the Internet at least weekly. In addition it was observed that ICT nowadays is not necessarily an integrated part of operating a bank, instead a high availability of internet among customers, can be an important facilitator to inducing improved usage of online banking.

Different broadband connections used to access the Internet are not only used as the basis for advanced e-business applications, but also to support internal and external collaboration and to provide customer services over the Internet (European Commission, DG Enterprise and Industry, 2008). Furthermore, broadband represents a faster way to connect to the Internet and is a technology which changes the way the Internet is used. While the general availability of Internet is almost complete across size bands, the Internet technology used in the BI is quite different across the different size bands as observe in this study. 56.7% said that the connection to the internet is below 144 Kb/s and 53.3% said that their connection to the internet is greater than 144Kb/s and less than 2 Mb/s. However, it is argued by some of respondents that normally for banks which have a shared internet connection, the bandwidth is supposed to be more than 512kb.

LAN is currently the dominating technology. The survey shows that 86.7% of banks in Uganda use wire-based LAN. It was observed that wireless LAN is used by 46.7% of banks. Banks which use this kind of technology, they use it is mainly for internet communication, not for data processing and transfer. The reason for the lower uptake of wireless LAN in the BI may be related to data security concerns, because hackers can easily access their networks and alter the information. Security is an issue in the BI, as the continuing digitalization of information means that bank processes are increasingly becoming dependent on reliable ICT operations. The application of wireless LAN may hence be limited by concerns about the secure application of this technology.

Intranets are among other things which were observed to be used by Uganda banks to facilitate collaboration across functions or to advance productivity and efficiency by supporting business operations and decisions across the inter-networked enterprise. Although extranet is considered as a safer way of conducting e-banking services compared to communicating over the Internet, as it is a closed data network between a bank and its customers, it was discovered that its uptake

in Uganda BI is fairly low with only 26.7% users. The rather low uptake might be explained by the fact that an extranet is often customized to individual , own ICT systems. In addition, this is associated to the fact that there is a low internet uptake among Ugandans.

It was further realized that Uganda BI is currently being renewed in many areas. One of these areas relate to the digitalization of formerly paper-based processes. Electronic mail is increasingly being applied for especially non-legal correspondence like account statements, marketing and sales. Despite the development in electronic mail, postal mail is still the preferred medium. About 33.3% of banks have only done minor substitution of postal mail, and only 20% have done major substitution of their postal mail by electronic means and 66.7% have not yet replaced any postal mail with electronic means.

As far as security is concerned, (Hannan, Rahman, & Uddin, 2007) argue that since banking is highly based on trust from its customers, the risk of hackers, denial of service attacks, technological failures, breach of privacy of customer information, and opportunities for fraud. Indeed, the sensitivity of the stored data necessitate that all possible measures are taken in securing data maintenance. It was realized that security in general is high in Uganda BI. Majority of banks use ICT-enabled security facilities, such as PIN codes, virus checking software, firewalls, off-site backups and security servers. PIN codes and firewalls are use by almost 70% of banks in Uganda while off-site data back up, and antivirus software are used by nearly 60% of banks. 53.3% use data encryption for confidentiality. A security facility not fully used in the BI is the secure server technology. Secure servers are not as frequently implemented in banks as firewall and anti-virus technology, as only 26.7% make use of this technology.

It is observed by (Jordan & Katz, 2000) that in this era of technology marketing has moved on to the Internet, and has become an important strategic tool for creating, distributing, and promoting goods and services to the consumers over the Internet or through other digital tools. Additionally, E-Marketing is often performed through websites, which makes the availability of websites . It is also argued that effective e-Marketing might be very helpful for the small and medium-sized banks with limited resources available for advertisement. In this regard, it was realized that all banks have a website/homepage. In a related insight, it was found that about 5 banks offer online financial services via the internet as mentioned by 33.3% of participants. Among services offered in e-banking, payments services, and application for loans are the most common. Payments

services show the greatest potential for quick gains as the labor-intensive work traditionally conducted by tellers in a branch office can be made more efficient.

Looking into the share of customers using interactive ordering via enterprise websites, the most common scenario is that below 1% of a bank's customers use interactive ordering online. This indicates that the Internet-only banks are still niche players and that the majority of the banks still operate on a traditional branch-based platform or a combination of the two. The low uptake of online ordering may be one of the main challenges for the future BI, if the trend of self-service is to manifest itself among the majority of consumers. The pressure from online banks may in the long force retail banks to promote e-banking among consumers to a larger extent in order to retain their market share.

