

**THE CONTRIBUTION OF UMOJA SWITCH ATM'S IN  
PERFORMANCE OF COMMERCIAL BANKS IN TANZANIA: A  
CASE OF AKIBA COMMERCIAL BANK (ACB)  
DAR ES SALAAM REGION**

**By  
Upendo Emanuel**

**A Research Report Submitted to Mzumbe University, Dar es Salaam Campus  
College in Partial Fulfillment of the Requirements for the Award of Masters  
Degree of Business Administration in Corporate Management.**

**2013**

### **CERTIFICATION**

We the undersigned certify that we have read and here by recommend for acceptance by the Mzumbe University a dissertation thesis entitled “***The Contribution of Umoja Switch ATM’s in Performance of Commercial Banks in Tanzania***” A Case of Akiba Commercial Bank in partial fulfillment of the requirements for award of the degree of Master of Business Administration of Mzumbe University.

.....

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Firstly, special thanks should go to my supervisor Dr. Barongo without his support, encouragement and challenges; I would not have been able to be at this stage as far as academic is concerned.

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### **DEDICATION**

This dissertation is dedicated to my parents Mr. and Mrs. Emanuel Mlay, who laid down the foundation of my education and whose love and devotion make my life worth living. I also dedicate it to my beloved husband Ernest Mgawe and my daughters Precious and Pauline.

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### **LIST OF ABBREVIATIONS**

|        |   |                                                       |
|--------|---|-------------------------------------------------------|
| ACB    | : | Akiba Commercial Bank                                 |
| ATM    | : | Automatic Teller Machine                              |
| B-ISDN | : | Broadband Integrated Services Digital Network         |
| BOT    | : | Bank of Tanzania                                      |
| ICT    | : | Information Communication Technology                  |
| IT     | : | Information Technology                                |
| ITU    | : | International Telecommunication Union                 |
| MBA    | : | Masters of Business Administration                    |
| MDGs   | : | Millennium Development Goals                          |
| SPSS   | : | Software Package for Statistical Science              |
| UNESCO | : | United Nations for Education Science and Organization |

## **ABSTRACT**

This study was investigating the contribution of Umoja Switch ATM's in performance of Commercial Banks in Tanzania at Akiba Commercial Bank (ACB) in Dar es Salaam Region. Specifically, the study was determining stakeholders perception on the service provided by Umoja Switch ATM Network; identifying challenges faced by Bank Management on course of providing services through Umoja Switch ATMs; and assessing the extent to which Bank Management have managed to solve challenges faced by Bank services through Umoja Switch.

Notably, on this study the researcher collected both primary and secondary data using open-ended and Closed-ended questionnaire.

This study found and concluded that; most of the respondents argued that there is perception toward using Automatic Teller Machines especially for day to day transactions. ATMs offer considerable benefits to both banks and their depositors. However, most of the respondents argued that factors that affect the performance of Automatic Teller Machines to the banking operations are: many customers' transaction and poor education of using ATMs for customers. Notably, most of the respondents argued that there is contribution of Umoja Switch ATM's in performance of Commercial Banks i.e. bank as customers could not or would not use them, or experience difficulties in their interactions. Moreover, most of the respondents argued that stakeholders decide to adopt and use ATM without first testing it for a while. This could be because of their already perceived notions as to the advantages of using ATMs.

Finally, this study recommended that; in the rapid diffusion of ICT in banking sector, bank should provide a platform to use innovative technologies to enhance operational efficiency and quality of service to attain and retain customers.

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## **CHAPTER ONE**

### **INTRODUCTION AND BACKGROUND TO THE STUDY**

#### **1.0 Introduction**

This study focuses on assessing the contribution of Umoja Switch ATM's in performance of Commercial Banks in Tanzania. It is noted that, Umoja Switch Consortium founded in 2006 by a group of six community-banks, the Umoja Switch network now boasts of 24 member banks and 150 ATMs scattered across Tanzania (Baker, 1996).

However, Umoja Switch was set up to provide electronic payment transfers to its members, but due to tremendous increase of member banks, the consortium changed the structure and became a company which is still owned by member banks (Baker, 1996).

Notably, ACB Manual, (2012) stated that, the Umoja Switch Consortium ATM network is spreading across Tanzania by the day while improving banking transactions for customers, especially those based in rural settlement, enabling the accessibility and interoperability for all holders of the Umoja ATM card.

According to Baker, (1996), the Umoja Switch Consortium network will soon unveil a range of products and services to offer more opportunities particularly to the population sidelined in the financial services. Moreover, the Umoja Switch sign is now seen on the ATM lobby of a number of Banks in the country unlike before and the group says its main objective is to provide services which are reliable, affordable and accessible across the country (Baker, 1996).

#### **1.1 Background of the Problem**

Commercial banks have been undergoing major reforms in terms of marketing, operations as well as in technology. They are increasingly becoming ICT driven businesses. Commercial banks are now striving for service excellence and increasing

their competitive advantage through deployment of information communication technology. However, it has become true that commercial banks cannot withstand heavy capital investments required in ICT. Sharing infrastructure and modeling their business process using modern methodology has been key approach in implementing various products in ATM using Umoja Switch Consortium (ACB Manual, 2012).

ATM-based networks have produced changes in the structure of bank income. As a result of increased competition that has lowered margins in lending operations banks have diversified their sources of income and rely increasingly on income from fees services (like payment transactions, safe custody and account administration) rather than interest rate spreads (Baker, 1996).

It is however that, the introduction of ATM-based networks has improved banking efficiency in rendering services to customer. ATM-based networks is at the centre of electronic banking system in Tanzania today (Steven, 2002). Banking industry in Tanzania cannot ignore ATM-based network systems because they play a critical impact in current banking system, they point out that the entire cash flow of most banks are linked to ATM-based networks system.

Notably, ATM-based networks in most of the banks in Tanzania began August 1997 as a result of the liberalization of the banking and financial sector. These excellent rates of growth in banks therefore, have been achieved through the experience and dedication of management of Bank of Tanzania (BOT) where now ATM-based networks changes Banks in opening more its market and thus more international trade to robust their services and retain their customers (BOT Report, 1997).

Apparently, Tanzania banks are now in the implementation process of the ATM-based networks called Umoja Switch ATM's. The system shall provide inter-bank funds transfer in real-time with finality and irrevocability of settlement by means of real time option or deferred option. The Umoja Switch ATMs' system is founded in 2006 by a group of six community-banks (BOT Report, 1997). It is against this background, this study assesses the contribution of Umoja Switch ATM's in performance of Commercial Banks in Tanzania.

## **1.2 Statement of the Problem**

ATM is emerging as a local area networking technology, since it provides flexible band width-on-demand capabilities for conventional data communications. ATM-based networks are therefore expected to accommodate a wide range of banking services (Baker, 1996).

The vast majority of the recent literature on ATM-based networks suffers from a narrow focus. Despite the potential benefits of ATM-based networks especially Umoja Switch, there is debate about whether and how their adoption improves bank performance. Use of ATM-based networks requires complementary investments in skills, innovation and change entails risks and costs as well as bringing potential benefits (Kariuki, 2005).

However, Freedman, (2000) argued that there are positive impacts of ATM-based networks on banks turnover and profitability and to a lesser extent on employment, most notably when ATM-based networks is part of larger business strategies of bank. The use of ATM-based networks can contribute to improved bank performance, in terms of increased market share, expanded product range, customized products and better response to client demand. ATM-based networks continue to influence banks activities and their income structure. Among the activities that may be subject to stronger pressures for change are those that, up to today, have remained relatively insulated from ATM-based networks development.

On preliminary survey, some of the recurrent issues with ATM-based networks such as Umoja Switch ATM especially at Akiba Commercial Bank (ACB) were facing problems like lack of cash, faulty machines, power failure and a situation when some ATMs at a particular time issue receipts showing that a customer has withdrawn cash while the machine has not cashed-out the amount. Therefore, this study wants to assess the contribution of Umoja Switch ATM's in performance of commercial banks in Tanzania.

### **1.3 Research Questions**

#### **1.3.1 General Question**

What is the contribution of Umoja Switch ATM's in performance of commercial banks in Tanzania?

#### **1.3.2 Specific Questions**

- i. What is stakeholders' perception on the service provided by Umoja Switch ATM Network?
- ii. What are challenges faced by Bank Management on course of providing services through Umoja Switch ATM?
- iii. What extent to which Bank Management has managed to solve challenges faced by bank services through Umoja Switch?

### **1.4 Research Objectives**

This part comprises general objective and specific objectives

#### **1.4.1 General Objective**

The general objective of this research was to investigate the contribution of Umoja Switch ATM's in performance of Commercial Banks in Tanzania which was conducted at Akiba Commercial Bank (ACB) in Dar es Salaam Region.

#### **1.4.2 Specific Objectives**

The following were research objectives;

- i. To assess stakeholders perception on the service provided by Umoja Switch ATM Network
- ii. To identify challenges faced by the Bank Management on course of providing services through Umoja Switch ATMs
- iii. To assess the extent to which Bank Management have managed to solve challenges faced by Bank services through Umoja Switch

### **1.5 Significance of the Study**

The findings of this study emphasizes on encouraging Commercial Banks join Umoja Switch ATM to ensure their desired ends in providing financial service effectively and efficiency. Notably, the findings of this study help academicians as

well as researchers who may wish to conduct further research on Umoja Switch ATM's. However, the information accrued from this study is of great importance to Commercial Banks especially the vulnerable group in Umoja Switch and add knowledge and understanding on the benefit of Umoja Switch as it contribute in their performance.

### **1.6 Limitations of the Study**

The main constraints of this research were financial constrains as the limited resources in collection of data. However, the researcher was anticipated a major problem to be willingness of respondents to reveal their information. Another major constraint was the time.

### **1.7 Delimitation of the Study**

As far as above limitation is concerned, yet the study was done. For the issue of financial constraints, the researcher asked the sponsor to fund as was committed to the whole course. Also the issue of time, the researcher was applied for 28days annual leave which was spent at field while collecting data. Moreover, on issues of information the research strictly used them for academic purpose not otherwise.

### **1.8 Organization of the Dissertation**

This dissertation is organized in six main chapters. Chapter one presents the background to the problem, statement of the research problem, research objectives and questions, significance of the study, limitations and delimitations of the study, scope and variables of the study. Chapter two presents the review of the related literature in relation with information, ideas, data and evidence written from a particular stand point to fulfill certain aims or express certain views on key statement of this study on investigate the contribution of Umoja Switch ATM's in performance of Commercial Banks in Tanzania, review of empirical studies, research gap and end up with the conceptual framework. Chapter three details study methodologies while chapter four presents main study findings. Chapter five provides a discussion and analysis of the main findings whereas chapter six presents study summary,

conclusion, and recommendations. A fine list of references and appendices finalize the dissertation.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter provides a theoretical literature review looking on the meaning of ICT in Brand Context, the need for ICT in an organization, the Umoja Switch, Commercial Banks, Indicators of Performance, Valid Performance Indicators, Concept of ATM technology, ATM networks, Architecture of ATM networks, Global issues of Banking, Tanzania National Policy looking on objective and scope of the policy and roles and responsibilities under the policy, empirical review, research gaps and conceptual framework.

#### **2.1 Theoretical Literature Review**

##### **2.1.1 The meaning of ICT in Brand Context**

ICT is an acronym that stands for “information communication technology” and is used often in the context of ICT roadmap to indicate the path that an organization will take with their ICT needs (Adkin, 2003).

The terms ICT should be read as "Information Technology and Communication Technology" literally to clarify its meaning which refers to the merging (convergence) of telephone networks with computer networks through a single cabling or link system, it has grown in usage out of huge economic incentives (huge cost saving due by eliminating the telephone network) to merge the telephone network with the computer network system. This in turn has spurred the term ICT in their names to indicate their specialization in the process of merging the two network system together (Odedra, 2003).

ICT has come to be regarded as the mainstay of all distance, the spread of information and communication technology has revolutionized the access to difference sectors and the distance open learning in particular, information and communication technology roles need to overemphasized in its common knowledge that every teaching institute is fast adapting itself to technology based teaching and

learning in order to keep abreast of the changes taking place in education and other sectors in general (Chacha, 2000).

### **2.1.2 The need for ICT in an organization**

ICT is offering even developed countries a window of opportunities to leapfrog the industrialization stage and transform their economics into high value added information economies on the global market. Technological innovation has contributed to globalization by supplying infrastructure for Trans World connections. The revolution taking place in information and communication technologies have been the central and driving force for the globalization process. Both developed and less developed countries cannot afford to miss out on the opportunities these technologies are creating (Rosa, 2004).

ICT is basically an electronic based system of information transmission, reception, processing and retrieval, which has drastically changed the way we think, the way we live and the environment in which we live (Baker, 2003).

ICT are increasingly playing an important role in organizations and in society's ability to produce, access, adapt and apply information they are being heralded as the tools for the post industrial age, and the foundation for a knowledge economy due to their ability to facilitate the transfer and acquisition of knowledge. ICT may not be the only cause of changes we are witnessing in today's business environment, but the rapid developments in ICT have given impetus to the current wave of globalization (Allan, 2001).

### **2.1.3 The Umoja Switch**

This is an ATM infrastructure shared by banks which collectively offer a wide ATM network to customers. Customers get greater control of their transactions with instant access in the most efficient manner in any ATM conveniently positioned at strategic locations (ACB Manual, 2012).

