

**THE EFFECT OF ELECTRONIC BANKING ON LIQUIDITY
OF COMMERCIAL BANKS IN KENYA**

BY

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DECLARATION

This research project is my original work and has not been presented in any other university for academic credit.

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DEDICATION

I dedicate this research project to my parents John Njilu Mitu and Cecilia Karimi Njilu for their support and encouragement. I also dedicate this project to my brothers and sisters who have greatly inspired me to further my studies. God bless you abundantly.

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ABBREVIATIONS AND ACRONYMS

ABC- African Banking Corporation

AFS-Audited Financial Statement

ANOVA- Analysis of Variance

ATM- Automated Teller Machine

CBA- Commercial Bank of Africa

CBK - Central Bank of Kenya

DTB- Diamond Trust Bank

EAPS- East African Payment System

E-B - Electronic Banking

EFMA- European Financial Management & Marketing Association

EFT- Electronic Funds Transfer

ICT- Information Communications Technology

IMF- International Monetary Fund

IPO- Initial Public Offering

KBA - Kenya Bankers Association

KCB - Kenya Commercial Bank

KEPSS- Kenya Electronic Payments and Settlement System

KPMG- Klynveld Peat Marwick Goerdeler

M-PESA- M-Mobile, PESA-Swahili word for money

NBFI- Non-Bank Financial Institution

PEOU- Perceived Ease of Use

POS- Point of Sale

PU-Perceived Usefulness

SAP- System Analysis and Program Development

SCN- SAP Community Network

SIM- Subscriber Identity Module

SPSS-Statistical Package for the Social Sciences

TAM- Technological Acceptance Model

TD- Technological Determinism

ABSTRACT

The motive of this research was to examine the effects of electronic banking on liquidity of commercial banks in Kenya. The research was conducted to find out how ATMs, POS, internet banking and mobile banking affect the banks' liquidity. Banks' major income is from the interest on loans. The banks use the short-term customer deposits to finance long-term loans therefore liquidity is indispensable for a bank's survival. Cash is a key operating tool and its availability affects performance of the banks. The upsurge in electronic banking creates a concern on the latter's effect on banks' liquidity. Descriptive research design was used for 43 commercial banks in Kenya. The study covered a period of 5 years; from 2010 to 2015. Secondary data was used and was collected from central bank of Kenya and the target commercial banks. The dependent variable was liquidity while independent variables were POS banking, ATM banking, mobile banking, internet banking and size of the bank. These variables were measured by average value of POS transactions, average value of ATM transactions, average value of mobile banking transactions, average value of internet transactions and total assets respectively. Liquidity was measured by the current ratio of the 43 commercial banks in Kenya. The study established that there is a strong positive relationship between liquidity and electronic banking of commercial banks in Kenya at 95% confidence level. ATM banking has the highest effect on liquidity while Internet banking has the least. The affordability of mobile phones and banks' high investment in mobile banking technology has also given this form of banking an advantage of increasing number and value of transactions. Many banks are embracing electronic banking to reap the benefits of efficiency, accessibility, flexibility and decreased cost. Mobile and internet banking provide flexibility of transaction amount together with convenience to enable fulltime money movement. POS and ATM machines are more accessible compared to the traditional banking limited by branch opening hours and queues. POS banking is offered by bank agents and merchants who operate even in remote areas with no bank branches while ATMs enable 24 hour banking. This enables formal banking even in remote areas and easy cash movement. The recommendation to the banks is to adopt e-banking to benefit from reduced cost, accessibility, efficiency, flexibility and speed. Banks size also has a positive relationship with liquidity. The more assets a bank have, the higher the liquidity. Therefore banks should increase their assets not necessarily by opening more branches but by marketing to increase the loan asset.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The principal source of revenue for banks is interest on loans (Glykas, 2010). The loans are lent from customer cash deposits therefore cash is a key operating tool. Banks have adopted various strategies to maximize revenue among them being adoption of electronic banking. Basel Committee Report on Banking Supervision (2003) describes electronic banking as the supply of small value and retail banking products via electronic medium. The major forms of electronic banking include ATM, internet banking, card banking and mobile banking (King, 2013).

The following theories will be used in this paper: Technology Acceptance Model (TAM) (Davis & Bagozzi, 1989), Technological Determinism (TD) Theory (Mcluhan, 1989), Financial Intermediation Theory (Akerlof, 1970) and Theory of Bank Liquidity requirement (Calomiris, Heider & Hoerova, 2015). The theories give insight of how electronic banking is affecting banks' liquidity. TAM explains why people accept or reject technology. Rejection could be due to lack of conviction and adequate information on usage and benefits. Technological Determinism theory states that technology determines how individuals and institutions in a society act, feel, think and how the general society operates as technology advances. These two theories explain why and how banks adopt e-banking. According to Allen and Santomero (1998), financial intermediation reduces transaction and information cost of investors. To meet the objective of financial intermediation, banks require a certain amount of cash to serve its

customers and to meet the regulatory reserve requirement (Calomiris, Heider & Hoerova, 2015).