Another important element of ICT uptake and usage in the BI is the banks' interaction with public authorities via the Internet. It was indeed realized that information gathering is the more frequent used by Uganda banks while interacting with public authorities as agreed by 66.7% of respondents (table 4.4). Given that the BI is heavily regulated and in dialogue with government institutions on security and administrative issues, the possibility of interacting with public authorities online provides the individual banks with several opportunities. First, the time saved when obtaining information and forms online, allows both the banks and public authorities to use these man-hours elsewhere. Second, online interaction can reduce bureaucracy as online processes are often more transparent and accountable. Third, the often paper intensive processes are performed online, which allow enterprises in the BI and the public authorities to pursue digitalization even further by digitalizing other processes in the company affected by the paperwork.

In general, there exists a strong normative pressure in the BI for banks to remain up-to-date with ICT developments. As far as this study is concerned, it was found that the most ICT facility used in Uganda banking industry consists of ATM machine, and about 60% have credit and debit cards. 63.3% of respondents further argued that only internet banking, ATM, POS smart cards are as results of ICT. They however said that telephone has along been used to facilitate banking activities although with mobile phone people can easily be informed about the statement of their accounts.

Now a day's online banking used by few banks here is getting very popular. Online banking makes things extremely convenient for people and saves their precious time. It allows people to

quickly manage their bank account and see where your balance is. Reputed banks have introduced their sites which are strictly devoted to explaining the measures they employ to protect customers and their bank accounts from internet hackers.

A large number of national and statewide banks are offering online banking services to their customers. One can now enjoy the benefit of paying the bill online. Most banks offer online banking free of charge.

The application of networks is a vital part of an effective ICT-enabled system, which is especially true in the case of banks with a branch network. Local Area Network (LAN) may also be seen as a basic indicator of the minimum infrastructure required to enable banks to conduct e-banking at a substantial level. Wire-based LAN is currently the dominating technology. Another recent development in the payment implementation of an electronic SWITCH which enables some Ugandan Banks to share service of Automated Teller Machine (ATM) with other banks in the industry, this alliance between these Banks here in Uganda is known as 'BANKOM' a system that enable some Bank like; DFCU, Orient Bank, and other bank customers to access there account through any of these banks' ATM machines.

5.2.2 Benefits and Barriers of ICT Adoption in Uganda Banking Industry

The study realized that quick access to services is the most benefit ICT have created in banking industry as 13% said that they access their money 24/7. Additionally, majority of the banks working with ICT as a process efficiency enabler agree that ICT have changed the role of the tellers, as they are no longer performing basic financial services. However, most banks state that they have upgraded the teller's skills so that they are now able to perform more complicated financial services, and this enables the bank to serve a big number of customers at the same time thereby improving there services.

It was further revealed that ICT has enabled people to bank everywhere instead of travelling every now and then to the domicile agent, 12% said that it reduces money trip carrying, 9% said that ICT facilitates wide coverage and it improves productivity.

As far as barriers are concerned, it was discovered that capital investment is the major barrier of ICT development in Uganda banking industry. Additionally, 43.3% argued that they found it difficult to recruit personnel with IT and management skills at the same time, especially when the banking system is not familiar.

Apart from the above mentioned barriers to the development of ICT in Uganda banking industry, almost three quarter of respondents said that ICT in Uganda has been a success. Reasons being that, it allows banks to meet customers' needs faster and leads to a better flow of information and communication; banks have managed to gain trust from their customer and they have increased their daily performance.

ICT implementation and exploitation often require substantial investments. Indeed, this can especially be burdensome for smaller banks which do not have the financial opportunity to invest as heavily as larger banks. This is justified by the fact that with technology, applications and systems become quickly obsolete. (European Commission, DG Enterprise and Industry, 2008) realized that old systems are increasingly outdated, as over 80% of ICT expenditure goes into maintenance of these systems. This means that new investment is required, and these are challenging projects. On the other hand,

As far as recruitment of personnel with IT skills is concerned, the results show that about 43.3% of respondents said that they find it difficult to recruit employees with IT skills, and 40% said the contrary. However, some of respondents argued that when a bank has an unfamiliar system, it might be difficult to find personnel with both IT and banking skills. Apart from lack of ICT specialist in Uganda BI, it was found that high remuneration for ICT specialist is another problem associated with IT personnel. These results support the argument of (D'Costa, 2006) who affirms that banks interested in reaping the efficiency benefits from ICT may, however, find the acquisition and maintenance costs too high. However, after interest expenses (which is largely a variable cost), labor is the biggest expense item for small banks (and is more likely to be a fixed cost). It was further revealed that ICT development in Uganda BI is affected by fear among employees and internal resistance against innovation. The fear may be justified, as the human factor is increasingly being removed and the future role of the teller in a modern bank is questionable (Ackerman, 2008, p. 15).