#### **2.1.4 Commercial Bank**

Commercial bank (or business bank) is a type of financial institution and intermediary. It is a bank that provides transactional, savings, and money market accounts and that accepts time deposits (Mark, 2004).

However, Commercial bank refers to a bank or a division of a bank primarily dealing with deposits and loans from corporations or large businesses. In some other jurisdictions, the strict separation of investment and commercial banking never applied. Commercial bank may also be seen as distinct from retail banking, which involves the provision of financial services direct to consumers. Many banks offer both commercial and retail banking services (Wood, 1999).

Commercial banks engage in the following activities: processing of payments by way of telegraphic transfer, internet banking, or other means, issuing bank drafts and bank cheques, accepting money on term deposit, lending money by overdraft, installment loan, or other means, providing documentary and standby letter of credit, guarantees, performance bonds, securities underwriting commitments and other forms of off balance sheet exposures, safekeeping of documents and other items in safe deposit boxes, distribution or brokerage, with or without advice, of insurance, unit trusts and similar financial products as a “financial supermarket”, cash management and treasury, merchant banking and private equity financing, and traditionally, large commercial banks also underwrite bonds, and make markets in currency, interest rates, and credit-related securities, but today large commercial banks usually have an investment bank arm that is involved in the mentioned activities (Mark, 2004).

#### **2.1.5.1 Indicators of Performance**

Performance indicators can be defined as data, usually quantitative in form, that provide a measure of some aspect of an individual's or organization's performance against which changes in performance or the performance of others can be compared. If analyzed further it can be said that although performance indicators have relatively precise meaning the term has grown to mean any statistical data related to the activity of higher education institutions, whether or not they really do throw any light on performance. Furthermore, a decade ago, Yorke (1995, p. 15) noted a tendency

for performance indicators to be collected irrespective of the policy framework within which they are to be used — this was particularly evident in the United States in the late 1980s and early 1990s.

From analytical point of view CHEA (2001) defines performance indicators as; Representations (usually numeric) of the state of, or outcome from, financial organization. These sometimes called "management indicators" regarded as a set of tangible measures designed to provide public accountability. Often includes admission and graduate data, research records, employment of graduates, cost per student, student/staff ratios, staff workloads, student relevance, class size, laboratory and other equipment, equity, libraries, information technology, and other learning resources; should be subject to informed interpretation and judgment.

The UNESCO definitions for Performance Indicators say that is a range of statistical parameters representing a measure of the extent to which a higher education institution or a programme is performing in a certain quality dimension. They are qualitative and quantitative measures of the output (short-term measures of results) or of the outcome (long-term measures of outcomes and impacts) of a system or of a programme. They allow institutions to benchmark their own performances or allow comparison among higher education institutions (Vlăsceanu et al., 2004, p. 39).

Use of performance indicators in quality review has shown that there is considerable variation in the use of performance indicators in quality review (Cave et al., 1997). Woodhouse (1999, p. 33). Most commonly, institutions are invited to specify their performance indicators, indicating why and how they use them. The external quality review agency, through its independent review team, then forms its own interpretation of the results. In other systems, however, higher education institutions are expected to report against a system-wide set of performance indicators, which are then available to the external quality review process.

Massoud and Bernhardt (2002) develop a spatial model in which consumers both choose a bank at which to deposit and choose their use of ATM services. In their

model two banks are on either side of a circle, and consumers are uniformly distributed around the circle. Consumers choose a bank, knowing that they face a fixed fee for banking services, and that, as they travel around the circle, they might experience a need for a banking service, and incur fees to conduct those services. For some services, the consumers need to travel to their bank, while others can be completed at an ATM.

Massoud and Bernhardt find that banks discriminate in favor of their customers, and that imposing uniform fees on the ATM prices of banks would result in fees higher than the surcharges for all customers (and would increase bank profit). In their model, the ATM surcharges are set explicitly to induce potential customers to establish accounts at the bank. They also find that when they alter their model to allow for heterogeneous-size banks, larger banks charge higher surcharges than smaller banks do. Prager (2001) empirically examines the experience of small banks in states that allowed surcharging prior to 1995 and comparing them to small banks in states in which surcharging was not allowed. She found that the small banks in the surcharging states did not lose market share or show a decline in profitability relative to small banks in the nonsurcharging states. She concludes that the level of surcharges that existed during that period was not enough to provide a strong incentive for small bank customers to switch their allegiance to banks with large ATM networks.

Vlăsceanu et al. (2004: pg. 40) argue that; Performance indicators work efficiently only when they are used as part of a coherent set of input, process, and output indicators. As higher education institutions are engaged in a variety of activities and target a number of different objectives, it is essential to be able to identify and to implement a large range of performance indicators in order to cover the entire field of activity. Examples of frequently used performance indicators, covering various institutional activities, include: the number of applications per place, the entry scores of candidates, the staff workload, the employability of graduates, research grants and contracts, the number of articles or studies published, staff/student ratio, institutional income and expenditure, and institutional and departmental equipment and furniture.

Performance indicators are related to benchmarking exercises and are identified through a specific piloting exercise in order to best serve their use in a comparative or profiling analysis.

#### **2.1.5.2 Validity Performance Indicators**

Basically there is no way human being can judge anything without having any sign which lead him/ her to declare or comment on anything; such signs which makes someone to have an insight or perception about something is called indicators. In the early 1990s there was much research on ‘performance indicators’, most of which suggested that statistical indicators, whether reliable or not, are rarely valid operationalisations of quality (Murphy, 1994). Furthermore, despite being ‘indicators’ it is unclear, exactly, of what performance they are indicative.

What, for example, does an increase in percentage of ‘good’ degree classifications tell us about quality? Does it indicate that the student learning performance has improved? Does this mean that the teaching staffs have performed better, or are the students learning more despite the teachers? Or does it mean that academic standards have fallen? Similarly, what does the employment rate of graduates within the first six months after graduation tell us about the performance of the institution? Perhaps it says more about the vagaries of the recruitment process and the differential in take-up rates between different subject specialisms than provide any indication of the performance of the institution.

Harvey (1998, p. 243) argues that, in practice, performance indicators are usually simplistic, convenience measures that bear no relation to any notion of quality. Yorke (1998) suggested that the benefit that might accrue from improving statistical measures to make them into really meaningful performance indicators is outweighed by the cost that would accrue.

#### **2.1.6 History of the Automated Teller Machine**

There are numerous men who lay claim to being the inventor of the ATM. Miller (2008) highlights some facts about these men, and they are subsequently discussed.

Luther George Simjian started building an early version of an ATM in the late 1930's. He came up with the idea of creating a hole-in-the-wall machine that would allow customers to make financial transactions. The idea was met with a great deal of doubt. Starting in 1939, Simjian registered 20 patents related to the device. He persuaded the City Bank of New York, today Citibank, to run a six-month trial. The trial was discontinued not due to technical insufficiencies, but due to a lack of demand. Simjian wrote: It seems the only people using the machines were a small number of prostitutes and gamblers who didn't want to

In the 1960's, John Shepherd-Barron had an idea for a 24/7 cash dispenser, while he was managing director of De La Rue Instruments. De La Rue today manufactures cash dispensers. There is a De La Rue cash dispenser in one out of every five ATM machines built. The ATM was installed outside a north London branch of Barclays Bank in 1967. He received the Order of the British Empire in 2005 for services to banking as inventor of the automatic cash dispenser, but there is some controversy over the invention. James Goodfellow developed an alternative ATM design, using PIN technology, resembling modern ATMs more than Shepherd-Barron's machine. However, Shepherd-Barron's machine was the first to be installed. Inspiration struck Shepherd-Barron while he was in the bath: It struck me there must be a way I could get my own money, anywhere in the world or the UK. I hit upon the idea of a chocolate bar dispenser, but replacing chocolate with cash. The machine paid out a maximum of £10 at a time

The Shepherd-Barron dispenser actually predated the introduction of the plastic card with its magnetic strip: the machines used special cheques which had been impregnated with a radioactive compound of carbon-14, which was detected and matched against the personal identification number (PIN) entered on a keypad.

A proposed six digit PIN was rejected and four digits chosen instead, because it was the longest string of numbers that his wife could remember.

James Goodfellow patented the Personal Identification Number (PIN) technology. In 1965 he was a development engineer with Smiths Industries Ltd and was given the project of developing an automatic cash dispenser. Chubb Lock & Safe Co. were to provide the secure physical housing and the mechanical dispenser mechanism. Eventually Goodfellow designed a system which accepted a machine readable encrypted card, to which he added a numerical keypad. The design was patented in May 1966 in the UK and subsequently in many other countries thereafter. These machines were marketed by Chubb Ltd and installed nationwide in the UK during the late 60s and early 70s.

John D. White started his work in 1968. In August 1973 he installed the first ATM at Rockville Center, Long Island, for the then Chemical Bank. Chemical Bank's ad campaign announced: On Sept. 2, our bank will open at 9:00 and never close again! His design was patented in May 1973 for the Docutel Corporation and was filed in July 1970. The machine was called a "Credit Card Automatic Currency Dispenser". There is a statement in the patent that supports the idea of the modern ATM. Both the original code and the updated code are scrambled in accordance with a changing key, which is what happens today. ATMs are programmed with security keys and the code changes and are scrambled to prevent fraudulent access to the card and ATM numbers between the machine, the bank, and the network processor.

Jairus Larson did not invent the ATM, but he did develop the very first 'online' ATM (Diebold's "550"). The first ATMs were all 'off-line' versions (sometimes referred to as 'stand-alone') meaning they did not have any means to communicate with the bank.

### **2.1.7 Introduction of ATMs in Tanzania**

Elke (2006) says that, a series of financial and economic reforms introduced in the 1990s is starting to bear fruit, aiding the development of a competitive and efficient financial sector in Tanzania. The Investment Act of 1990 and the Banking and Financial Institutions Act of 1991 were among the earliest reforms which

removed the state monopoly on banking services. According to this report, in 2006 two Acts of parliament were passed namely, the Bank of Tanzania Act and the Banking and Financial Institutions Act, in order to keep control of the booming Tanzanian banking sector.

Tanzania is a fast growing country and is ranked as one of the highest receivers of foreign direct investment in the world, so has the demand for efficient financial services. Unlike the old days when in the large urban areas, ATMs were usually installed at major banks, the gadgets are currently spread in almost every street in major towns. Thus, many banks introduced ATMs in Tanzania as a result of these two Acts of parliament of 2006. For example NMB introduced ATM cards in 2008 and all its branches in the country have installed ATMs. This implies that ATMs are now used by NMB customers almost in all districts of Tanzania.

Twiga Bancorp installed its ATMs in July 2008 under the name of UMOJA Switch having a link with ACB, Community Bank of Dar es salaam, Tanzania Investment Bank Ltd, Azania Bank, and BOA. Cardholders of these banks can make a transaction with any ATM of these banks. Any bank can join this Switch and form party of the UMOJA SWITCH extending its ATM transactions to its customers. CRDB has introduced the card branded Tembo card . This card can be used to withdraw cash from Tembo card cash points or to purchase goods from retail outlets which accept the card as a means of payment. It is observed from the field that many banks in Tanzania started ATM programs mainly from 2006 following the law reforms in banking system

#### **2.1.8 Concepts of ATM technology**

ATM (Asynchronous Transfer Mode) is a communications technology designed and recommended by ITU (International Telecommunication Union) for supporting the B-ISDN (Broadband Integrated Services Digital Network) infrastructure. As the B-ISDN has to provide satisfactory support to a wide range of applications, it include both real-time services such as voice and video, and data services like file transfers, data base querying, etc.

However, ATM's most successful applications today include the replacement to existing, traditional LAN technologies, as well as the interconnection of LANs through a backbone network. Thus, in the future, ATM is expected to integrate both LAN and WAN environments. For this reason, ATM becomes a serious candidate technology to support communications in parallel computing applications.

The reference model for ATM approximately maps to the three lowest layers of the ISO-OSI reference model: network layer, data link layer, and physical layer. ATM is a core protocol used over the SONET/SDH backbone of the public switched telephone network (PSTN) and Integrated Services Digital Network (ISDN), but its use is declining in favour of all IP.

ATM provides functionality that is similar to both circuit switching and packet switching networks: ATM uses asynchronous time-division multiplexing, and encodes data into small, fixed-sized packets (ISO-OSI frames) called *cells*. This differs from approaches such as the Internet Protocol or Ethernet that use variable sized packets and frames. ATM uses a connection-oriented model in which a virtual circuit must be established between two endpoints before the actual data exchange begins. These virtual circuits may be "permanent", i.e. dedicated connections that are usually preconfigured by the service provider, or "switched", i.e. set up on a per-call basis using signalling and disconnected when the call is terminated.

ATM became popular with telephone companies and many computer makers in the 1990s. However, even by the end of the decade, the better price/performance of Internet Protocol-based products was competing with ATM technology for integrating real-time and bursty network traffic. Companies such as FORE Systems focused on ATM products, while other large vendors such as Cisco Systems provided ATM as an option. After the burst of the dot-com bubble, some still predicted that "ATM is going to dominate". However, in 2005 the ATM Forum, which had been the trade organization promoting the technology, merged with groups promoting other technologies, and eventually became the Broadband Forum

### **2.1.9 ATM Networks**

The ATMs of a bank are connected to the accounting platform of the bank through ATM switches. Inter-bank ATM networks are created by setting up apex level switches to communicate between the ATM switches of different banks. The inter-bank ATM networks facilitate the use of ATM cards of one bank at the ATM(s) of other banks for basic services like cash withdrawal and balance enquiry. Banks owning the ATMs charge a fee for providing the ATM facility to the customers of other banks. The ATM deploying bank from the card issuing banks recovers this fee referred to as 'interchange fee'. However the interchange fee is not fixed across banks and depends on the terms of bilateral / multilateral arrangements. Banks with larger ATM network treat interchange fee as an important stream of revenue.