The Kenyan financial sector consists of 43 commercial banks which are government owned, private owned and foreign owned (CBK, 2015). With the increased number, competition has set in with digital restructuring as the focal point. One of the competition strategies adopted by banks is provision of electronic banking through advancing ATMs, POS, internet banking and mobile banking by virtue of their efficiency, lower cost, flexibility, customer service, convenience, real-time money transfers and borderless-banking (Allen, 2010).

1.1.1 Electronic Banking

Xiao (2008) defines e-banking as a service that enables a bank client to effect a financial transaction anywhere, via electronic means without necessarily visiting the brick and mortar bank. E-banking has not replaced traditional banking but relatively improved on quality service delivery, speed, decreased cost and optimized on efficiency of banking services (Gonzalez, 2008). Electronic banking offers a variety of channels ranging from POSs and ATMs to mobile banking, telephone banking, and internet banking which have multiplied banking transactions (Ghodrati & Khah ,2014).

Electronic banking enables viewing of accounts and generating statements, paying bills, transferring money, scheduling electronic periodic payments like rent, bills or loan and opening accounts or loan application (Sathye, 1999). Banks are enhancing their traditional methods with e-banking because of its vast benefits. It has improved customer service because it is self-service in nature. Again, it is helping banks increase their

account sales through a wide market reach and brings in new market opportunities which increase bank deposits. It is also a new source of fee-based income (KPMG, 1998). Electronic payment has brought down expenses like the cheque processing costs; cashiers and customer service staff cost through automation of services; cost of stationery due to online filling and processing of data and importantly data entry cost because customers fill applications themselves (Wright & Ralson, 2002).

Average value of customer transactions via ATM, POS, Internet banking and mobile banking measure the usage of E-banking by commercial banks' customers. They affect the banks' cash flow and essentially liquidity.

1.1.2 Liquidity of Commercial Banks

Adebayo, David & Samuel (2011) define liquidity as the potential of a company to meet its interim obligations. Bank liquidity according to Global Association of Risk Professionals (2013) is the capability of a bank to finance increase in loan assets and enable withdrawal of both anticipated and unanticipated cash demand as well as collateral obligations at a reasonable cost without incurring financial losses. One of the obligations of Kenyan Commercial Banks is the minimum liquidity requirement of 20%. As at June 2015, the average liquidity ratio was at 38.7% an indication that the banks still have the ability to lend more (CBK, 2015).

Sufficient liquidity will enable a bank to meet short term obligations like normal customer withdrawals, loan requests and operating expenses (Lockett, 1980). This ability will shield the bank against challenges of loss of business, poor credit worthiness, reputational risk and even insolvency.

Banks receive customers' deposits and lend them out to earn interest and this is the major source of revenue for most banks worldwide (Choudhry & Masek, 2013). Current day banks are desperate for customer deposits to increase their liquidity and lend them out to generate more income. However, Pandey (2010) cautions that too high liquidity is bad because idle funds are only classified as current assets but earning nothing and advises that organizations should balance between high liquidity and lack of liquidity. Liquidity is also necessary for banks investments. Banks finance the long-term loans using short-term customer deposits. Therefore, a bank may choose to have low liquidity by investing in the highly profitable long-term investments. On the other hand, few long-term investments will leave the bank with high liquidity. High liquidity is therefore an opportunity cost for some investment that would have generated high returns (Kamau 2009). This could explain why some banks are concentrating on mobile banking to lend small valued short-term amounts rather than long-term loans. Liquidity is important in ensuring banks survival during financial crises and bank runs. Ideal liquidity is important as it eliminates costs of maintaining cash deficits. (Chiu, Tombazzi & Leung, 2010). These costs include interest on Interbank borrowing or borrowing from the CBK to cater for customers' cash demand.

Liquidity ratios measure the capability of a firm to settle its short term obligations. The liquidity state of a company is evaluated by quick ratio and current ratio. The current ratio is current assets divide by current liabilities. A high current ratio is an indication that the firm has the potential to meet its short term liabilities on time (Berk, 2009). Quick ratio is a measure of liquidity of a company, which is the assets that can effortlessly be

converted to cash. It is the total sum of cash, cash equivalents, account receivables and marketable securities divide by current liabilities.

1.1.3 Electronic Banking and Liquidity

Banks are prone to technological obsolescence and therefore respond swiftly to variations in both economic and technological environment to not only maintain but also increase their customers. Banking technology has increased transactions which ultimately have direct and indirect impact on banks' liquidity. The use of ATMs, POS and Electronic Funds Transfer cut cost and speed up payments. They enable instant global access to information, products and services therefore customers do banking transactions anywhere anytime (Kondabagil & Kondabagil, 2007).