The researcher also observed that some of the barriers of ICT development Uganda banking industry includes; the customer inexperience on the usage of the ICT facilities such as internet , lack of trust on ATM usage 'customers prefer to bank there money face –to-face on the counter instead of using such facility on the machine', also the expensive nature of internet facilities in Uganda posses a barrier.

5.2.3 Impact of ICT development on Uganda Banking Industry

The impact of ICT capital on the employment perspectives in Uganda Banking Industry shows that overall employment in this industry tend to decline in most banks, especially since the beginning of the new millennium. With regard to average working hours, ICT investments tend to have a diminishing impact on these in Uganda BI, although significant differences between banks prevail.

The analysis has confirmed that the diffusion of ICT drives the innovation process in the BI. It was realized that ICT enabled innovation process in the banking industry since for a bank to remain competent it has to cope with changing environment. On the other hand (Fasan, 2008) asserts that studies of the impact of ICT on firm-level productivity have shown that ICT investment does not lead to productivity growth at firm-level by itself. It depends on how the technology is actually used in business processes; it means a company's ability to innovate its work processes and business routines with support of ICT. Thus, only if ICT investment is combined with complementary investment in working practices, human capital, and firm restructuring will it have an impact on performance. Indeed, the analysis of the impact of ICT capital on labor and total factor productivity growth confirms to some extent that ICT capital has a moderate impact on productivity. The full exploitation of total factor productivity growth is however only found when high- and medium-skilled labor is combined with organizational innovative strategies and changes.

This finding shows that tellers are increasingly being retrained to perform financial services in the banks, thus moving the tellers from the low-level skill class to the medium-level skill class, but not all the way to the high-level skill class. However, if the development in ICT continues with more sophisticated systems, even medium-skilled labor becomes substitutable by ICT equipment in the long run. However, this development remains yet to be seen.

As far as competition is concerned, it was discovered that competitive pressure force banks to lower their cost. Uganda banks seek to get economy of scale in bank procession instead of being a big bank. Banks seek to secure the optimal business structure, and secure the competitive imperative of economy of scale. There are other options to get economy of scale, including acquisition, joint venture and confederation of financial firms; for instance Nile Bank was acquired by Barclays in 2006 and recently Uganda Micro-finance Limited was acquired by Equity bank from Kenya.

The exodus of some telecommunication providers (MTN & ZAIN) into E-Business has resulted to the provision of financial services (M-banking) such as (MTN money transfer and ZAIN-Zap) constitute threat to banking industry in Uganda. Also micro credit sector is another challenge that Uganda commercial banks are facing today.

So far, commercial banks deploy m-banking platforms to provide mini statements, alerts on account activity, monitoring deposits, accessing credit and credit statements. They also provide ATM and credit card transactions, account and credit history, status of cheque and stop cheque facilities, over the counter payments, PIN management, peer to peer transactions, fund transfers, mobile top-up and mobile withdraws.

In short, with m-banking, a trader in Kampala will pay for his premises, pay wages, purchase airtime, send money to his mother, pay for a coca cola, check his bank balance with on his mobile phone. The trader will also be able to move money into one account, pay school fees for his children in different schools, pay his water, power and other bills, using the facility. An m-banking user will also be in position to stop a cheque, check forex rates and pay for his air ticket. Basically carry-out any money transaction without ever stepping in a banking hall. M banking is an industry that is less than 10 years old. Mobile banking can either be telecom led (zap/ZAIN model) or bank led (the Standard Chartered Bank/MTN model). There are solemn opportunities for banks to seize in this affair.

Money laundering is an age-old criminal activity that has been greatly facilitated by electronic banking because of the anonymity it affords. It was observed that Uganda banks are facing the same challenge as agreed by majority of participants. However, Bank of Uganda has come up measures to checkmate money laundering. One of these measures indicates that 'any payment that is above 20,000,000 UGX (twenty million shillings) should be made by Electronic Money Transfer' Additionally, it was discovered that technological changes forces banks to adopt new modes of production, and consequently to re-organize their assets as mentioned by almost three quarters of participants.