The motivation of banks to deploy ATMs and share their ATMs with the customers of other banks are areas that economists have investigated. Humphrey (1993) examines the motive for deploying ATMs based on cost saving. He studies the costs of banking in the U.S. and how the costs are influenced by the deployment of ATMs. He finds substantial scale economies in the production of ATMs services, and that ATM transactions cost about half the amount that the same transaction would cost if it were conducted in a branch of a bank. However, no savings were realized from the significant expansion of ATM services that Humphrey observed. Instead, bank customers, taking advantage of the increased convenience of ATM services, increased the number of transactions, leaving total bank costs roughly the same as had no ATMs been deployed.

Humphrey also found that some banks, those that carefully managed their service delivery operations, were able to reduce their costs by deploying ATMs. Humphrey's findings indicate that satisfying consumer demands is an important consideration in the decision to deploy ATMs, perhaps more important than an attempt by banks to reduce costs.

Saloner and Shepard (1995) examine the deployment of ATMs by individual banks prior to the advent of sharing ATMs in the U.S. By considering the size of the bank and the geographic dispersion of the bank's depositors, they are able to detect a

significant network effect in the demand for ATM services by bank customers. They examine a dynamic model of investment. Banks whose customers have a higher willingness to pay for a service will invest in providing that service sooner than another bank that is similar in other respects. Saloner and Shepard find that banks that have a more extensive branch network adopted ATMs sooner than other large banks, as their customers could take better advantage of the geographic diversity of ATM sites (usually provided at a bank's branches) in meeting their demands for cash.

McAndrews (1991) measures an indicator of the demand-side network effect, the number of on-others transactions, sometimes called interchange transactions. He finds that interchange transactions increased as ATM networks were formed among banks and became more concentrated. As ATM networks became more concentrated, the ability of bank customers to use other regional banks' ATMs tended to expand as well. Carlton and Frankel (1995) closely examine the effect of a merger of two ATM networks in Chicago, Illinois, and find that the merger led to a significantly higher growth rates of total transactions, interchange transactions, and ATMs than were experienced nationally during the same time period. They conclude that the network effects in ATM services are very large at the level of a large metropolitan area. In addition, network operating costs fell substantially following the merger.

Matutes and Padilla (1994) present a seminal paper on the factors that lead a bank to share ATMs with other banks. They consider a three-bank market, in which the banks are located around a circle. Within their model, there are both advantages and disadvantages to a bank considering sharing its ATMs with another bank. The advantage is that a bank's customers will tend to accept a lower return on their deposits, as sharing lowers the customer's expected transportation costs. The disadvantage is that by sharing, the bank reduces the differentiation its locational distinction otherwise provides it with. They conclude that less than full sharing of ATMs will result in the equilibrium of their model (that is, one equilibrium is for two of the banks to share ATMs, while the third bank is not included; there is no equilibrium with all three banks sharing ATMs).

Matutes and Padilla (1994) make a significant extension of their basic model to consider the imposition of an interchange fee. The interchange fee softens the effect of increased substitutability among banks. The interchange fee softens competition as banks' are less willing to bid to attract depositors, because depositors cause costly on-others' withdrawals. With interchange fees, full sharing of ATMs is a possible outcome of the model. This result is an important and quite general one. In a paper that is consistent with Matutes and Padilla's analysis, Laderman (1990) finds that states within the U.S. that mandated the sharing of ATMs tended to experience slower growth of ATM cards, and therefore, probably in ATM transactions. Laderman points out that a number of states did not mandate ATM sharing by networks, while many states did.

The laws tended to impose the requirement on ATM networks that they admit any qualified participant on reasonable terms. Nonetheless, such mandatory admission to the sharing of ATMs implied by network membership might not be desirable from the private point of view, as in Matutes and Padilla (1994). Laderman exploits the cross-sectional variation across the states to test the effects in number of ATM cards and in the number of ATMs. She finds that those states that mandated sharing the number of ATM cards is significantly reduced, while controlling for many other influences; the number of ATMs is not significantly reduced. The number of cards is a proxy for number of transactions (which cannot be directly observed at the state level), indicating to Laderman that mandatory sharing tended to increase the prices of ATM transactions in those states.

McAndrews and Rob (1996) consider whether the joint-venture structure by a network might influence the willingness to join an ATM network. In their model banks can join one of two networks, each of which set a switch price (there is no interchange fee in this model). The banks then compete in quantities in the downstream market, in which the demand for services displays a network externality in the number of banks belonging to a particular switch. They show that for any equilibrium of the model in which upstream competition for network affiliation is carried out between two third-party, for-profit networks, there is a corresponding

equilibrium of the model in which upstream competition is between a third-party, for-profit network and a joint-venture, not-for-profit network. The main result shows that the corresponding equilibrium in the not-for-profit competition case is one in which the industry is more concentrated into a single network.

In other words, by delegating the pricing power to its member-banks, the presence of a joint-venture network better achieves the extraction of the full gains from network expansion. In equilibrium the prices to consumers are the same, for the same sized networks, regardless of upstream for-profit or not-for-profit organization, the difference between the two is the level of the industry at which profits are extracted.

McAndrews (1996) indirectly estimates customer demand for the size of the network, by estimating how the foreign fee varies as the size of the network varies. He finds that in the U.S. the foreign fee tended to increase in the size of the network up to a certain point, and decline thereafter. This result is interpreted in the context of a model in which ATM sharing displays both a demand-side network effect, and ATM switching displays economies of scale. The first effect dominates up to some size of network, and banks increase their retail prices, while the second effect dominates after networks reach large scale, allowing banks to lower their prices, although their price-cost margin remains high.

In addition, McAndrews (1996) concludes that networks operating nearby exert little competitive influence on an entrenched network.

#### **2.1.10 Architecture of ATM networks**

The ability of ATM to adapt to the different services comes from the compromise between the low delay achieved by circuit-switching mechanisms and the flexibility inherent to packet-switching technologies.

This behavior has been made possible with the encapsulation of data into fixed-sized, very short packets, known as cells, whose transmission is carried out through a hierarchy of virtual connections. The final objective is to efficiently exploit the high

bandwidth enabled by current transmission media (fiber optics). ATM-based networks involve a fairly complex architecture in order to allow for a wide range of applications to take advantage of ATM.

The ATM layer is in charge of providing the cell transport service. As data are transferred by using virtual connections, cells are delivered in order to the receiving peer. In fact, ATM is a packet-switching technology dealing with small packets having all of them the same short length. As a consequence, like in all packet-switching networks, the delay experienced in the virtual connection is not constant but varies

#### **2.1.11 Global issues of Banking**

Banking have made important progress in demonstrating that ATM's services that have been shown to have a significant impact on the social goals of reducing poverty and social exclusion and hence make an important contribution to the banks in achievement of the Millennium Development Goals (MDGs) (IMP –Act policy note, 2005:1).

The achievement of the millennium Development goals by the year 2015 as suggested by the United Nations depends entirely on the individual countries to strive hard and objectively to manage existing human and non-human resources; a suggestible approach can be the one of both individual lending and group lending. With their approaches, the concerned are directly involved in their own salvation to better living standards (IMP –Act policy note, 2005:1).

El-Solh (1999; 22) argued that 'though access to finance cannot by itself generate income, ATM's system viewed as an important into the process of developing commercial banks perceived to have the potential to make an important contribution to economic development in countries that are moving from a state –led strategy towards a market oriented policy environment that favors the private sector. Structural adjustment programs are believed to contribute to improving the climate within their enterprises operations (Paker, Riopelle and Steele 1995)

A top priority for banks around the world is meeting the demand for quality services from increasingly sophisticated clients. “Consumers are becoming more sophisticated and therefore have high expectations of their banks,” says Sophonpanich of his Thai corporate and consumer customers. “However, customer needs differ widely; therefore banks have to design their strategies to meet the requirements of each customer segment,” he adds.

One way that the National Bank of Kuwait maintains the satisfaction of its customers—whether retail, private banking or corporate—is by conducting regular surveys to identify customer perceptions and needs, says Dabdoub. The bank then refines its planning process to make sure it’s meeting those customers needs and expectations. “We have been experiencing qualitative and quantitative growth in customer demand. Kuwaiti customers have faith in the stability and health of the banking system,” adds Dabdoub. “Consumers are currently the driver behind growth in our business and will continue to play this role in the coming year.”

The Public Bank in Malaysia has seen customers become more demanding on a range of issues from pricing to product features to delivery. “We have a proactive market-intelligence-gathering infrastructure, which includes regular feedback from branch managers and others on the ground, to ensure the group can speedily respond to changes in customer demand,” the bank’s founder adds. Parex Bank has placed a priority on investments in technology so the Latvian bank can meet the needs of its increasingly mobile and technologically advanced clients. “In addition to advanced technology, today’s client is concerned about the transparency and integrity of his bank,” says Kargin. “We feel that Parex Bank’s success in this has been a significant contributing factor in expanding our customer base and attaining another year of nearly 40% growth in deposits.” Customers at the Commercial Bank of Ceylon increasingly want secure and inexpensive methods of money transmissions as well as convenient ways to access their accounts. And referring to corporate customers, Gooneratne adds that “banks are routinely required to have a global reach through strong correspondent and a branch network.”

Since products and prices can be emulated quite easily, customer service is the key differentiator in South African banking for both corporate and retail customers. “The retail bank constantly measures its service levels using both internal and external surveys and aims to meet targets set every year,” Standard Bank’s Maree says. “On the corporate and commercial side, much emphasis is placed on relationship-building and service.”

According to South Africa’s leading independent ATM provider, Spark ATM Systems (2010), during the month of May 2010, the average value of cash withdrawn was R402 per withdrawal, showing a 7.53% increase from May 2009. To date, R402 is the third highest value recorded in the Spark Cash Index. This performance is consistent with previous years. The increase of 7.53% is the fifth month in a row with increases in excess of 7%, indicating that consumers have continued to withdraw larger values of cash well into 2010.

## **2.1.12 Tanzania National Financial Policy**

### **2.1.12.1 Objective and scope of the Policy**

The Government considers commercial banks system as an integral part of the financial sector that falls within the general frame work of its financial sector Reform Policy statement of 1991, the overall objective is to establish a base for evolution of an efficient and effective microfinance system in the country that services the low – incomes segment of the society, and that will contribute economic growth and reduction of poverty. This is made possible through, establishing will develop and laying out the principles that will guide operations of the system.

### **2.1.12.2 Roles and responsibilities under the Policy**

Commercial banks as in other aspects of financial sector development the government’s major role will be to create a supportive macro-economic setting and a regulatory environment that allows sound them survives to emerge. The key Government’s function is keeping inflation low, allowing interest rates to be set freely and developing rural infrastructure to allow access to remote areas. Furthermore, building a healthy loan culture through public awareness programs,

providing high-quality banking supervision a legal framework supportive of commercial banks operations are of the government.

### **2.1.13 The Laws Governing ATM Transactions in Tanzania**

#### **2.1.13.1 Contract Laws**

The use of ATMs is primarily governed by contract laws. Nearly all ATMs processes operate from beginning to end through a series of legal agreements. Banks issue ATM cards to their customers with certain terms and conditions that are to govern ATM transactions.

The question may arise as to whether banks can exclude or limit their responsibilities to their customers in respect of ATMs. Banks usually set out in a standard printed agreement with each cardholder the conditions and terms of use of the banks cash cards and ATMs. Banks thus have opportunities to limit or completely exclude their legal liabilities to their cardholders by an express clause in those terms and conditions.

Banks can incorporate unfair terms in the conditions on the cards because there is no other governing law in making contracts that protect customers, all contracts are governed by the Law of Contract Act in Tanzania. Some other countries have introduced specific laws to govern the terms in the contract as to avoid the possibility of the banker to limit or completely exclude its responsibilities with unfair terms in ATM cards. For example, England has introduced a specific legislation known as to ATM transactions in Tanzania and thus a need to have a specific law to regulate ATM transactions.

#### **2.1.13.2 Criminal Laws**

Criminal law forms a source of laws governing ATMs due to the facts that several fraudulent activities are done on the use of ATMs. Criminal liability is thus imposed on fraudsters either under specific laws or under the general criminal law framework. In Tanzania, the Penal Code is the governing law to such issues.

It is worth adding that a person who uses someone else cash card without authority or fraudulently manufactured card will be guilty of a number of criminal offences including, possibly, theft. The actual manufacture of a duplicate cash card may constitute forgery which is also a criminal offence in Tanzania.

#### **2.1.13.3 Law of Torts**

In permitting customers to make ATM cash withdrawals, a bank is providing a service. As with any other service, the bank must perform the service with due care and skill. The bank must ensure that its ATMs are designed and programmed to respond accurately to the proper commands of cardholders, as far as is reasonable maintained in working order, provide sufficient information to the bank of completed cash withdrawals to enable cardholders current accounts to be debited with the right amount on the right date.

Security is a major concern in ATM systems. Cardholders are required under the contract not to be negligent in handling their PIN or passwords and even the cards. Likewise the issuer and the operator of an ATM are required to perform their functions with due care as per the terms and conditions of the contract.

Negligence of either party may cause liability on his side and the law of torts is of essence in determining the loss/ injuries and damages resulted from ATM transactions.