Greater liquidity may be required for virtual banks than for traditional banks; should liquidity risk be perceived considerably higher than for traditional banks (IMF Policy Discussion Paper, 2002). Virtual banks rely on outside parties to evaluate their credit risk as compared to their branched counterparts who have direct interaction with their customers (SCN Education, 2001). The indirect appraisal of loan customers also exposes the banks to moral hazard and adverse selection. The ease of money access has also been supplemented by e-banking. To and from bank cash movement is easier than before therefore managers are tasked to ensure that the banks have sufficient collateral that could be used to obtain temporary liquidity support. (IMF Policy Discussion Paper, 2002).

Banks have enabled small value borrowing via mobile phones. These loans not only earn interest income but also are more liquid. They have short maturity periods therefore the

bank can recover its money more easily. There is also less risk by virtue of their small amounts and short life that can easily be monitored compared to long-term loans. Banks have also shifted to internet banking. One of the services offered by banks through internet banking is electronic bill payment (SCN Education, 2001). These banks have collection accounts for electricity, water and taxes among others. The customers can transfer money directly to these accounts to pay their bills. Therefore the more the collection accounts the bank has the more the liquidity advantage it has. Birch and Young (1997) state that accessibility and flexibility in transactions provides access to competitive prices and returns. The factor of convenience makes internet banking attractive. Fewer bank customers are visiting bank lobbies; they have shifted to using internet banking to do transactions at the comfort of their homes (SCN Education, 2001). The internet attracts a wide market view and hence opportunity of more accounts which increase in deposits. The convenience and accessibility of POS through bank agents is making formal banking more popular even in remote areas with more people saving in the bank than at home.

1.1.4 Commercial Banks in Kenya

The Kenyan banking industry is regulated by the Banking Act, Companies Act, the CBK Act and prudential guidelines from CBK. Commercial banks are certified and governed under the Banking Act cap 488; deposits taking micro finance institutions are regulated under Micro Finance Act and the forex bureaus under the CBK Act cap 491 (CBK, 2015).

As at end of 30th June, 2015, the Kenyan banking sector comprised 43 commercial banks, 12 microfinance banks, 1 mortgage finance company, 87 foreign exchange bureaus, 8 representative offices of foreign banks, , 14 money remittance providers and 3 credit reference bureaus. Commercial Banks decreased slightly to 43 compared to 44 in 2014. The sector's balance sheet however expanded by 20 percent.

Kenya Electronic Payments and Settlement System (KEPSS) and East African Payment System (EAPS) registered a 28.0 percent and 11.1 percent increase in volume and value of transactions respectively compared to 2014. EFT transactions based payments rose by 8.92 percent in 2015; from KSh 471 billion in 2014 to KSh 513 billion in 2015. However, the value and number of transaction effected through ATM decreased. Mobile phone money transfer transactions increased by 21.59 percent from 824.26 million transactions in 2014 to 1,002.25 million transactions in 2015. As at June 30, 2015, average liquid assets were worth KSh 970.1 billion whereas average liquid liabilities were KSh 2,507.3 billion, culminating to an average liquidity ratio of 38.7%, the same level registered in June 2014. This ratio is above the minimum statutory limit of 20.0% (CBK Annual Report)

Kenyan banks have also partnered with telecommunication firms to enable mobile banking platform. For instance in November 2012 CBA and Safaricom launched an innovative mobile banking service called Mshwari that enables customers to save in their virtual accounts and earn interest as well as borrow loans using their mobile phones. By November 2015 Safaricom had partnered with nine banks to enable real-time funds transfer through M-Pesa. In July 2015, Equity bank introduced Equitel, a mobile banking

platform which enables customers to use their SIM card to access their accounts via their mobile phones.

1.2 Research Problem

Technology is replacing the brick and mortar banking. For example use of POS in agency banking has boosted accessibility to pay or deposit cash because of its broad network. As agency banking is growing, financial inclusion is growing proportionately (Kambua, 2013). The increase in the customer base has increased banks' cash deposits. Mobile banking and internet banking has allowed easy account opening as well as fast and convenient cash movement so customers can have many virtual accounts. This has weakened customers' loyalty because small quantities of money are held in these mobile accounts only for a short time. People do not use their virtual accounts to store wealth (Mbiti & Weil, 2011).

Kenyan banks have embraced ATMs, POS, mobile banking, internet banking and card business. Electronic banking is being used as a tool to cut cost, increase efficiency, deliver product varieties, and increase flexibility or for the mere purpose of being perceived as technology leader (Pyun, Scruggs & Nam, 2002). Ogare (2001) observes that electronic banking affects financial performance of commercial banks. However, a company may be liquid but not profitable or profitable but illiquid. More banks are embracing e-banking as a competitive strategy to increase performance but with little attention on indirect impacts.