5.3 Conclusions

This study focuses on Information Communication Technology Inception in Uganda Banking Industry. It aimed at describing how banks in Uganda apply ICT in their operations, identifying benefits and barriers of ICT adoption in Uganda banking industry; and assessing impacts of ICT development on Uganda banking industry. From discussion of findings, in line with objectives of the study a set of conclusions was drawn:

The Uganda BI has a high uptake of computers, and a high application rate of the internet, LAN and Intranet and many banks apply security measures like firewalls and encryption systems to secure data. However, the overall high uptake of general purpose technologies has not yet influenced the uptake of authentication technologies, e-banking and e-marketing. In addition, the basic systems for e-banking like electronic authentication are not yet widespread in the Uganda BI. If the fundamental systems for e-banking have been implemented in banks, they are not able to offer a reliable and safe e-banking product. A difference between banks in terms of e-bank capacity may arise and the competition between banks may be affected by their ability to develop or implement the necessary technologies of e-banking,

Adoption of ICT has influenced the content and quality of banking operations. From all indications, ICT represents great potential for reengineering of Uganda Banks. Investment in information and communication technology should form an important component in the overall strategy of banking operators to ensure effective performance. It is imperative for bank management to intensify investment in ICT products to facilitate speed, convenience, and accurate services, or otherwise lose out to their competitors. The banking industry in Uganda presents ICT providers with great opportunity to market their innovations. Success in this area however depends on how they can customize their services to appeal to the ready minds of various stake holders in the industry.

The adoption of ICT in banks has improved customer services, facilitated accurate records, provides for home and office Banking services, ensures convenient business hour, prompt and fair attention, and enhances faster services. The adoption of ICT improves the banks' image and leads to a wider, faster and more efficient market. It has also made work easier and more interesting, improves the competitive edge of banks, improves relationship with customers and assists in solving basic operational and planning problem.

The developments in information collection, storage, processing, transmission and distribution has influenced all aspects of banking activity and was regarded as the main driving forces for the changes in banking industry.

In conclusion; due to the development of technology, bank's superiority in information is deteriorated. Entry barrier have been declining, new competitor have emerged. Some financial products and services have become more transparent and commodities, customer show willing to unbundled the demand for financial products and services, all these lead to a more competitive market environment. Due to lowered entry and exist and deconstruction, for some sub-financial markets, contestability in banking. Technology has a major impact on the way banking and financial services are delivered. A wide range of alternative delivery mechanism becomes available, Internet, ATM... these reduces the dependence on the branch network as a core delivery mechanism. With the development of technology, the financial systems are substantially over-supplied with delivery system through a duplication of net work, bank has to change their delivery strategy, rationalize their branch network strategy.

In sum, all of the above-mentioned trends and challenges are ICT-driven and therefore relevant to include when analyzing ICT uptake in the BI. The increased focus on customer relations management is possible thanks to ICT, and the data protection has been fuelled by increased investment in ICT in order to create systems to support data recovery. Customer confidence is only an issue with respect to online banking. Also, the development of standards is increasingly necessary with increased online banking and thereby increased banking across borders, but also allows for streamlining the information flow, which can give Ugandan Banks a competitive advantage in the long run. Although people lack of awareness about ICT has affected the proper use of the ATM machines, also the introduction of ATMs is largely possible due to investments in ICT people prefer to bank there money at the counter instead of use the ATM machine to bank it due to lack of trust. However, the introduction of ICT to the BI also calls for an increased focus on data protection and fighting the misuse of the Banking Industry.

5.4 Recommendations

In recommendation the banking industry need to better apply IT to improve its operations, such as customer services and products. Banks should also devote more resources to develop, implement and secure IT services,

The future impact of outsourcing IT requirements should be thoroughly evaluated as the long term effect may be very expensive

Also Industry organizations could support training and skills development among bank staff and customers by arranging training courses or facilitate networks for exchange of best practice;

ICT is an enabler, but without sufficient capabilities of the human workforce to use it efficiently, the costly investments become ineffective, as a result of these; Banks should create awareness through advert and educate there customers on the usage of various ICT related services. The focus of managers making investment decisions should therefore focus more on the implications of a new technology related to changing needs in skill formation and consequences in the organization of business processes than on pure technical equipment.

Promote initiatives such as shared ICT development processes in the banks or facilitate a forum where banks could cooperate in developing ICT systems to support increased harmonization, such as smart cards or possibly e-Invoicing standards, encourage the cooperation between banks in ICT development projects. This should be facilitated by the industry organizations as banks may not be willing to cooperate on ICT development projects by themselves,

In summary, it is imperative for Uganda bank management to intensify investment in ICT products to facilitate speed, convenience, and accurate services, this will help Uganda banks to be informed and incorporate new ICT innovations such as ATM Biometrics revolution.