#### **2.1.13.4 Procedural Laws**

In matters of evidence, the Evidence Act is the governing law in Tanzania and thus, even in ATM transactions the Evidence Act governs matters of evidence. However, the Evidence Act hardly fits the need for ATM transactions; thus, we need a specific statute to govern matters of evidence in ATM transactions. And in ATM transactions” disputes and procedural matters provided for the Civil Procedure Code and the Criminal Procedure Act apply as the general laws.

However, the Law Reform Commission of Tanzania has taken an important step in supporting the legal reforms in this area. It has drafted bills presented to the Minister of Justice and Constitutional affairs for further steps. The bills include the followings:-

- a) Electronic Evidence Bill
- b) Electronic Transactions and Communication Bill
- c) The Cyber-and Computer Related Crimes Bill and;
- d) The Data and Privacy Protection Bill. Such legislation would be most welcome and is much needed in Tanzania.

UNCITRAL (1984) has developed model laws on electronic transactions which have been adopted by many countries like Australia and Mauritius. But the case is different with Tanzania because there is no specific act providing the rules and guidelines to electronic transactions. In relation to electronic funds transfer a fraud has been defined as an unauthorized instruction, alteration of the account to which an entry is to be made or alteration of the amount of the entry from UNCITRAL.

Several countries have enacted statutes specific for electronic funds transfer including ATMs. For example, USA has enacted the Electronic Funds Transfer Act specific on electronic funds transfer that regulates and governs the issues relating to electronic funds transfer. Rules and guidelines specific on ATM transactions are specifically set out by the provisions of this Act. For example, section 909 of the Act states that a consumer is liable for unauthorized electronic funds transaction only if the card is used with the PIN and the loss is limited to fifty dollars if the report is made to the relevant authority within two days of the loss of the card.

#### **2.1.13.5 Judicial Activism**

Tanzania is one of the common law countries that abide by common law principles in its legal system. Precedent is one of the common law principles that apply in Tanzania. The court may use previously decided cases either as authoritative or persuasive from the court of records within the country or from any other common law country respectively.

Previous decisions from the courts of record in Tanzania may provide authority for recent cases. Some principles have been developed that can also be applied to ATM matters. For example the bank owes a duty of care to its customers in that it should conduct its activities with care and circumspection. There is a need for the banks to display vigilance when handling their customers financial matters and that, it is the bank that owns the customers money deposited in the bank, and this principle holds the banker-customer relationship to be of a debtor-creditor. Therefore, the bank should ensure safety of its money from accounts of customers by ensuring clear and proper instructions on the ATMs and provide proper functioning of ATMs to customers..

## **2.2 Empirical Literature Review**

Various studies were reviewed in line with this study. Peeyush (2001) research explained the working of ATM, ATM penetration per million persons in Asian countries and the system of security –how it works and also the frauds of ATM. However, Raja (2003) in his article explained the importance of shared network of ATM in Indian banks. Notably, Kamath (2004) emphasized that banks in India have traditionally claimed the strength of their networks based on the number of branches. The logic was that the increase in branch network corresponds to more transactions, more business and therefore more profits. Not unlike the rest of Asia, where branch rationalization first started in Japan and then spread across the continent, this logic is steadily getting reversed in India.

However, according to Kumal (2012) argued that, deployment of IT by the banks is about using the infrastructure of the digital age to create opportunities - both local and global. It enables the dramatic lowering of transaction costs and the creation of new types of banking opportunities that address the barriers of time and distance. Banking opportunities are local, global and immediate in e-banking. The current web based variant of banking is the latest of several generations of systems: ATM was the first well-known machines to provide electronic access to customers of retail banks. With advent of ATM, banks are able to serve customers outside the banking hall.

Therefore, he concluded that ATM is highest and the number of users of ATM is also highest as compared to other services.

Joan (1997) research presents a network architecture that addressed to the execution of parallel computing applications on top of a computer network based on the ATM technology. Advances in network performance and workstation technologies have encouraged strategies to provide support to the communication needs of network-based parallel computing environments i.e. the use of such platforms for supporting parallel computing makes sense when the environment takes advantage of a previously existing network that supports a base of networking applications. In many cases, it will be possible to achieve satisfactory performance for parallel computing applications without the need of incurring in the cost motivated by the acquisition and maintenance of a dedicated multiprocessor, which may be difficult to amortize unless a highly intensive use of parallel computing is performed. For this reason, parallel computing will no longer be limited to critical applications but rather the availability of less costly environments will allow for a wider range of applications to benefit from parallelism. Thus, the existence of both options can lead to a popularization of parallel computing.

Agnihotri Peeyush (2001) in his paper ‘ “ IT way of getting cash” explained the working of ATM, ATM penetration per million persons in Asian countries and the system of security –how it works and also the frauds of ATM. Simhan Raja (2003) in his article, “Shared ATM networks gain favour” explained the importance of shared network of ATM in Indian banks. Puri and Kamath (2004) in their article, “Indian Banks: Bigger, Better & Remote Controlled” explained that banks in India have traditionally claimed the strength of their networks based on the number of branches. The logic was that the increase in branch network corresponds to more transactions, more business and therefore more profits. Not unlike the rest of Asia, where branch rationalization first started in Japan and then spread across the continent, this logic is steadily getting reversed in India.

Dilijonas et al., (2009) examined the essential aspects of ATM service quality in Baltic States.

They identified essential resources (adequate number of ATMs, convenient and secure location and user-friendly system); important dimensions of operation of ATM (maximum speed, minimum errors, high uptime, cash backup); and value-based aspects (quality service at reasonable cost, and maximum offering to cover maximum needs of customers) as vital facets.

Based on the prior studies, Al-Hawari et al. (2006) compiled a list of five major items about ATM service quality that include convenient and secured locations, functions of ATM, adequate number of machines and user-friendliness of the systems and procedures. An empirical study found that these items constitute important aspects of ATM service quality.

Islam et al., (2005) examined the satisfaction level of ATM card holders of a leading bank

(HBSC) in Bangladesh. The study found significant relationship of ATM service quality with

customers' satisfaction. The study identified that location, personnel response, quality of currency notes, promptness of card delivery and performance of ATM were positively and significantly related to customer' satisfaction. The security, frequent breakdown of machine, and insufficient number of ATM were major contributors of customers' dissatisfaction.

In another study in Bangladesh, Shamsdouha et al., (2005) found that 24 hours service,

accuracy, and convenient locations were the main predictors of customer satisfaction. The study also indicated lack of privacy in executing the transaction, fear of safety and complexity of the machine were the major cause of concern for the customers.

Joseph and Stone (2003), through focus group study in the United States, found that easy access

to location, user-friendly ATM, and security are important factors that influence majority of bank

customers' perception of ATM service quality. Patrício et al., (2003) undertook a qualitative study of a Portuguese bank regarding customers' use of multi channel offerings. The study identified accessibility and speed of operation as strong predictors of customers' satisfaction, whereas security dimension and technical failures were main causes of dissatisfaction.

Previous researches have found that reliability feature of ATM is essential to consumers' use of

electronic channels of banking (Liao & Cheung, 2002; Polatoglu & Ekin, 2001). Rugimbana and

Iversen (1994) studied the perceived attributes of ATM service quality and their marketing implication.

They found that convenience, reliability, and ease of use are important aspects, whereas complexity and unreliability (risk) were causes of dissatisfaction. Lebanc (1990), in a study of ATM users in Canada, established that major reasons for using ATM were accessibility, freedom to do banking at all times, and to avoid waiting lines. The study also found the users' apprehension about the risk associated with its use and complexity of the machine in executing the transaction.

Moutinho (1992) examined relationship of dimensions of usage rate and performance expectation with customers' prolonged satisfaction with ATM services. The results indicated that

usage rate had a negative association with customer perceived prolonged satisfaction whereas

performance expectations found to have positive and significant predictor of customers' prolonged satisfaction. Moutinho and Brownlie (1989) found that accessibility and location of ATMs significantly affect users' satisfaction. The research found that customers were willing to accept new offerings through ATMs. Waiting in queue to use the ATM was the major cause of dissatisfaction among the users.

Howcroft (1991) noted that dissatisfaction among customers is associated with frequent

interruptions and breakdown of ATMs. Intense competition and technology-based new services are shaping customers loyalty. These have resulted into switching of banks by customers based on competitive services (Lewis & Bingham, 1991). Meller (1993) found that location of ATMs, increasing number of ATMs, and diversified service offering are associated with switching of banks.

Marketers identified customers' satisfaction through behavioural, cognitive, and attitudinal

response to the service provider. These dimensions manifest in repeated use of services, tolerance with regard to price, word of mouth promotion and display of cognitive and attitudinal behaviour (Bowen & Chen, 2001). Athanassopoulos, (2000) found strong empirical evidence of innovation, convenience, price, and service quality as vital dimensions of customers' satisfaction. An understanding of customers' expectations enables organizations to offer customer-focused services and reduce attrition of customers. Literature offers significant evidence of the association between satisfaction of customers and superior financial performance, customer loyalty, and market share (Beerli et al., 2004; Wood, 2008).

McAndrews and Kauffman (1993) discuss network externalities and shared ATM networks. According to this study, the number of bank's own branches is not related to early ATM adoption but the number of other banks' branches is. Frame and White (2004) survey

ATM diffusion studies in their article on empirical studies of financial innovation. The six studies summarised by Frame and White discuss initial adoption, or diffusion, of ATM technology. However, the demand for ATMs after the first phase of adoption has not been discussed very widely. Hester et al (1999) study decisions on ATMs in Italian banks. According to their results, the number of ATMs is positively related eg to the bank's number of branches and deposit accounts. There are studies on ATM pricing and fees. There are various fees related to ATMs: An interchange fee is a fee that the customer's bank pays to the ATM owner when the customer uses another bank's ATM. A surcharge fee is paid by the cardholder to the

ATM owner. A foreign fee is paid by the cardholder to his bank when using another bank's ATM. These and other fee definitions are found in McAndrews (2003).

Salop (1990) discusses the pricing decisions of shared ATM networks. He states that ATM networks should eliminate their pricing rules for interchange fees and that there should be price competition between ATM owners in order to increase the efficiency. Matutes and Padilla (1994) investigate shared ATM networks, banking competition and fees. The authors use a three-bank model to study the manner in which banks make their ATM networks compatible. They conclude that in equilibrium either a subset of banks will share ATM networks or there will be total incompatibility. This is a somewhat surprising result, since many national ATM networks seem to be compatible (eg ECB 2001). On the other hand, there have been changes in compatibility during the 1990s. The paper was published in 1994, when incompatibility was more typical than nowadays. According to Matutes and Padilla (1994), fully compatible networks are found in countries where the banking system is highly collusive, dominated by 15 public banks, or competing in different geographical markets.

Furthermore, Matutes and Padilla state that network fees enhance the likelihood of compatibility.

Hannan et al (2003) analyse the pricing of ATM usage and surcharge levels in the USA. This empirical paper studies depository institutions' decisions on whether to have surcharges on non depositors

using their ATMs. The authors conclude that the probability of surcharging is positively related to the institution's share of ATMs and negatively related to local ATM density. Massoud and Bernhardt (2002) investigate theoretically the pricing of ATM services. According to their results, in equilibrium, banks charge nonmember users high ATM fees but do not charge their own customers for ATM usage. Own customers have to pay high bank account fees, and larger banks charge higher bank account fees and higher surcharges than smaller banks. The authors state that forcing banks to charge both members and non-members the same ATM fees leads to higher ATM prices and bank profits, and possibly to less consumer welfare.

Partly based on Massoud and Bernhardt (2002), Massoud et al (2003) analyse empirically ATM surcharges and customer relationships. They find that changes in ATM surcharges have a direct

effect on bank profitability and an indirect effect via customer switching to use of other services provided by the bank. Prager (2001) analyses the effects of ATM surcharges on small banks, comparing states that allowed surcharging prior to 1995 and those that did not.

Contrary to the results by Massoud et al (2003), Prager (2001) finds that ATM surcharges do not affect banks' profitability. Also Croft and Spencer (2003) analyse fees and surcharging in ATM networks. They develop a theoretical model and conclude that surcharging raises the customer's price above the joint profit-maximising level for a shared network. Joint profits of the shared network are maximised by setting the interchange fee at marginal cost and not surcharging. Furthermore, large banks prefer lower interchange fees than do small banks.

McAndrews (1992) discusses ATM network pricing based on a survey conducted in 1989 and 1990 in the USA. McAndrews (1998) discusses ATM surcharges in the USA, and McAndrews (2003) reviews the ATM pricing literature. There is very little discussion on competition, mergers or monopolization of ATM networks. McAndrews and Rob (1996) compare theoretically competition between two solely owned switches (ATM networks) and between one solely owned and one jointly owned switch. The authors study these two duopolies and differences in supplied quantities and profits, assuming the existence of network externalities in the ATM market. According to their results, the equilibrium profits of banks in the solely owned network are the same in both duopoly cases. On the other hand, the equilibrium profits of banks in the jointly owned network are higher than the equilibrium profits of banks in the solely owned network in the case of one solely owned and one jointly owned network. In addition to the equilibrium profits from supplying ATM services to customers, banks in the jointly owned network receive part of the profits of the jointly owned network. Furthermore, the authors state that the network jointly owned by all banks produces the monopoly output, and consumers pay the monopoly price. They also discuss welfare implications and

conclude that, because of network externalities and economies of scale, the monopoly may be a better structure in the end.