Internationally, studies relating to electronic banking and liquidity have been carried out. Rauf et al. (2014) carried a study on to determine whether internet banking affects liquidity and asset quality. They concluded that a proportionate increase in e-banking lend to a more than proportionate increase in liquidity and asset quality of the whole banking sector in Pakistan. Ghodrati & Khah (2014) did a study to establish whether there exists a connection between liquidity management and electronic banking on banks in Iran and one of the findings was that there is a linear relationship between e-banking development and the variable of interbank liquidity ratio. Stoica, Mehdian & Sargu (2015) did a research on how internet banking impacts on the performance of Romanian banks and concluded that e-banking provides efficient and lower cost services which increase banks' performance. Related studies have also been done locally. Aduda et al. (2012) did a study on the relationship between e-banking and financial performance among commercial banks in Kenya. The study established that there exists a strong positive relationship between the two considered variables. Njogu (2014) studied the effect of electronic banking on profitability of Kenyan Commercial Banks and found out that there exists a strong positive relationship. Kombe & Wafula (2015) sought to establish whether e-banking has an effect on financial performance of commercial banks in Kenya and concluded that e-banking enables cheaper services with round the clock accessibility. Both global and local studies on the e-banking have found mixed result. Multiple studies have been made covering electronic banking but from the studies reviewed inadequate research has been done on the relationship between electronic banking and liquidity of Commercial Banks in Kenya. This research aims at establishing

this relationship. What is the effect of electronic banking on liquidity of commercial banks in Kenya?

1.3 Research Objective

To establish the effect of electronic banking on liquidity of commercial banks in Kenya.

1.4 Value of the Study

The recommendations and findings of this paper will assist commercial banks to evaluate the effect of growth and development of electronic banking on the bank's liquidity. They will gain knowledge on contribution of the growing mobile and internet banking to banks' liquidity. They will improve their mode of delivery and assist in competitive strategies especially with NBFIs.

The study will be beneficial to the policy makers when it comes to setting standards of commercial banks liquidity requirements. It will also enlighten them on the appropriate electronic banking standards. They will be informed on the liquidity benefits and risks posed by the adoption of electronic banking. The CBK as the regulator will make informed decisions on the minimum reserve requirement.

This study will form a foundation for future research and provide literature for subsequent studies on electronic banking by scholars and academicians. It will help scholars to improve on literature on liquidity of banks based on their automation muscle.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This part examines the effect of electronic banking on liquidity from previous studies. It also presents the gap to be closed by this study.

2.2 Theoretical Review

This paper will be based on the following theories: Technological Acceptance Model (TAM), Technological Determinism (TD) Theory, Liquidity Preference Theory and Financial Intermediation Theory.

2.2.1 Technological Acceptance Model (TAM)

TAM focused on the primary goal of explaining the factors affecting computer applications' acceptance in general. This model explains why a particular system is acceptable or rejected. An information system will be accepted or rejected based on the users' perception on ease of use and usefulness. A setup that is easy to use and would make work easier can be readily accepted. TAM implies that, other things being constant, perceived usefulness (PU) of a system is dictated by the perceived ease of use (PEOU). (Davis, Bagozzi, & Warshaw, 1989).

The theory emphasized on user motivation to make the employees accept and easily adapt to changes (Ajzen and Fishbein's, 1980). According to this theory, PU and PEOU dictate whether a user will accept or shun a technology. An employee will embrace a

technology that is easy and work friendly (Davis, 1989). Therefore, the success of a new banking technology is determined by both employees and customers. For instance ease of use in internet banking would motivate customers to explore its features and the details of the system (Kusuma & Susilowati, 2007).

2.2.2 Technological Determinism Theory

Technological Determinism (TD) Theory seeks to explain that technology is a key determinant of change. It explains that technology force drives our political, economic, cultural and social life. A given technology determines many factors in the society but only for a specific period. On the other hand, the degree of technological acceptance, impact and usage will be determined by the social context. Capitalism determines the rate of technological change (McLuhan, 1969)

An invention once introduced into a society shapes its own life. For instance the continuing advancement of the computer has followed a sort of internal logic and a seemingly predetermined sequence. Most organizations embraced computerization to keep abreast with other firms as computers were more efficient and accurate. Therefore technology is a crucial agent of modernity. Individuals and institutions keep updated technologically to fit in the society (Smith, 1994). Banks keep pace with technology to be competitive in the prevailing business environment.