5.5 Limitations of the study

The researcher did not have sufficient funds to conduct extensive research given that the research was fully funded by the researcher himself; to overcome this, the researcher had to target only few key employees of the commercial banks;

The researcher encountered difficult constrains in collecting data, this is due to the fact that the Banking Institution as organization which deals with finance and valuable documents are highly

security conscious, the staffs are seriously prohibited from letting out some confidential information, as a result of these the researcher was made to go through some scrutiny before questionnaires are collected and completed.

Although the researcher believes that the methods used for this project represent a rigorous attempt to comply with academic requirements for a research project at the Kampala International University, specific objectives of the study, and the use of a single method of data collection constitute limitations. Therefore, the results of this study are limited by techniques of data collection and measures used which make external validity difficult to measure. Indeed, the results are only applicable to the case under study.

5.5 Areas for further Research

The banking sector has been described as generally sound and well capitalized by ICT, credit card remains the overwhelming payment method of choice for online purchases, and this dominance will last for several more years, therefore it should be researched on to avoid fraud. Future researchers should also focus on the interest of bank customers to the services made possible by ICT inception.

Emphases should also be concentrated on the use of ICT to better the services of other Uganda's financial services industry such as; the Insurance, Microfinance and investments sectors, which were dominated by the banking sector in the past years, this study should also be extended to areas like e-security, e-commerce, e-marketing and viability of the latest ATM Biometric technology in Uganda banking industry.

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APPENDICES

Appendix A: Introduction Letter



KAMPALA
INTERNATIONAL UNIVERSITY

P.O.BOX 20000
KAMPALA- UGANDA.
TEL:-041-266813

**OFFICE OF THE DIRECTOR
SCHOOL OF POSTGRADUATE STUDIES AND RESEARCH**

April 15TH 2009

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: INTRODUCTION FOR KORIE MALACHY CHUKWUNDI.

This is to inform you that the above named is our registered student (MIS/17965/71/DF) in the School of Post Graduate Studies pursuing a Master of Science in Information System (MSC IS)

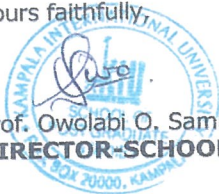
He has completed his taught Modules and is left to embark on research titled: "Information and Communication Technology Inception; An Aid to Banking Industry Development in Uganda".

Any assistance rendered to him regarding research, will be highly appreciated.

Yours faithfully,

Prof. Owolabi O. Samuel,

DIRECTOR-SCHOOL OF POSTGRADUATE STUDIES AND RESEARCH



Appendix B: Questionnaire

**Korie Malachy C.
Kampala International
University
PO BOX: 20 000
Kampala**

17th April 2009

Dear Respondents,

This questionnaire is part of my research project in partial fulfillment of the requirements for the award of a Degree of Masters in Information systems of Kampala International University. The thesis focuses on *the impact of Information Communication Technology on Banking Industry Development in Uganda*. Answering these questions sincerely will be important to the success of my research and contribute to the enhancement of ICT usage in banking industry.

This questionnaire however, is not meant to stress you, but your humble participation will be of great importance and the information you provide will be held in strict confidentiality and used only for the academic research purposes as stated above.

Please read the instructions carefully, and answer all questions in the space provided. If you wish to add further comments feel free to do so.

I hope you will find this questionnaire interesting, and I thank you for devoting your time to help me. If you have any queries or would like further clarification, please feel free to contact me on **0782170701** at anytime.

Thank you for your assistance.

Yours Sincerely,

Korie Malachy C.

Bank Name _____

Position held _____

SECTION A: ICT UPTAKE AND USAGE IN UGANDA BANKING INDUSTRY

1. Use of internet in Uganda banking industry

The following table presents six statements about the use of internet in Uganda banking industry. Each statement has three different answers (Yes, No, Do not know). Please tick (✓) the answer of your choice

	Yes	No	Do not know
Do you have access to the internet?			
You use a computer connected to WWW at least once a week			
The connection to the Internet is below 144 Kb/s			
The connection to the Internet ≥ 144 Kb/s and < 2 Mb/s			

2. Use of networks in Banking industry in Uganda

The following networks are used in your bank	Yes	No	Not sure
• Wireless LAN			
• Wire based LAN			
• Intranet			
• Extranet			

3. Specific use of IT systems in Uganda Banking Industry

Specific use of IT	Yes	No	Not sure
IT systems are dedicated for managing orders or purchases			
IT systems are used for transaction links within the Bank and its branches/group of banks			
IT systems are useful for customer/Bank interaction			
Others (Specify)			

.....