Carlton and Frankel (1995) discuss the merger between two ATM networks in Chicago. These two networks, Cash Station and Money Network, were competitors until 1987. After the merger decision and a transition period, all ATM terminals of the new-combined network were available to all customers in early 1988. Carlton and Frankel state, on the basis of the statistics, that the growth in the number of ATMs in the new network has been faster than average growth in the number of ATMs in the USA. Furthermore, the volume of transactions increased even though the interchange fee of the new network was increased in 1991. Based on these arguments, the authors state that the merger of these two ATM networks benefited consumers. Also Balto (1995) and Baker (1995) discuss mergers of ATM networks in the USA. They are clearly more skeptical about the benefits of ATM network mergers than Carlton and Frankel (1995). Horvitz (1996) discusses the effects of ATM surcharges on competition and efficiency. According to Horvitz, the Department of Justice and the Federal Reserve failed to prevent the consolidation of ATM networks in the USA in the 1980s. He presumes that high surcharges charged by large banks will encourage small banks to provide ATM networks at lower costs or even without surcharges, which may restore competition in the ATM network market. Cost savings from ATMs and electronic payments have also been discussed. Humphrey (1994) studies possible cost savings and concludes that ATMs have not reduced banks' costs. This may be the case because consumers use ATM services more intensively than services provided in bank branches. However, Humphrey et al (2003a) get the opposite results. They analyse cost savings from ATMs and electronic payments in 12 European countries in 1987–1999.

According to the results, the ratio of operating costs of providing banking services to total assets has decreased considerably because of 17 electronic payments and use of ATMs. Humphrey et al (2003b) and Humphrey and Vale (2004) state that the shift to electronic-based payments leads to remarkable cost savings. In addition, Humphrey and Vale (2004) discuss cost savings from bank mergers. They use Norwegian

banking sector data and state that bank mergers in Norway have on average reduced costs. Hancock et al (1999) discuss the consolidation of Fedwire and find that consolidation reduced costs.

Humphrey et al (1998) investigate the gains from electronic payments with Norwegian data and conclude that electronic payments lead to social benefits. Raa and Shestalova (2004) analyse payment media costs with Dutch data and find that currency is cost-effective for small payments.

Furthermore, their results suggest that debit cards or emoney are likely to replace cash usage for larger legal transactions. To conclude, various aspects of ATMs have been analysed in the literature. The earliest ATM papers concentrated on the adoption of ATMs, and a significant part of the recent literature discussed the pricing and cost saving questions. However, the effects of monopolisation in the ATM network market structure have attracted insufficient attention. Our analysis is aimed to fill this gap in the literature.

Hannon, Kiser, Prager and McAndrews (2003) empirically examine the determinants of the decision by a bank to impose surcharges by 1997. They find that larger banks, both in terms of asset size, as well as in share of the market's ATMs, were more likely to impose surcharges. In addition, they find that some variables associated with the depositor affiliation decision, such as the amount of immigration to the market, tend to be associated with higher surcharges. This evidence is consonant with a bank's desire to influence potential depositors' choices when determining its surcharges. They conclude that surcharges are not determined solely as convenience fees for ATMs in high-cost or high-value locations, but as strategic tools for raising the costs of customers of rival banks.

Massoud and Bernhardt (2001) extend the results of Massoud and Bernhardt (2002) to the case in which banks endogenously choose the number of ATMs to deploy. As in their previous paper, banks can better extract surpluses from their own depositors by charging them two-part prices. Banks set transaction prices at marginal costs for depositors, and extract surplus via high fixed fees. A set of such fees causes no

distortion in depositors' choice of transactions. At the same time, banks can extract surplus from non-depositors only by charging high (and distorting) surcharges. Adding the ATM deployment decision to the mix, Massoud and Bernhardt (2001) find that banks will deploy more ATMs than is socially optimal. They do so because having a large number of ATMs allows a bank, *ceteris paribus*, to better compete for depositor affiliation in the first instance. As all banks respond to this incentive, overprovision results, both in games in which prices and ATM locations are chosen simultaneously, and in a game in which investment in ATM location precedes price competition. One criticism of the Massoud and Bernhardt papers is that in their models there is no interchange fee or foreign fee (this does not seem to correspond exactly with any country's pricing arrangement). As a result, the potential richness of the competitive environment is somewhat muted as a competing bank cannot, for example, subsidize its own customers transactions made at a high-cost rival's ATMs, nor is the collective setting of fees an issue.

Donze and Dubec (2002) examine a model that might be considered as a successor to Matutes and Padilla (1994), in that there are no surcharges or foreign fees, but banks make a decision to deploy machines in a context of a collectively determined interchange fee (the authors report that this observed in the U.K. and France, among others). Banks compete for both deposits (and earn revenue from deposits) and withdrawals (and earn interchange fees) when they deploy ATMs. Donze and Dubec note that there are two effects of interchange fees. As interchange fees are set at a higher level, the competition for withdrawals quickens and more ATMs are deployed, which increases deployment costs.

Each bank, however, experiences a squeeze on its profits from offering deposit services as it must service costly foreign withdrawals by its customers (as in Matutes and Padilla). As a result, banks tend to increase their retail deposit prices to compensate. Donze and Dubec show that the second effect dominates the first (under conditions that continue to assure the willingness to share ATMs) and conclude that the interchange fee can be used as an instrument of tacit collusion. They also show that for large numbers of banks, ATMs will be over-deployed in equilibrium.

In what is perhaps the richest model of ATM pricing, Croft and Spencer (2002) examine a spatial model of ATM pricing by banks that examines the effects of interchange fees, foreign fees, and surcharges, and considers the effects on shifting customers away from the use of branch resources and on bank competition given a set of depositors (but does not consider the deployment decision). In the model, following Salop (1979) bank customers and ATMs are positioned around a circle and “interleaved” so that the ATMs are equidistant from their customers. They first examine the joint profit-maximizing price for ATM services, which can be collected from consumers by foreign fees and surcharges; it increases in the greater consumer utility from ATM use, and increases the smaller is the cost savings from conserving on branch resources.

Then Croft and Spencer consider the case in which surcharging is banned, the interchange fee is set equal to the marginal cost of an ATM transaction, and banks non-cooperatively set the foreign fee: the resulting prices maximize the joint profit. Allowing surcharging yields the result that banks with a larger customer base would prefer lower surcharges (as the bank with the larger customer base has the lower demand for foreign transactions). The model is examined to determine the conditions under which banks would voluntarily agree not to surcharge. They find that only when banks are of sufficiently similar sizes would such agreements be struck, but the agreement would entail higher interchange and foreign fees than would be the case were surcharges simply banned. They point out that given the heterogeneity in sizes of ATM network participants, especially when one considers non-bank ownership of ATMs, no surcharge agreements are simply impractical, and that as long as surcharges aren’t banned they will likely become widely adopted. They address the fixed size of the network to some extent in their model by showing that greater customer access to ATMs by linking or sharing of ATMs always raises customer welfare. As a result they express the opinion that the loss of welfare from ATM surcharges may be a short-run effect followed by increased customer welfare with the increased number of ATMs that surcharging encourages.

Kaul Urvashi (2007) in his article, “ATM: The Power of Cash” explained the importance and benefits of ATM, the players in the Indian market and presented various statistical data concerning the growth of ATM. Manager FSDNCR Corporation India Pvt. Ltd. (2008) in his article, “ATMs: Changing Fundamentals” stressed that the Indian ATM industry has seen explosive growth in recent times and Banks have committed to substantial capital outlays on ATM deployment, recognizing the significance of the 3 Ms – Maintenance, Monitoring and Management of the ATMs to make the self service channel a reliable and profitable one.

#### **2.2.1 Infrastructural Bottlenecks and High User Charges:**

The lack of appropriate infrastructure for enabling the use of ICT for Distance Education is a serious bottleneck. The aspect of Internet access in Developing Countries is a case in view. The low levels of Internet penetration in India are clearly visible from the data presented in the table. The percentage of Internet users is just .05%, which compares unfavorably with countries like Thailand (.26%) and China (.27%). The same scenario holds true for most basic infrastructure needed to make ICT usage more viable in Developing countries. Further the waiting time for obtaining access to basic ICT is also very long. Even after liberalization, the average waiting time for obtaining telephone access in India is more than 8 months in India. Access to even the most basic of electronic devices like the Television is also highly limited in countries like India. In India the TV penetration is only 80 per 1000. Coupled with these is the fact that, for most modern information and communication technologies, the user charges are very high that makes their use for Distance Education a very costly affair. A case in view is that of the cost of Internet connectivity for Indian homes. It still costs as much as Rs.30 per hour for Internet access in Indian homes. Such prohibitive costs make the use of such technology for imparting Distance Education, a luxury.

#### **2.3 Research Gaps**

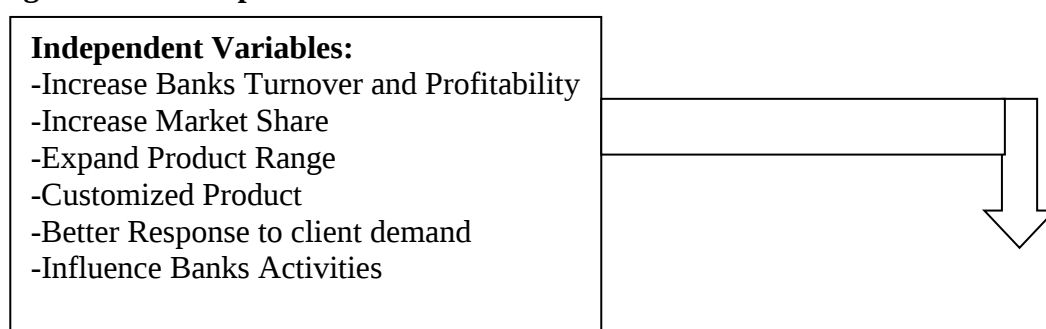
In-depth review of the literature on assessing the contribution of Umoja Switch ATM's in performance of commercial banks in Tanzania was done; but in

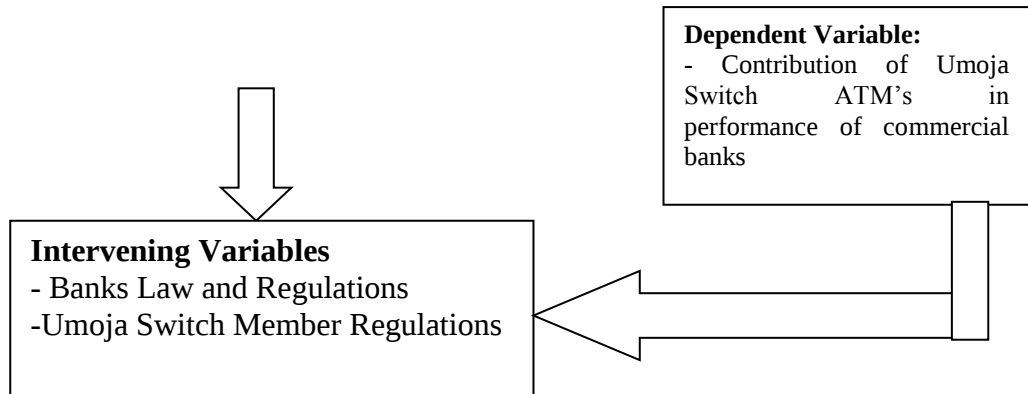
comparison, there has been a number of studies attempt to address gaps in this research. Kaul (2007) in his article explained the importance and benefits of ATM, the players in the Indian market and presented various statistical data concerning the growth of ATM. However, Manager FSDNCR Corporation India Pvt. Ltd. (2008) in his article stressed that Indian ATM industry has seen explosive growth in recent times and Banks have committed to substantial capital outlays on ATM deployment, recognizing the significance of the 3Ms Maintenance, Monitoring and Management – of the ATMs to make the self service channel a reliable and profitable one. Therefore, this study wants to identify services available in Umoja Switch ATM Network; determine customer satisfactions on Umoja Switch ATM services; assess the challenges faced by Umoja Switch member banks in providing ATM service to customers; assess the communication link used by Umoja Switch member banks in providing ATM services; and find out difficulties encountered in provision of ATM services to customers.

## 2.4 Conceptual Framework

Uma (2003) defines the conceptual framework as a conceptual model of how one theorizes or makes logical sense of the relationships among the several factors that have been identified as important to the problem. The basic framework of this study is built around the conceptual model below (See Figure 2.1). The purpose of the conceptual framework is to analyze the variables which contribute to the problem hence show lights on what variables do contribute on assessing the contribution of Umoja Switch ATM's in performance of commercial banks in Tanzania. In order to get the variables contributing on key statement a conceptual framework is essential. Under this study independent variables are increase banks turnover and profitability, increase market share, expand product range, customized product, better response to client demand, influence banks activities whereas dependent variable is contribution of Umoja Switch ATM's in performance of commercial banks whereby Banks Law and Regulations and Umoja Switch Member Regulations being Intervening Variables

**Figure 2.1: Conceptual framework**





**Source: Researcher's Own Construct, 2013**

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter of the study covers the methodology that was used by the researcher to conduct the study. It provides study design, area of study, targeted population, sample and sampling procedure. It also entails data collection methods, validation of

the instruments administration of questionnaire and finally the methods employed to analyze the data.

### **3.2 Study Area**

The study was conducted at Akiba Commercial Bank (ACB) in Dar es Salaam Region. The reasons of taking Akiba Commercial Bank (ACB) is that: it was mainly influenced by the researcher's accessibility to data and also it is the one of the member of Umoja Switch.