2.2.3 Theory of Financial Intermediation

Theory of Financial Intermediation states that financial intermediaries prevail because they reduce transaction and information costs. The intermediaries provide liquidity and

transform the liquid characteristics of the assets thus reducing the cost of money exchange between borrowers and lenders (Allen & Santomero, 1998)

Information asymmetry is evident when borrowers have more information on the projects they want to be financed by lenders. The financial intermediaries obtain information at less cost compared to individual investors because the former avoid duplication of information, (Hirschleifer & Riley, 1979). Adverse selection is also a cost of information asymmetry to the institutions. However, in the recent times intermediation has increased while information asymmetry and transaction costs have declined. Developing countries have a growing financial intermediation infrastructure. This can be improved further through technologies like electronic banking.

2.2.4 Theory of Liquidity Requirement

Theory of Liquidity Requirement states that bank cash holding requirements are pegged on the fact that cash is observable, verifiable and has minimal risk and that banks hold cash voluntarily and by regulation. They hold cash voluntarily to be able to meet depositors' cash withdrawals in response to adverse news.

Prudential regulatory framework requires deposit insurance and minimum cash reserve requirements. A bank ensures that it has sufficient cash to meet cash withdrawals by its customers and to lend out as loans. (Calomiris et al,2015).

2.3 Determinants of Commercial Banks Liquidity

Lucchetta (2007) gives the Central banks regulation and bank size as among the determinants of commercial banks liquidity. Delechat et al., (2012) state that influencers of banks' liquidity buffer include macroeconomic fundamentals, opportunity costs and shocks to funding.

2.3.1 Electronic Banking

Sarlak and Hastiani (2011) give among others, Automated teller Machine (ATM), internet banking and mobile banking as the forms of e-banking. An ATM is an automated telecommunication appliance that provides the clients of a financial institution with access to banking products without the need of a bank teller. (Sarlak & Hastiani, 2011). Sasidharan & Mathews (2008) outlines the benefits of ATM as: availability of different banking transactions like cash withdrawal, bill payment, cash deposits and statements printing; provision of 24 hour banking services; it is innovative, secure and acts as a value added product that attracts new generation customers. In this era of technology, network of financial providers is very important for accessibility of financial services. The value that both customers and banks derive from ATM usage increase as ATM network increases (Saloner & Shepherd, 1995). The convenience and broader network coupled with 24 hour operation has ensured that holding cash at home has reduced. Again ATMs has materially multiplied the frequency of demand for money although the average amount is less than that withdrawn through the teller (Sowunmi et al., 2014).

A Point of Sale (POS) terminal is an electronic machine used to process card transactions at retail locations. A POS provides a means through which a customer performs banking

through the merchants and other bank agents by use of their debit or credit cards even when the physical bank branches are closed. Since A POS transaction entails movement of cash from one account holder to another usually in the same bank, the latter is able to maintain its deposit base. However Abubakar, Shagari & Olesegun (2015) found no notable relationship between POS and banks' liquidity.

Internet banking is performing monetary transactions via the internet by means of a bank's website (Sarlak & Hastiani, 2011). It enables bill payment, money transfer, saving and investment. With the internet banking, banks need only a processing centre which can be located anywhere in the world instead of large branch network while customers can manage their accounts from their homes. The costs are low and customers can switch between the many suppliers. Other advantages of internet banking include faster marketing with wider customer reach, easier to introduce new product and information is easily accessible by customers (Gomez, 2011).

Mobile banking is a banking product offered by financial institutions that allows use of mobile phones and other cellular devices to do financial transactions such as transferring funds, paying bills and saving. However, EFMA and McKinsey & co., (2011) establishes that telecommunication, internet, and other consumer companies are better placed to provide mobile banking services than banks and only a few leading banks invest heavily in this technology. The latter provides high technology that reaches out to the unbanked through the mobile phone. Mobile phone money transfers indirectly influence liquidity of commercial banks because they are jointly provided by banks and mobile services firms hence reducing cash deposits to banks and negatively impacting on banks' liquidity (Kamukama & Tumwine, 2012). The problem of lack of access to formal banks has been

solved by convenient and cheaper services provided by mobile money therefore financial services have been extended to the unbanked population (Morawczynski & Pickens (2009).

2.3.2 Central Bank Regulations

CBK regulations include minimum reserve requirement and the monetary policies. According to the CBK Act, Liquidity Regulation Supplement (2004), CBK uses the liquidity ratio which is given by the percentage of net liquid assets as a proportion of net deposits liabilities. The minimum statutory limit in Kenya is 20%. Central banks regulate prices, inflation, financial stability and growth through interest rates. When monetary policy interest rate increases, banks' risk also increases while liquidity reduces due to the high lending. A bank that is facing liquidity problems could reduce its loans (Lucchetta, 2007).