4. Use of postal mail and ICT in the BI

	Yes	No	Not sure
The bank has not substituted postal mail by electronic means			
The bank has done minor substitution of postal mail by electronic means			
The bank has done major substitution of postal mail by electronic means			

5. Security facilities used in the BI

The following are security facilities used in the bank	Yes	No	Not sure
Virus checking or protection software			
Firewalls			
Secure servers			
Off-site data backup			
Electronic digital signature as customer's authentication mechanism			
Other authentication mechanism (e.g. PIN code)			
Data encryption for confidentiality			
Have encountered ICT related security problem in the last 12 months?			
Others (Specify)			

.....

6. Use of websites and Provision of financial services via the Internet in the BI

	Yes	No	Not sure
Do you have a web site or a homepage?			
Do you use the website to market own products			
Bank provided online financial services to customers via the Internet			
Products/ services provided Bank via the Internet:			
Payment services			
Savings deposits			
Loans			
Investment services			
Banking products/services			

Others (Please specify)

.....

7. Percentage of private account/ deposit holders who use interactive ordering via bank website

	Yes	No	Not sure
< 1%			
1-5%			
5-10%			
10-25%			
25-50%			
50+%			

8. Interaction in the BI with the public sector

	Yes	No	Not sure
Do you use Internet for interaction with public authorities?			
Interaction with public authorities through the Internet is used for:			
Obtaining information			
Obtaining forms			
Returning filled in forms			
Submitting a proposal in an electronic tender system			

Others (Please specify)

SECTION B: POTENTIAL BENEFITS OF ICT ADOPTION IN UGANDA BANKING INDUSTRY

9. Does ICT improve the banking system?

Yes ☐

No ☐

Not sure ☐

Give reasons to support your answer

10. ICT facilities

	Yes	No	Do not know
Do you have facilities such as:			
Telephone and internet banking			
Cash point machine			
Smart cards (Debit/credit)			
Automatic Teller Machine (ATM)			
Do you think ATM, telephone & internet banking and others are results of ICT inception?			
Do Customers prefer ATM facilities to normal teller method?			
Do ATM facilities help reduce the long queue in banking hall?			

11. What are benefits of ICT inception in banking industry in Uganda?

SECTION C: BARRIERS OF ICT ADOPTION IN UGANDA BANKING INDUSTRY

12. Is ICT inception in banking industry in Uganda a success?

Yes ☐

No ☐

Give you reasons

.....



13. Recruitment of personnel with ICT skills

	Yes	No	Not sure
Did you have difficulties in recruiting personnel with ICT skills?			
The following are problems the bank faced trying to recruit personnel:			
Personnel with required skills in the use of ICT are scarce			
Applications were not available or not entirely suitable			
ICT specialists were not available or not entirely suitable			
High remuneration costs of ICT specialists			

Other problems (Please specify)

.....

15. Does ICT adoption require huge capital investment?

Yes ☐

No ☐

Not sure ☐

SECTION D: IMPACT OF ICT DEVELOPMENT ON BANKING INDUSTRY IN UGANDA

	Yes	No	Not sure
Technology is influencing competition and the degree of contestability in banking			
Productivity growth depends on the company's ability to innovate its work processes and business routines with support of ICT			
ICT-capital investment has is a key element in productivity growth in this bank			
ICT has together with high- and medium-skilled labor a positive impact on labor productivity growth in the banking industry			
ICT has improved labor productivity by reducing working hour per employee			
Innovations enabled by ICT change the cost structure of companies in banking industry			
Radical changes in technology traditionally lead to an emergence of new products or change the production processes of existing products			

ICT enables companies to re-define the boundaries of their organizations and outsource business activities			
ICT adoption has led to a decline in employment in the banking industry in Uganda			
ICT inception has increased fraud and money laundering			

Others (Specify)

.....

Thanks for your assistance!

Appendix C: Definition of Terms as Used in the Document

Aid: Help or support

Adoption: Implementation

Inception: Commencement

Appendix D: Sample of Completed Questionnaire

Bank Name Barclays

Position held Marketing

SECTION A: ICT UPTAKE AND USAGE IN UGANDA BANKING INDUSTRY

1. Use of internet in Uganda banking industry

The following table presents six statements about the use of internet in Uganda banking industry. Each statement has three different answers (Yes, No, Do not know). Please tick (✓) the answer of your choice

	Yes	No	Do not know
Do you have access to the internet?	✓		
You use a computer connected to WWW at least once a week	✓		
The connection to the Internet is below 144 Kb/s		✓	
The connection to the Internet ≥ 144 Kb/s and < 2 Mb/s	✓		

2. Use of networks in Banking industry in Uganda

The following networks are used in your bank	Yes	No	Not sure
• Wireless LAN	✓		
• Wire based LAN	✓		
• Intranet	✓	✓	
• Extranet			

3. Specific use of IT systems in Uganda Banking Industry

Specific use of IT	Yes	No	Not sure
IT systems are dedicated for managing orders or purchases	✓		
IT systems are used for transaction links within the Bank and its branches/group of banks	✓		
IT systems are useful for customer/Bank interaction	✓		

Others (Specify)

.....