### **3.3 Research Design**

Research design is the plan showing the approach and strategy of investigation aimed at obtaining valid and reliable data that achieves the research objectives and answer research questions (Adam and Kamuzora, 2008). The researcher employed a case study design because the case study design enables the researcher to study deeply few cases in the system.

### **3.4 Study Population**

Population refers to the larger group from which the sample is taken (Adam and Kamuzora, 2008). The population can be very large or small depending upon the size of the group of the persons or objects from which the researcher plans to make inference. Thus a population refers to the people that the researcher has in mind from which information (data) can be obtained. Hence, the population of study was involved staff at Card Centre Department, customers and management at Akiba Commercial Bank (ACB) in Dar es Salaam Region.

### **3.5 Sample Size and Sampling Techniques**

#### **3.5.1 Sample Size**

The sample of 100 respondents from members of Akiba Commercial Bank (ACB), employees at benefit department and management at Akiba Commercial Bank (ACB) in Dar es Salaam Region was taken as presented in table 3.1

.

**Table 3.1: Distribution of Sample Size**

| <b>Respondents</b>              | <b>Sample Size</b> | <b>Percentages (%)</b> |
|---------------------------------|--------------------|------------------------|
| Customers                       | 60                 | 60                     |
| Staff at Card Centre Department | 30                 | 30                     |
| Management                      | 10                 | 10                     |
| <b>TOTAL</b>                    | <b>100</b>         | <b>100</b>             |

**Source: Researcher's Own Construct, 2013**

### **3.5.2 Sampling Techniques**

According to Saunders et al, (2006), sampling is defined as selection of parts of aggregate of the totality based on which a judgment about the aggregate or totality is made. It is a process of selecting a group of people, events, behavior, or other elements with which to conduct a study. An important issue influencing the choice of a sampling technique is whether a sampling frame is available, that is, a list of units comprising the study population. Therefore, the researcher uses two types of the sampling technique to obtain relevant sample size which are simple random sampling as probability sampling and judgmental sampling as non-probability sampling.

#### **3.5.2.1 Simple random sampling**

This sampling was used to get 60 respondents from customers. The researcher was selecting those customers randomly at Akiba Commercial Bank (ACB) from different branches in Dar es Salaam Region because Akiba Commercial Bank (ACB) is among Umoja Switch Members. This technique gives each element an equal and independent chance of being selected. It selects the sample at random from the sampling frame without replacement. It is not biased in nature.

#### **3.5.2.2 Judgmental sampling**

Judgmental sampling as non-probability sampling was used to select 30 respondents from staff and 10 respondents from Management at Akiba Commercial Bank (ACB). This technique entails deliberately selecting cases on the basis of specific qualities. The researcher was intentionally selecting the respondents likely to yield a greater understanding of the topic selected as well as information rich to the problem.

### **3.6 Types and Sources of Data**

In this study, the researcher was collecting both primary & secondary data from his case study.

#### **3.6.1. Primary data**

Primary data was obtained from different interviews that the researcher was going to do with respondents especially management, and the use of questionnaires at respondents from employees at Operations department.

#### **3.6.2 Secondary Data**

Secondary data was obtained from documentary review, management reports from the bank, journals and literature review. Upon collecting secondary data, researcher was gathering more from manuals of Akiba Commercial Bank (ACB).

### **3.7 Data Collection Methods and Instruments**

Data collection refers to the gathering of specific information aim at proving or refuting some facts (Adam and Kamuzora, 2008). It is important in research as it allows for dissemination of accurate information and development of meaningful programmes. In this study, the researcher was used documentary review, interviews and questionnaires.

#### **3.7.1 Data collection methods**

##### **3.7.1.1 Documentary Review**

It deals with secondary data where by the researcher obtains information from articles, journals, books pamphlets and other documents (Adam and Kamuzora, 2008). The reason for using documentary research in this study is that documents pertaining to the study are available which enables the researcher to track information from documents, records, and publications within a short time and with less cost. Saunders et al, (2009) commented that one of the advantages of using secondary data is the enormous saving of resources particularly time and money.

##### **3.7.1.2 Interviews**

The interview method of collecting data involves presentation of oral-verbal stimuli and reply in terms of oral-verbal responses. This method was used through personal interviews and if possible through telephone interview. The researcher was

identifying respondents and requests them to answer certain questions. The researcher and research assistant noted down the answers given. In some interviews the response was recorded. The researcher used both structured and unstructured interviews. The researcher was collecting primary data through this method.

### **3.7.2 Data collection instrument**

#### **3.7.2.1 Questionnaires**

Well-designed questionnaire with open and close ended questions was formulated and distributed to respondent as a way of obtaining primary data/ information. The researcher was distributed questionnaire to sampled employees and managers to be filled and later to be collected for recording and analysis. The choice of using questionnaire in data collection has been given greater priority because of its advantage over the other methods as it is efficient and has the ability to capture more information from the source.

### **3.8 Data analysis Procedures**

The data obtained from a study was analyzed by using both quantitative and qualitative (descriptive) method with simple statistics. The analysis was based on the statement of the problem; research objectives and research questions. Data from the questionnaire was coded and then a statistical analysis program known as software package for statistical science (SPSS) was used to process the data.

The reason for using SPSS is because it can perform the entire statistical analysis and classification analysis required in this study making it compatible to the data and the problem in question. It is also a user friendly program. Though Ms Excel was used once in the analysis, however, data was presented through different ways like the use of charts, histograms, tables so as to get the logical findings.

## **CHAPTER FOUR**

### **FINDINGS AND ANALYSIS**

#### **4.1 Introduction**

This chapter presents details of the research results that presented and then discussed in light of predetermined research objectives and questions. Therefore, the analysis of data collected was guided and confined to the predefined research problem and

present objective. However, this chapter consist two mainly parts, namely research findings presentation and analysis, and discussion of the result.

#### **4.2 About Akiba Commercial Bank**

Akiba Commercial Bank (ACB) commenced banking operations in August 1997 as an initiative of over 300 Tanzanian entrepreneurs who were inspired overall to move into microfinance, by the moral and economical concern for the plight of Tanzanians. These founder members were bound together by a strong conviction that in Akiba, they would have the vehicle with which they would reach and touch the lives of previously un-banked and commercially underserved men and women of Tanzania. The group's mission and vision was to support the emergence of down to earth Tanzanian businesses through the provision of financial services at all levels, by a Tanzanian-owned commercial bank, which understood Tanzanians and was committed to Tanzania. This was the original, very firm and deep rooted vision of founder members of Akiba in Tanzania.

In order to strengthen the resource base of the bank, the founder members over time invited like-minded local institutional investors namely, Inter-consult Ltd, PPF, TDFL, and NIC, and foreign institutions such as Triodos Hivos, Triodos Fonds, FMO, Rabo Bank, (all of The Netherlands), SIDI of France, and INCOFIN of Belgium. All these institutions were invited because they share the same vision; and were willing to participate actively without being driven by profits as their main objective; rather they were also committed to uplift the economic status of Tanzanians, irrespective of their socio-economic positions in life, so long as they have entrepreneurial skills that can be nurtured. ACB's target markets are small and medium sized entrepreneurs, companies and community banks. As a committed bank, ACB are guided by the following Core Values in all activities we undertake: Team work, Integrity, Commitment, Respect and Socially Responsible

Moreover, ATM Services at ACB are available in all branches and they have also been extended to other various strategic locations as off site ATMs with the essence of bringing services closer to the customers. The ever growing UmojaSwitch

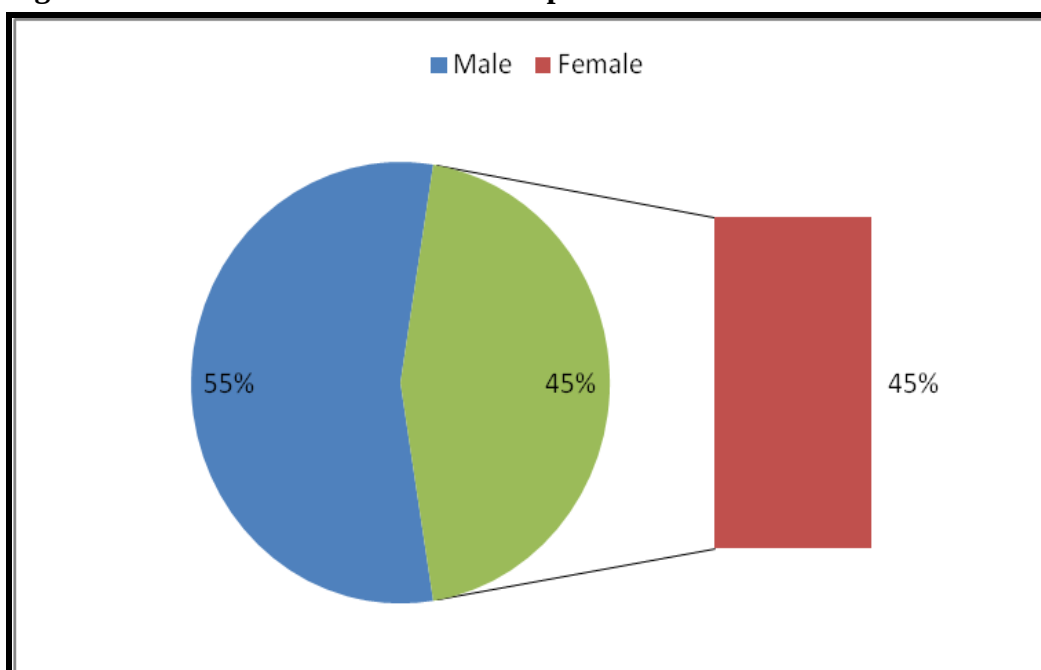
network enables customers to easily access their account with over 130 ATMs scattered all over the country. In an effort to enhance service delivery and improve customer service, the bank continued to be the leading principal member in Umoja Switch consortium in the number of ATM booths.

### 4.3 Respondents Characteristics

#### 4.3.1 Gender

The gender distribution of the sample who participated in this research included of male (N=55 or 55%) whilst remaining sample (N=45 or 45%) were female. Due to gender differences on number there is a high possibility more male being used in this study.

**Figure 4.1: Gender Distributions of Respondents**



**Source: Research Data, 2013**

#### 4.3.2 Age

Table 4.1 shows the distribution of respondents' age. The age pattern shows that 49% of respondents' age is between 25 and 34 years. The next biggest age group forming 28% is made up of respondents whose age is between 25 and 44 years. The third age group forming 16% is made up of respondents whose age is between 45 and 54

years. The last age group with the lowest proportion in this study is 55 years and above which has 7 respondents forming 7% of the total respondents.

**Table 4.1: Distribution of Age of respondents**

| Age Bracket       | Frequency  | Percentages of Contribution |
|-------------------|------------|-----------------------------|
| Below 24 years    | 0          | 0%                          |
| Between 25 and 34 | 49         | 49%                         |
| Between 35 and 44 | 28         | 28%                         |
| Between 45 and 54 | 16         | 16%                         |
| From 55 and above | 7          | 7%                          |
| <b>Total</b>      | <b>100</b> | <b>100%</b>                 |

**Source: Research Data, 2013**

#### 4.3.3 Qualifications

Table 4.2 shows education level of respondents. It is clear that the vast majority of the 26 respondents that form 26% have attained a primary education. The second biggest group is formed by Graduates which forms 25 %( 25) of the respondents. Holders of Secondary school are the third largest group forming 16%(16) of the respondents, whereas Advance Diploma forms 10% (10) and Masters respondent has got5%(5). Lastly diploma respondents form 3% (3).

**Table 4.2: Qualification level**

| Descriptions      | Frequency | Percentages |
|-------------------|-----------|-------------|
| Primary Education | 26        | 26%         |
| Secondary School  | 16        | 16%         |
| High School       | 15        | 15%         |
| Diploma           | 3         | 3%          |

|                 |            |             |
|-----------------|------------|-------------|
| Advance Diploma | 10         | 10%         |
| Graduate        | 25         | 25%         |
| Masters         | 5          | 5%          |
| <b>Total</b>    | <b>100</b> | <b>100%</b> |

**Source: Research Data, 2013**

#### **4.4 Perception towards using Automatic Teller Machines**

On establishing perception towards using Automatic Teller Machines, as noted in table 4.3, out of 100 questionnaires distributed, 65 respondents which form 65% answered that it is convenient especially for day to day transactions. Automatic Teller Machines (ATMs) offer considerable benefits to both banks and their depositors. The machines can enable depositors to withdraw cash at more convenient times and places than during banking hours at branches. However, ATMs reduce the costs of servicing some depositor demands. ATMs also, are client delivery channels, which can be seen as a reputational risk for the bank when no cash is available. ATMs are also the only access point within the bank that clients can get their hands on physical cash. Large volumes and amounts of monies are transferred, distributed and dispensed every day.

Linking to the findings, according to Delyno (2011), using the ATM as a cash dispenser is beneficial due the client's familiarity with the process. A low level of literacy is required to navigate through the user interface screens in order to withdraw cash. The limitation in choices at the ATM also ensure that the client queue move quicker. Using the ATM as a customer delivery channel will mean a shift from a homogenous to a heterogeneous client relationship and marketing vehicle. It will mean that ATMs will become points of banking. The benefit for financial institutions is that clients are able to assist themselves without having to enter the branch. This frees up branch space and capacity to deal with more complex transactions, i.e. loans.