2.3.3 Bank Size

Banks' network is important for banks' reaction towards monetary policies. The interbank flows allow the smaller banks to manage their loan portfolio after monetary contraction (Ehrmann & Worms, 2004). Bank size negatively affects liquidity. Large sized banks are able to arrange funds from external sources whereas small banks need to maintain sufficient liquidity. Therefore, with an increase in bank size, liquid buffer of banks decreases (Delechat et al., 2012).

Gambacorta (2005) in his study noted that for lending, size did not affect the banks' response to a monetary policy impulse. This could be due to a closer relationship with

liquid customers who helped to smooth effects of the impulse. Liquidity is a material factor enabling banks to reduce the impact of a decrease in deposits due to lending. A decrease in liquidity after a monetary tightening was greater for small and imperfectly capitalized banks. Ray & Academic Foundation (2008) state that large banks are able to protect their loan portfolios from the negative effects of contractionary monetary policy.

2.4 Empirical Review

DeYoung et al. (2006) studied the effect of internet on financial performance of community banks in U.S. from 1999 to 2001. The outcome of the study showed that embracing internet improved community banks' profitability. Ceylan et al., (2008) did a research regarding the effect of e-banking on profitability of banks in Turkey. They used bank specific variables and macroeconomic variables to evaluate the effect of e-b on financial muscle of 14 commercial and saving banks in Turkey in the period between the years 1996 and 2005. Results showed that e-banking activities have had a favorable outcome on performance of Turkey's banks.

Sathye (2005) explored the effectiveness of Internet banking on performance and operating risk profile of credit unions in Australia and the outcome showed no correlation. Hasan et al. (2002) did a research to find out whether financial institutions that had embraced internet banking were performing better than those that had not. They found out that the latter were performing better than the former groups.

Kamesam (2001) did a study on the changes that occurred in the Indian banking industry following a period of increased technology adoption by banks. The results showed that technological progress improved level of profitability of the banks. Ghodrati & Khah (2014) sought to establish the relationship between banking and liquidity management on banks in Iran and one of conclusions was that there is a strong linear relationship between electronic banking development and the variable of liquidated assets ratio to total assets. Abubakar et al. (2015) did a research to know if there is the connection linking electronic banking and liquidity of deposit money banks in Nigeria. They found out that POS and mobile banking had no significant relationship with liquidity, while internet banking had a significant negative relationship with liquidity.

Ogare (2013) investigated the correlation between e-banking and performance of Kenyan commercial banks. Performance was measured by profit after tax and the e-banking variables consisted of number of POS terminals, ATMS, debits and credit cards issued and the level of usage of internet banking, mobile banking and EFT. The results showed that as electronic banking usage rose, so did the performance of the banks.

Njogu (2014), in his study found out that there is a very strong relationship between financial performance and the electronic banking technology adoption by commercial banks in Kenya. This is because e-banking has helped the commercial banks to cut costs, increase flexibility, convenience and efficiency. He also found out that bigger banks perform better compared to their smaller counterparts.

Maiyo (2014) carried out a study on commercial banks in Kenya to establish whether financial performance is affected by electronic banking. The outcome revealed that

commission charges from mobile banking, credit cards and debit cards had a notable upshot on returns on asset. However commission and fees generated from internet banking had insignificant effect on return on assets.

Maore (2006) analyzed the determinants of the liquidity of the commercial banks in Kenya. The motivation was to establish whether the determinants of liquidity are empirically robust. The focus was exclusively on a cross section of 30 commercial banks in Kenya. Results indicated that significant factors that determine the liquidity are liquid liabilities, growth and maturity. Liquid liabilities and maturity have a positive impact on liquidity whereas growth has a negative impact. The other factors such as liquid assets and cash flows have a positive but insignificant impact on the liquidity of the banks. Similarly, leverage, size, profitability and loan commitments have an insignificant negative effect on banks' liquidity.

2.5 Critique of Literature Review

Most of the studies reviewed indicate existence of a significant relationship between e-banking and bank performance. Factors like competitiveness, economic status of a country, market share of a bank, bank characteristics (Bashir, 2003) affect banks' profitability. However, other factors that influence performance were not considered. The studies were also based on a short duration of 5 years whereas a longer period would have captured various economic cycles.

2.6 Summary of Literature Review

This chapter reviewed the empirical literature on the effect of electronic banking on liquidity of commercial banks. From the studies reviewed, effect of electronic banking on financial performance of banks shows a positive correlation. However, banks may be profitable but illiquid or liquid but performing poorly financially. Therefore, increase in electronic banking may increase banks performance but not liquidity. Studies reviewed on relationship between electronic banking and liquidity of banks show positive and nil correlation. Whereas these studies were relevant to this study, insufficient study has been conducted so far on the effect of electronic banking and liquidity in Kenyan context where mobile banking is one of the most developed in the continent. This study therefore seeks to examine the correlation.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology used for the study. Research design, population, methods of data collection and how data was analyzed are among the matter in question.