.....

.....

.....

4. Use of postal mail and ICT in the BI

	Yes	No	Not sure
The bank has not substituted postal mail by electronic means			✓
The bank has done minor substitution of postal mail by electronic means	✓		
The bank has done major substitution of postal mail by electronic means		✓	

5. Security facilities used in the BI

The following are security facilities used in the bank	Yes	No	Not sure
Virus checking or protection software	✓		
Firewalls	✓		
Secure servers	✓		
Off-site data backup	✓		
Electronic digital signature as customer's authentication mechanism	✓		
Other authentication mechanism (e.g. PIN code)	✓		
Data encryption for confidentiality	✓		
Have encountered ICT related security problem in the last 12 months?		✓	

Others (Specify)

.....

.....

.....

.....

6. Use of websites and Provision of financial services via the Internet in the BI

	Yes	No	Not sure
Do you have a web site or a homepage?	✓		
Do you use the website to market own products	✓		
Bank provided online financial services to customers via the Internet			✓
Products/ services provided Bank via the Internet:			
Payment services	✓		
Savings deposits	✓		
Loans		✓	
Investment services	✓		
Banking products/services		✓	

Others (Please specify)

.....

.....

.....

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7. Percentage of private account/ deposit holders who use interactive ordering via bank website

	Yes	No	Not sure
< 1%	✓		
1-5%			
5-10%			
10-25%			
25-50%			
50+ %			

8. Interaction in the BI with the public sector

	Yes	No	Not sure
Do you use Internet for interaction with public authorities?	✓		
Interaction with public authorities through the Internet is used for:	✓		
Obtaining information		✓	
Obtaining forms		✓	
Returning filled in forms		✓	
Submitting a proposal in an electronic tender system		✓	

Others (Please specify)

.....

.....

.....

.....

SECTION B: POTENTIAL BENEFITS OF ICT ADOPTION IN UGANDA BANKING INDUSTRY

9. Does ICT improve the banking system?

Yes ☒

No ☐

4



Not sure ☐

Give reasons to support your answer

.....

.....

.....

.....

10. ICT facilities

	Yes	No	Do not know
Do you have facilities such as:			
Telephone and internet banking	☒		
Cash point machine	☒		
Smart cards (Debit/credit)	☒		
Automatic Teller Machine (ATM)	☒		
Do you think ATM, telephone & internet banking and others are results of ICT inception?			
Do Customers prefer ATM facilities to normal teller method?			
Do ATM facilities help reduce the long queue in banking hall?			

11. When did you introduce these facilities?

1998

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12. What are other benefits of ICT inception in banking industry in Uganda?

Easy Access to money 24/7, bank can handle more customers in a short time.

Reduce staff

Can pay by credit/debit card, no need to carry money around, makes your money more safe

.....

.....

SECTION C: BARRIERS OF ICT ADOPTION IN UGANDA BANKING INDUSTRY

13. Is ICT inception in banking industry in Uganda a success?

Yes ☒

No ☐

Give you reasons

.....

.....

.....

.....

14. Recruitment of personnel with ICT skills

	Yes	No	Not sure
Did you have difficulties in recruiting personnel with ICT skills?			
The following are problems the bank faced trying to recruit personnel:			
• Personnel with required skills in the use of ICT are scarce		✓	
• Applications were not available or not entirely suitable			✓
• ICT specialists were not available or not entirely suitable	✓		
• High remuneration costs of ICT specialists			

Other problems (Please specify)

.....

.....

.....

.....