Moreover, ATMs are known by various casual terms including automated banking machines, money machines, bank machines, cash machines, and hole-in-the-wall and cash point. ATMs are now a way of life. They are the only way to conduct some

banking activities for many due to branch closures and increases of banking transactions. Many banks in Tanzania have made ATMs compulsory with some transactions like money withdrawal but normally the amount of withdrawal is limited

**Table 4.3: Responses on perception toward using ATM**

| Responses      | Frequencies | Percentages (%) |
|----------------|-------------|-----------------|
| Convenient     | 65          | 65              |
| Not convenient | 35          | 35              |
| Total          | 100         | 100             |

**Source: Research data collection, 2013**

#### **4.5 Challenges faced by Bank Management on course of providing services through Umoja Switch ATMs**

On establishing the challenges faced by Bank Management on course of providing services through Umoja Switch ATMs, as noted in table 4.4 and figure 4.3; out of 100 questionnaires distributed, 20% of respondents argued that Poor Education of using ATMs is among the challenges faced by Bank Management on course of providing services through Umoja Switch ATMs. Notably, 22% of the respondents argued poor system of ATMs is among the challenges faced by Bank Management on course of providing services through Umoja Switch ATMs. And 20% of the respondents argued lack of ATM networks in various support services is among the challenges faced by Bank Management on course of providing services through Umoja Switch ATMs whereas 24% of the respondents illiteracy of customers is among the challenges faced by Bank Management on course of providing services through Umoja Switch ATMs; and 14% of the respondents argued that many ATMs applications are not user friendly as among the challenges faced by Bank Management on course of providing services through Umoja Switch ATMs.

Linking to the findings, according to Delyno (2011), the local ATM branches are not responsible for ordering cash when levels are low. The ATM branches have no intelligent information to determine the cash levels within the ATM.

Notably, according to Delyno (2011), forecasting the cash demand of each ATM accurately is extremely difficult and error prone. The demand for cash differs from ATM to ATM and is influenced by holidays, pay days, regional events, etc., and the ability to manage these different situations is critical. Forecasting within the bank is a manual process done with MS Excel and dependant on the knowledge, business experience, judgment and common sense of the operator. There is no scientific guidance for the operator as to the cash demand per ATM. This is a huge responsibility on the abilities of the operator and leaves room for human error, especially when a skilled operator is not on duty, i.e. leave, illness etc.

Moreover, according to Delyno (2011), ordering cash and instructions for deliveries to ATMs is a manual process and managed via MS Excel. There is no holistic view of orders, deliveries and cash on hand in the different 'warehouses', i.e. count house, ATMs and in transit cash. This makes it difficult to accurately determine the cash available to promise or to order for an ATM.

Finally, according to Delyno (2011), the replenishment of an ATM takes place based on the forecasted day of when the ATM will run out of cash. On a specific day there can be a couple of ATMs that need replenishment. It is left to the CIT company to decide which ATMs to replenish and when to replenish on the day. In the first instance errors can occur when the ATM runs out of cash a day earlier or later than was predicted. The ATM can also run out of cash in the morning and will only be replenished in the afternoon due to the route being followed by the Umoja Switch. In order to ensure that cash is delivered when and where required it is important to match up, as close as possible, the ATM cash deliveries with the ATM cash out events.

Therefore, ordering cash when levels are low, forecasting the cash demand of each ATM accurately, ordering cash and instructions for deliveries to ATMs, and the replenishment of an ATM are challenges faced by Bank Management on course of providing services through Umoja Switch ATMs.

**Table 4.4: Response on challenges faced by Bank Management on course of providing services through Umoja Switch ATMs**

| Responses                                        | Frequencies | Percentages (%) |
|--------------------------------------------------|-------------|-----------------|
| Poor Education of using ATMs                     | 20          | 20              |
| Poor system of ATMs                              | 22          | 22              |
| Illiteracy of customers                          | 24          | 24              |
| ATMs applications are not user friendly          | 14          | 14              |
| lack of ATM networks in various support services | 20          | 20              |
| Total                                            | 100         | 100             |

**Source: Research data collection, 2013**

#### **4.6 Contribution of Umoja Switch ATM's in performance of Commercial Banks**

On establishing the Contribution of Umoja Switch ATM's in performance of Commercial Banks, as noted in table 4.5 and figure 4.4; out of 100 questionnaires distributed, 82 respondents which form 82% strong agree that there are contribution of Umoja Switch ATM's in performance of Commercial Banks. Linking to the findings, this implies that, bank customers could not or would not use them, or experience difficulties in their interactions. They suggested that technology should be used as a means by which non- users might be encouraged to use ATMs, while at the same time, improving usability for bank. The advantages of this include hands-free and eyes-free use for physically- and visually impaired users, and improved ease and speed of use through increased naturalness of the interaction at the bank. ATM emerged as the most popular with 96 percent level of awareness. Awareness level of ATM also ranked higher than that of current accounts and slightly below savings account.

**Table 4.5: Response on the contribution of Umoja Switch ATM's in performance of Commercial Banks**

| Responses    | Frequencies | Percentages (%) |
|--------------|-------------|-----------------|
| Strong agree | 82          | 82              |
| Not Agree    | 18          | 18              |

|       |     |     |
|-------|-----|-----|
| Total | 100 | 100 |
|-------|-----|-----|

Source: Research data collection, 2013

#### **4.7 Stakeholders perceptions on the service provided by Umoja Switch ATM Network**

On establishing stakeholders' perceptions on the service provided by Umoja Switch ATM Network, as noted in table 4.6 and figure 4.5; out of 100 questionnaires distributed, 72% of the respondents agree on the service provided by Umoja Switch ATM Network. Linking to the findings, stakeholders just decide to adopt and use ATM without first testing it for a while. This could be because of their already perceived notions as to the advantages of using ATMs. Still, since the construct was significant in this study, it meant that potential adopters of ATM may well benefit from trial demonstrations as an introduction to using the technology. This would help eliminate uncertainty about ATMs, improve confidence in its use and make its diffusion more widespread.

**Table 4.6: Response on stakeholders' perception on the service provided by Umoja Switch ATM Network**

| Responses  | Frequencies | Percentages (%) |
|------------|-------------|-----------------|
| Agreed     | 72          | 72              |
| Not Agreed | 28          | 28              |
| Total      | 100         | 100             |

Source: Research data collection, 2013

## **CHAPTER FIVE**

### **DISCUSSION OF THE FINDINGS**

#### **5.0 Introduction**

The discussion is very important to a researcher since it approves or disapproves the research questions which were set forward for verification in the field. The researcher discusses attitude toward using Automatic Teller Machines, factors affect the performance of Automatic Teller Machines to the banking operations and opinions from stakeholders to effectively implement performance of Automatic Teller Machines to the banking operations.

#### **5.1 Perception toward using Automatic Teller Machines**

As noted by 65% of the respondents, the deployment of ATM by banks and its use by bank customers is just gaining ground and has burgeoned in recent times. This has happened especially after the recent consolidation of banks, which has in all probability, made it possible for more banks to afford to deploy ATMs or at least become part of shared networks (Fasan, 2007). The increased deployment of ATMs in the banking sector has made the issue of technology relevance important. At first in Tanzania, ATMs were operated as elitist services designed for those desirous of exclusive service. Cards were rare and the process for obtaining them tortuous. Presently, the use of ATM cards has been widely promoted. Banks no longer appear to want personal contact with their customers. Some banks have resorted to penalizing the customer as it were, for not possessing an ATM card, by debiting the account of such a customer for withdrawing below a certain amount across the counter.

Agboola (2006) reported that although only a bank had an ATM in 1998, by 2004, fourteen of them had acquired the technology. He discovered that the adoption of ICT in banks has produced largely positive outcomes such as improved customer services, more accurate records, ensuring convenience in business time, prompt and fair attention, and faster services etc. Also, the banks' image is improved creating a more competent market. Work has also been made easier, and more interesting, the

competitive edge of banks, relationship with customers, and the solution of basic operational and planning problems has been improved.

In time, some banks started charging customers for not using ATMs, through so-called “human teller fees”- a charge for each time a customer uses a teller for a service that could be performed by an ATM. Banks that embraced the ATM profited handsomely, often growing far faster. At first, a bank's ATMs could only be used by customers who already had current or savings accounts with that bank, through the bank's proprietary ATM network (Ugwu, 2008).

According to Merton (1992), the primary function of a financial system is to facilitate the allocation and deployment of economic resources, both spatially and across time, in an uncertain environment. This conception would also apply to financial innovations such as ATMs and highlights the view that a financial innovation represents something new that reduces costs, reduces risks, or provides an improved product/service/instrument that better satisfies participants' demands.

## **5.2 Challenges faced by Bank Management on course of providing services through Umoja Switch ATMs**

As noted by 88% of the respondents, challenges faced by Bank Management on course of providing services through Umoja Switch ATMs are:

### **5.2.1 Many customers transaction**

It is observed that banks still have many customers transacting with tellers within their doors, and queues are still not a thing of the past inside banks. The patronage of ATMs is also not well defined, and even epileptic at best, as sometimes long queues were observed outside ATMs, while at other times, there are few or no customers. It is consequently, important to discover why this is so, because as a technology, ATMs are supposed to make life easier and more efficient for the customers of banks. Concerning banks, ATMs ought to assist in improving a banks' turnover (Batiz-Lazo & Barrie, 2005). Therefore, low patronage of ATMs by their customers could affect the banks' profit adversely.

### **5.2.2 Poor education of using ATMs for customers**

Most technologically savvy bank customers sometimes had trouble comprehending the maze of options available. A lot of people keep trying until they find solutions, but the elderly usually have problems using ATMs. Banks may be losing the elderly as ATM customers. Education and machine redesign could be the best hope for elderly customers. Most systems designers and bank officers assumed that ATM was easy to use and required no training. Evidence however showed that users of all ages had problems using ATMs initially when no training is provided, and that older adults have problems even after training. They indicated that banks could find better ways of teaching people how to use ATMs. At CRDB Bank PLC only two provided brochures that showed the user how to operate the ATMs and these brochures were perfunctory at best. Probably, lack of knowledge about how the system worked and their discomfort in having to learn it while others waited. Many respondents were not aware of the different options offered on ATM and were more predisposed to use it if they were provided training. Non-users and users stressed concerns about safety in using ATMs.

### **5.3 Stakeholders' perception on the service provided by Umoja Switch ATM Network**

As noted by 82% of the respondents; it was evident that the stakeholders believed that the information concerning their use of ATMs was secure, and their using ATM was safe. This supported Sheth's (2001) proposition that lowered perceived risk increases the likelihood of consumer adoption. Also, the use of ATMs appeared to be convenient compared with using the teller in the banking hall. Complexity also has significant relationship with intention to use ATM. In relation to the complexity construct revealed that ATMs were quite simple to use, and were efficient (at least relative to transacting with a human cashier). According to Rogers (1995) the harder an innovation is to use, or perceived to use, the less likely that an adopter would use it. Therefore, as ATMs seemed to be easy to use, it means their use would be more widely adopted in the nearest future. This finding suggests that easy to use technologies should be put in place by banks in order to enhance usage.

Compatibility is another opinion that influences attitude and intention to use ATM. Given that individuals have already established personal banking norms, lifestyle, finance management system, and account monitoring mechanism prior to the advent of ATM, their acceptance or rejection of the technology will rely greatly on the extent to which it accommodates or rejects all or some of these past values.

However, this study shown that some people have phobia for change, and will avoid change if they can. This might explain why more compatible ATM would be needed to be adopted by banks. Analysis for compatibility revealed that the use of ATM was compatible with the lifestyle of the respondents. It was also revealed that ATM's use is widespread today because of its usefulness but because of its compatibility with users' previous values and its being a current practice.

In addition, the impression that there was privacy while using an ATM was not very strong, probably because ATMs were situated in public places (such as outside banking halls), and most ATMs were not enclosed in such a way that the user was alone with the ATM while transacting. Sometimes, there were long queues, or two or three people crowding close to someone using an ATM. This finding suggests that there was a need for privacy to be included in the provision of better ATM services by banks. This could also help in boosting security of private information concerning ATM use, such as pin numbers.

In addition, it was not strongly felt that all the transactions with ATMs were all good experiences, which meant that at one time or the other, an adopter might experience a fault with the use of an ATM. It was not strongly felt that withdrawing from an ATM was less safe than withdrawing from a bank teller. This was probably due to the fact that after withdrawal of money, whether from an ATM or bank teller, it was possible for crime to be committed against the user after he/she had left the scene. This did not appear to stop the respondents from believing in the security of their ATM information such as pin numbers, passwords, etc, which is a strong reason why ATMs are patronized today.

#### **5.4 Cash Demand Forecasting**

Using a spreadsheet the bank predicts the next month's demand for cash per ATM and then distributes the monthly demand into a daily forecast per ATM. The planner will make use of empirical cash demands per ATM, to do this. The planner will start the forecast for the coming month in the second week of the current month. It takes the planner three to four days to compile the forecast. The planner starts by determining the year-on-year trend for the previous month. The demand of the previous month is adjusted to accommodate the increase or decrease in the trend. The planner will then search for a historical month with a similar pattern to the month to be forecasted, i.e. peak days. The month with the similar pattern is used to determine the distribution of demand per day. The year-on-year growth together with the data of the month with a similar pattern are used to forecast the coming month's cash demand. The planner will scan the forecasted month's daily data in order to identify zero values and special days, i.e. holidays. Where the value is zero the planner will search for historical data to determine the demand for the ATM for that day. Where there is a holiday the planner will remove the demand for that day and distribute it amongst the days preceding and following the special day. The planner will also make sure that the peak days are provided for. This is done for more than 400 ATMs.