3.2 Research Design

Descriptive design was appropriate for the research to explain the relationship between electronic banking and liquidity. Cooper and Schindler (2011) defines descriptive studies as those studies that aim at explaining a phenomenon, estimating a proportion of a population with similar characteristics and ascertaining the relationship that exists between the variables under study.

Descriptive design was deemed appropriate as it enabled us to carry out the research and meet the objective of establishing whether electronic banking affects liquidity of Kenyan commercial banks. The design also helped to critically analyze the content in question and draw more comprehensive and specific information as well as recommendations that are useful to banks.

3.3 Population of the Study

The target population was all commercial banks operating in Kenya. As at 31st December 2015, there were 43 Commercial banks regulated by CBK (CBK, 2015). A census survey

was adopted for the study of all the commercial banks because the population is small and it eliminates sampling error and provides necessary data on all the entities of the population.

3.4 Data Collection

The study used secondary data; which was collected from target banks' yearly reports, CBK annual report, published reports and other documents such as banking industry publication. To ensure that the study elements are complete and consistent, the researcher collected data for the Commercial Banks that were in operation from 2010 to 2015. The five (5) year period was considered adequate to provide the data that is in the analysis and this in line with past similar studies. Liquidity data was deduced by looking at the current assets and current liabilities sections of the audited financial statements (AFS).

3.5 Data Analysis

The study used inferential and descriptive statistics to analyze the data. To analyze the effect of electronic banking on liquidity of commercial banks in Kenya, regression analysis was considered suitable. The analysis was undertaken with the help of Statistical Package for the Social Sciences (SPSS). The elements to be regressed were liquidity and electronic banking as dependent and independent variables respectively.

3.5.1 Analytical Model

The empirical model applied in the study was presented as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon.$$

Where:

Y = Liquidity

X₁ = Average value of ATMs transactions

X₂ = Average value of POS transactions

X₃ = Average value of internet banking transactions

X₄ = Average value of mobile banking transactions

X₅ = Size of the bank

3.5.2 Operationalization of the Variables

Y; Bank liquidity measured by current ratio of the 43 Kenyan commercial banks

Current ratio is given by current assets as a proportion of current Liabilities. This ratio shows the bank's ability to pay its current liabilities from its current assets. Current assets are those that are anticipated to convert into cash within one year while current liabilities are the expenses that are supposed to be settled within one year.

X₁; Average value of ATMs transactions

$$X_1 = \frac{\text{Total value of ATM transactions}}{\text{Number of ATM transactions}}$$

X₂; Average value of POS transactions

$$X_2 = \frac{\text{Total value of POS transactions}}{\text{Number of POS transactions}}$$

X₃; Average value of internet banking transactions

$$X_3 = \frac{\text{Total value of internet banking transactions}}{\text{Number of internet banking transactions}}$$

X₄; Average value of mobile banking transactions

$$X_4 = \frac{\text{Total value of mobile banking transactions}}{\text{Number of mobile banking transactions}}$$

X₅; Size of the bank

Total bank assets will be appropriate to measure the size of the bank where bank assets also include the total loans. The bank can only lend after meeting both CBK regulation of minimum reserve and its operational obligations, therefore bank assets is the appropriate measure.

3.5.3 Test of Significance

F-test was used to test the significance of the model at 95% confidence level and 5% significance level.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the outcome of the study on the effects of electronic banking on liquidity of commercial banks in Kenya. The data was collected from the Central Bank of Kenya and Commercial banks in Kenya. Regression analysis was done to determine the effects of electronic banking on liquidity of the commercial banks. The study covered a period of 5 years from year 2010 to 2015.

4.2 Electronic banking

The study was aimed at finding out the effects of electronic banking on the liquidity of commercial banks in Kenya. The electronic banking platforms considered in the study were: Automated Teller Machine (ATM) banking, Point of Sale (POS) banking, mobile banking and Internet banking. The results of the total number of transactions and the total value of transactions were collected and analyzed.

4.2.1 ATM Banking

Table 4.1: ATM Banking

Year	Number of Transactions (000)	Value of Transactions (000)	Mean (000)
2010	5507	117627	21.36
2011	6827	140825	20.63
2012	7283	156892	21.54

2013	9040	171930	19.01
2014	6666	38094	5.71
2015	2123	10279	4.84

Source: Central Bank of Kenya

From the Table above, it is evident that the transactions were dropping systematically over the years. In the year 2010, there were 5507 ATM transactions which had a total value of 117627 and an average of 21.36 of the total transactions. In the year 2011, the banks recorded a total number of transactions of 6827 with a total value of 140825 and an average transaction value of 20.63. In the year 2012, the banks recorded the second highest number of ATM transactions totaling to 7283 with a total value of 156892 and an average value of 21.54. In 2013, the total number of ATM transaction rose to 9040 and a total value of 171930 but the average value of the ATMs dropped to 19.01. The figures continued dropping whereby in the year 2014 the transactions dropped to 6666 with a total value of 38094 and an average value of 5.71. In the year 2015 the total number of transactions dropped further to 2123 which is more than 60% drop from the previous year with a total of value of transactions of 10279 and an average value of 4.84.