12. Does ICT adoption require huge capital investment?

Yes ☒

No ☐

Not sure ☐

Appendix E: Variables

	Name	Type	Width	Decimals	Label	Values	Missing
1	internet	Numeric	8	0	Access to the i	{1, Yes}...	999
2	www	Numeric	8	0	Use of a comp	{1, Yes}...	999
3	connen	Numeric	8	0	The connectio	{1, Yes}...	999
4	connecti	Numeric	8	0	The connectio	{1, Yes}...	999
5	wireless	Numeric	8	0	Wireless LAN	{1, Yes}...	999
6	wirebase	Numeric	8	0	Wirebased LA	{1, Yes}...	999
7	intranet	Numeric	8	0	Intranet	{1, Yes}...	999
8	extranet	Numeric	8	0	Extranet	{1, Yes}...	999
9	order	Numeric	8	0	IT systems are	{1, Yes}...	999
10	links	Numeric	8	0	IT systems are	{1, Yes}...	999
11	it	Numeric	8	0	IT systems re	{1, Yes}...	999
12	postal	Numeric	8	0	The bank has	{1, Yes}...	999
13	minor	Numeric	8	0	The bank has	{1, Yes}...	999
14	major	Numeric	8	0	The bank has	{1, Yes}...	999
15	virus	Numeric	8	0	Virus checking	{1, Yes}...	999
16	firewall	Numeric	8	0	Firewalls	{1, Yes}...	999
17	security	Numeric	8	0	Security server	{1, Yes}...	999
18	backup	Numeric	8	0	Off-site data b	{1, Yes}...	999
19	signatur	Numeric	8	0	Electronic digit	{1, Yes}...	999
20	pincode	Numeric	8	0	PIN code	{1, Yes}...	999
21	encrypti	Numeric	8	0	Datta encryptio	{1, Yes}...	999
22	homwpage	Numeric	8	0	Existance of a	{1, Yes}...	999
23	marketin	Numeric	8	0	Use of website	{1, Yes}...	999
24	online	Numeric	8	0	Provision of on	{1, Yes}...	999
25	products	Numeric	8	0	Services provi	{1, Payment se	999
26	holders	Numeric	8	0	Percentage of p	{1, Below 1%}	999
27	public	Numeric	8	0	USE of internet	{1, Yes}...	999
28	intercat	Numeric	8	0	Interaction with	{1, Obtaining ii	999
29	improve	Numeric	8	0	Improvement o	{1, Yes}...	999
30	faciliti	Numeric	8	0	ICT facilities	{1, Telephone	999
31	ictincep	Numeric	8	0	Telephone and	{1, Yes}...	999
32	atm	Numeric	8	0	Preference of	{1, Yes}...	999
33	queue	Numeric	8	0	ATM facilities r	{1, Yes}...	999
34	benefits	String	200	0	Benefis of ICT	None	None
35	suceess	Numeric	8	0	ICT inception i	{1, Yes}...	999
36	reasons	String	200	0	Reasons	None	None
37	personel	Numeric	8	0	Difficulties in r	{1, Yes}...	999
38	problems	Numeric	8	0	Problem experi	{1, Pesonnel w	999
39	investme	Numeric	8	0	Huge capital in	{1, Yes}...	999
40	competit	Numeric	8	0	Technology infl	{1, Yes}...	999
41	producti	Numeric	8	0	Productivity gr	{1, Yes}...	999

	Name	Type	Width	Decimals	Label	Values	Missing
42	capitali	Numeric	8	0	ICT capital inv	{1, Yes}...	999
43	impact	Numeric	8	0	ICT has togeth	{1, Yes}...	999
44	labor	Numeric	8	0	ICT has impro	{1, Yes}...	999
45	innovati	Numeric	8	0	Innovations en	{1, Yes}...	999
46	assets	Numeric	8	0	Technological	{1, Yes}...	999
47	employme	Numeric	8	0	ICT adoption h	{1, Yes}...	999
48	fraud	Numeric	8	0	ICT inceprion	{1, Yes}...	999

Source: SPSS

Appendix: Data View

	internet	www	connen	connecti	wireless	wirebase	intranet
1	1	1	2	1	1	1	1
2	1	1	999	1	1	1	1
3	1	1	2	1	2	1	1
4	1	1	2	3	2	1	1
5	1	1	2	1	2	1	1
6	1	2	1	2	1	1	1
7	1	1	1	3	3	1	1
8	1	999	2	2	1	1	1
9	1	999	3	3	1	2	1
10	1	1	2	1	2	1	1
11	1	1	2	1	1	1	1
12	1	1	999	1	1	2	1
13	1	2	1	1	2	1	999
14	1	1	1	1	2	1	1
15	1	1	1	1	1	2	2
16	1	2	1	1	1	1	1
17	1	2	2	2	3	1	2
18	1	1	2	1	2	1	3
19	1	1	1	1	1	1	1
20	1	1	1	2	2	3	2
21	1	1	1	1	999	1	3
22	1	1	1	3	1	1	3
23	1	999	2	1	2	1	2
24	1	1	1	3	1	1	1
25	1	1	1	3	2	1	2
26	1	2	1	3	2	1	3
27	1	1	1	3	1	1	2
28	1	2	1	3	3	1	2
29	1	1	1	3	1	1	1
30	1	1	1	1	2	1	1

Source: SPSS



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