Linking to the findings, Harvey & Koopman (1993) designed a time-varying periodic spline component that provides a good way of modeling the changing electricity load pattern within the week and found that the overall forecasts are relatively accurate. Harvey et al. (1997) designed a model with the key feature being the setting up of the seasonal component in terms of a periodic component and a movable dummy component. The advantage of the structural time series approach was that once a regression formulation had been found it could be extended to allow the effects to evolve over time. This meant that deterministic components could be generalized so that they became stochastic. They also showed that it is possible to build in constraints that ensure that the forecasts of the seasonal component sum to 0 over a year, thereby ensuring that there is no confusion of trend and seasonal effects. Once such a model has been formulated, statistical handling via the state-space form is relatively straightforward.

Gould et al. (2008) did a study on the hourly demand of a utility company and the hourly vehicle count data of a freeway. Their approach provided new state space models that allow for the forecasting of a time series with either additive or multiplicative seasonal patterns. They divided the longer seasonal lengths into sub-seasonal cycles that have similar patterns. Taylor & Snyder (2009) studied the forecasting of seasonal intraday time series that exhibit repeating intraweek and intraday cycles. They introduced a new exponential smoothing formulation that allows parts of different days of the week to be treated as identical. They applied their method to electricity load data and a series of arrivals at a call center that is open for a shorter duration at the weekends than on weekdays. They reason that a limiting feature of intraday cycle exponential smoothing is that it allows only whole days to be treated as identical. They argue that it often makes more sense to assume that just parts of days are identical. The example they use is that during daylight hours the series differs on each day of the week, but that the pattern during night hours can be treated as identical on all days of the week.

Simutis et al. (2008) proposed forecasting methods for ATM cash demand based on flexible artificial neural networks (ANN) and support vector regression algorithms. To forecast the daily cash demand they found that the flexible ANN produced slightly better results than the support vector regression algorithms.

Teddy & Ng (2010) proposed the use of a novel local learning model of the pseudo self-evolving cerebellar model articulation controller (PSECMAC) associative memory network to produce accurate forecasts of ATM cash demands. PSECMAC was developed with the aim of emulating the rapid and nonlinear function learning capability of the human cerebellum. PSECMAC manifests as a multidimensional multi-resolution associative memory network, and employs an error-correction scheme to drive the network learning and knowledge construction process. They achieved positive results which affirm the use of local learning-based computational intelligence models as promising alternatives to the commonly-used global learning based approaches for time series modeling and prediction.

## **CHAPTER SIX**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **6.0 Introduction**

This chapter entails the summary of the findings, conclusion, recommendations and area for further research that originated from the findings of the study:

#### **6.1 Summary of the findings**

This study summarizes that; 65% argued that there is attitude toward using Automatic Teller Machines especially for day to day transactions. Automatic Teller Machines (ATMs) offer considerable benefits to both banks and their depositors. The machines can enable depositors to withdraw cash at more convenient times and places than during banking hours at branches. However, ATMs reduce the costs of servicing some depositor demands.

However, 88% argued that there are challenges faced by Bank Management on course of providing services through Umoja Switch ATMs. The challenges are: many customers' transaction and poor education of using ATMs for customers

Notably, 82% argued that there are contribution of Umoja Switch ATM's in performance of Commercial Banks i.e. bank as customers could not or would not use them, or experience difficulties in their interactions. They suggested that speech technology should be used as a means by which non- users might be encouraged to use ATMs, while at the same time, improving usability for bank. The advantages of this include hands-free and eyes-free use for physically- and visually impaired users, and improved ease and speed of use through increased naturalness of the interaction at the bank. ATM emerged as the most popular with 96 percent level of awareness. Awareness level of ATM also ranked higher than that of current accounts and slightly below savings account.

Moreover, 72% argued there are stakeholders' perceptions on the service provided by Umoja Switch ATM Network i.e. stakeholders just decide to adopt and use ATM without first testing it for a while. This could be because of their already perceived

notions as to the advantages of using ATMs. Still, since the construct was significant in this study, it meant that potential adopters of ATM may well benefit from trial demonstrations as an introduction to using the technology. This would help eliminate uncertainty about ATMs, improve confidence in its use and make its diffusion more widespread.

## **6.2 Conclusion**

This study concluded that, Banking has come a long way from the time of ledger cards and other manual filing systems. Most of the banks today have electronic systems to handle their daily voluminous tasks of information retrieval, storage and processing. Irrespective of whether they are automated or not, banks by their nature are continually involved in all forms of information management on a continuous basis. The computer is, of course, an established tool for achieving a competitive edge and optimal resource allocation. Competition and the constant changes in technology and lifestyles have changed the face of banking. Nowadays, banks are seeking alternative ways to provide and differentiate amongst their varied services. Customers, both corporate as well as retail, are no longer willing to queue in banks, or wait on the phone, for the most basic of services. They demand and expect to be able to transact their financial dealings where and when they wish to. With the number of computers increasing every year, the electronic delivery of banking services is becoming the ideal way for the banks to meet their clients' expectations.

In the consideration of ATM, there are different aspects that should be considered. First, one has to have an idea about the communication within ATMs. Second, the issue of security is of paramount importance due to the fact that all over the world, there is an increasing use of ATMs and so the risks of hacking turn to be a reality more than ever before. In the past, the function of ATMs was to deliver cash in the form of bank notes and to debit a corresponding bank account. Cards were used to identify the user. As for the withdrawal of money, different methods were used. For instance, punched cards were used. By the use of such cards, only one payment was authorized. Thereby, a user had to get a supply of cards from his/her bank because the punched cards were not returned to the user. Another example was the use of a magnetic card which had a limited life. The use of such cards allowed; for instance,

twenty withdrawals of money. From the beginning, personal identification number PIN has been of very great importance in the overall operation.

The use of it has been done with the aim to decrease the risks that might result from the loss of cards and the misuses that might be connected to that. In fact, in the past as well as in the present, there have been different aspects in the consideration of the designing and the communicative basics of Automated Teller Machines. One aspect of it has been how communication between its participants could be possible. The second of it has been to take into consideration the purposes which could be a part and a parcel of any communicative act. In this context, there are different participants involved in ATMs communication. To cite but a few of them, in an ATM communication, there are remote partners and interfaces to the outside world and these interfaces are in their turn subject to more than one classification. The first interface represents the relationship between the End-user and Automated Teller Machine. The second interface occurs between the ATM and the central bank computer.

### **6.3 Recommendation**

- Recommendation here is based on the statement of this problem;
- It was expected that the information systems facilitated ATM in banking operations to increase bank competition and efficiency. Banking markets remained largely oligopolistic and was still dominated by inefficient if not use the ATMs.
- However, Information systems on ATM have made substantial progress in banking by giving the customers standards of international best services on drawing their money.
- Investigator recommend in the rapid diffusion of ICT in banking sector, Should provides a platform to use innovative technologies to enhance operational efficiency and quality of service to attain and retain customers. The rapid growth in use of ATMs offers opportunities to banks to use customers' passion for this innovative service for strategic advantage.

- The banks particularly ACB should proactively monitor customers' preferences with regard to use of this delivery channel for effective response. Bank should focus on important aspects of security and privacy as well as efficient operation of ATMs.
- Banks particularly ACB should also augment and diversify their offerings through ATM and use this medium to build a strong and sustained relationship with customers.
- For the process in its current form to be successful it is important that the planner knows the demand pattern of each region, as there is a great deal of business experience and judgment required to accurately predict the demand for cash per ATM
- Umoja Switch is a shared structure where participating banks corporate while competing. Despite the fact that individual banks have internal procedures, policies as well as their own strength and weaknesses, the Umoja Switch must define some common standards and put in place the enforcement mechanism in order to force the member banks to conform.
- To sum up, opportunities of IT in banking are immense but the only need is to explore them. The nature of banking services may still be the same but the way in which they are being offered has been changed dramatically. Banks should realize the seriousness of challenges ahead and develop a strategy that will enable them to leverage the opportunities presented by IT. Banks need to shift now from product centric to customer centric i.e. to design services according to the needs dreams and expectations of the customers. Opportunities and challenges offered by IT can only be met fruitfully if banks assemble different dimensions services including banking, broking, insurance, channel delivery, sales culture, back office processes and knowledge management under one corporate name. Most of the market is still untapped in India especially in rural areas. ICT infrastructure facilities are also not well developed and the banks are unable to extend the e-banking services, therefore, good infrastructure of IT to bank performance need to be developed.

#### **6.4 Area for further study**

With the growing trend of IT in the banking Industry, the issue of whether IT improve bank cost efficiency become the concern in this study looking on banking business practices. ATM in banking industry determines the extent to influence IT investment that has on a bank's cost efficient. ATM plan future trend and predict ATM development in advance by recognizing the relationship between IT investment and bank performance. Therefore, future researchers who have an interest in understand the relationship between IT investment and cost efficiency of bank, as a researcher I would like to caution that this study should not be taken as representative especially to all banks as exhaustive package on ATMs research issue. It this view, the researcher recommend further studies looking into why some banks would not deploy ATMs, or if they have deployed ATMs, what could limit or enhance it. And other researchers would adopt approach in this research looking on Umoja Switch Consortium to expand more innovative of IT application in practice between different industries. Moreover, there is need to identify and understand the changes that ICT are causing on the banking sector and the payments systems, in order to examine in detail how the recent (and foreseeable) advances in ICT are affecting the sector and can affect its future evolution.

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## APPENDIX

### Appendix 1-Questionnaire

**Title: THE CONTRIBUTION OF UMOJA SWITCH ATM's IN PERFORMANCE OF COMMERCIAL BANKS IN TANZANIA: A Case of Akiba Commercial Bank (ACB)**

**Dear Participant,**

I **Upendo Emanuel**, currently undertake Master in Business Administration at Mzumbe University. In order to fulfill the requirements of the Masters program, the following are questions to collect information that was strictly be treated as data collected and was be strictly confidential, and participants' responses was remain anonymous.

|                      |                            |      |       |      |
|----------------------|----------------------------|------|-------|------|
| Personal Particulars |                            |      |       |      |
|                      | Respondent's Position/Role |      |       |      |
|                      | Date Interview Held        | Date | Month | Year |

Sincerely

**Upendo Emanuel**

|                      |  |  |  |  |
|----------------------|--|--|--|--|
| Questionnaire Number |  |  |  |  |
|                      |  |  |  |  |

**INSTRUCTION;** Answer(s) the questions correct.

**Part I: Demographic Information**

|    |                                    |                                                                                                                                                            |
|----|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <b>Basic Household Information</b> |                                                                                                                                                            |
|    | Sex of Respondent                  | 1=M <input type="checkbox"/><br>2=F <input type="checkbox"/>                                                                                               |
|    | Age of Respondent                  | A. 25-34 <input type="checkbox"/> B. 35-44 <input type="checkbox"/> C. 45-54 <input type="checkbox"/><br>D. Over 55 <input type="checkbox"/>               |
| 3. | Education Level of Respondent      | 1 = Primary education<br>2 = Secondary education <input type="checkbox"/><br>3= High school<br>4 = Diploma<br>5=Advance Diploma<br>6=Graduate<br>7=Masters |

**Part II: General Questions**

4. What do you know about Umoja Switch ATMs? State

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.....

5. What are the main problems facing in Umoja Switch ATMs as members? State

.....

.....

.....

.....

6. As customer in Umoja Switch ATMs: Are you satisfied with services provided in Umoja Switch ATMs? Please Tick one of the following categories: use √.

YES ( )

No ( )

7. If No in question 6 above, why give the details

.....

.....

.....

.....

8. What are services available in Umoja Switch ATM Network?

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9. What are the challenges faced by Umoja Switch member banks in providing ATM service to customers? State

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10. What is the communication link used by Umoja Switch member banks in providing ATM services? State

.....

.....

.....

11. What are difficulties encountered in provision of ATM services to customers? State

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.....

.....

.....

12. What is stakeholders' perception on the service provided by Umoja Switch ATM Network? State

.....  
.....  
.....  
.....

13. What are challenges faced by bank management on course of providing services through Umoja Switch ATM? State

.....  
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.....  
.....

14. What extent to which bank management has managed to solve challenges faced by bank services through Umoja Switch? State

.....  
.....  
.....

15. What is your recommendation on improving the Umoja Switch ATM's services? State

.....  
.....  
.....

**Thanks for your patience!**

## Appendix II-Interview Question Guide

1. What is the contribution of Umoja Switch ATM's in performance of commercial banks in Tanzania?
2. What is stakeholders' perception on the service provided by Umoja Switch ATM Network?
3. What are challenges faced by Bank Management on course of providing services through Umoja Switch ATM?
4. What extent to which Bank Management has managed to solve challenges faced by bank services through Umoja Switch?

| Activity                             | 2012-2013                                                                           |       |                                                                                       |                                                                                       |      |                                                                                       |
|--------------------------------------|-------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------|
|                                      | Feb                                                                                 | March | April                                                                                 | May                                                                                   | June | July                                                                                  |
| Review articles                      |  |       |                                                                                       |                                                                                       |      |                                                                                       |
| Review journals                      |                                                                                     |       |  |                                                                                       |      |                                                                                       |
| Review books                         |                                                                                     |       |                                                                                       |  |      |                                                                                       |
| Review pamphlets and other documents |                                                                                     |       |                                                                                       |  |      |  |