From the findings, the number of ATM transactions increased up to year 2013 from which the total value of the transactions followed the same pattern. Average value of ATM transactions was on a downward trend since 2013.

4.2.2 Mobile Banking

Table 4.2: Mobile Banking

Year	Number of Transactions	Value of Transactions	
	(000)	(000)	Mean(000)
2010	311	732	2.35
2011	433	1169	2.70
2012	577	1544	2.67
2013	732	1901	2.59
2014	911	2371	2.60
2015	1114	2816	2.52

Source: Central Bank of Kenya

The value of transactions is increasing as the number of transactions increase over the years. In the year 2010, there were 311 mobile banking transactions with a total value of 732 and 2.35 as average value of the mobile banking transactions for that year. In the year 2011, the total number of mobile banking transactions rose to 433 leading to an increase in the value of the transactions to 1169. In the following year, 2012, the banks recorded 577 transactions and 1544 total value of transactions thus the average value of transactions was 2.67. In 2013, there were 732 transactions across the country with 1901 total value of transactions. In the year 2014, the banks recorded an increase in the number of transactions to 911 and a total transaction value of 2371 and an average of 2.60. 2015 had the highest number of mobile banking transactions than the previous years. The

banks recorded a total of 1114 mobile banking transactions and 2816 as the value of the transactions. This made the average of the value of the transactions that year to be 2.52.

From the findings, the number and value of mobile banking transactions was increasing year after year. Mobile banking is time-dependent such that it depends with the inventions and technology development over time (Kamukama & Tumwine, 2012).

4.2.3 Internet Banking

Table 4.3: Internet banking

Year	Number of Transactions	Value of Transactions	Mean (000)
	(000)	(000)	
2010	240	9450	39.38
2011	460	13870	30.15
2012	580	15900	27.41
2013	670	17780	26.54
2014	760	18980	24.97
2015	980	19670	20.07

Source: Central Bank of Kenya

From the table, the numbers of internet banking transaction are increasing year after year and so is the value of transactions. Despite the increase in the number of transactions and the total value of the transactions, the average value of the transactions is decreasing year after a year. In the year 2010, the banks recorded a total of 240 internet banking transactions with a total value of 9450 and the average value of the transactions was

39.38. Comparing the results for that year with the results of the year 2015, the number of internet banking transactions rose to 980; the value of the transactions rose also to 19670. Despite there being a very huge increase in the value of the transactions as well as the total number of the transactions, the average value of the transactions reduced to 20.07 which is a 48.06% decrease. This therefore shows that a rise in the number of the internet banking caused a subsequent increase in the total value of the transactions but a decrease in average value of the transactions.

4.2.4 Point of Sale (POS) Banking

Table 4.4: Point of sale Banking

Year	Number of Transactions	Value of Transactions	
	(000)	(000)	Mean (000)
2010	5496.36	43615.00	7.94
2011	6570.15	64523.00	9.84
2012	11302.79	111302.79	9.82
2013	15764.92	103468.00	6.56
2014	11635.36	62183.00	5.34
2015	13170.83	70716.00	5.30

Source: Central Bank of Kenya

The table above shows that the number of POS transactions is relatively related to the total value of the transactions. In the year 2010, the banks recorded a total of 5496 transactions and these resulted to a total value of 43615. The average value of the

transactions for the year was 7.94. In the year 2011, the POS transactions rose to 6570.15 and this resulted to increase in the total value of transactions to 64523 and the average value of transactions rose to 9.84. The following year, 2012, the banks recorded an increase in the number of POS transactions to 11302 and the total value of the transactions as well rose to 111302. The average value of the transactions for the year was 9.82. In the year 2013, the transactions still increased to 15764 but the total value of the transactions dropped to 103468 with a further drop in the average value to 6.56. In 2014, the banks recorded a decrease in the number of POS transactions which dropped to 11635; the total value of the transactions as well dropped to 62183 while the average value of transaction dropped to 5.34. In the year 2015, the number of the transactions increased to 13170 and the total value of transactions also increased to 70716 with an average of 5.30.

The number and value of transactions increased up to year 2013 from which they started dropping. The average value has been on the downward trend except in the year 2011.

4.2.5 Size of the Bank

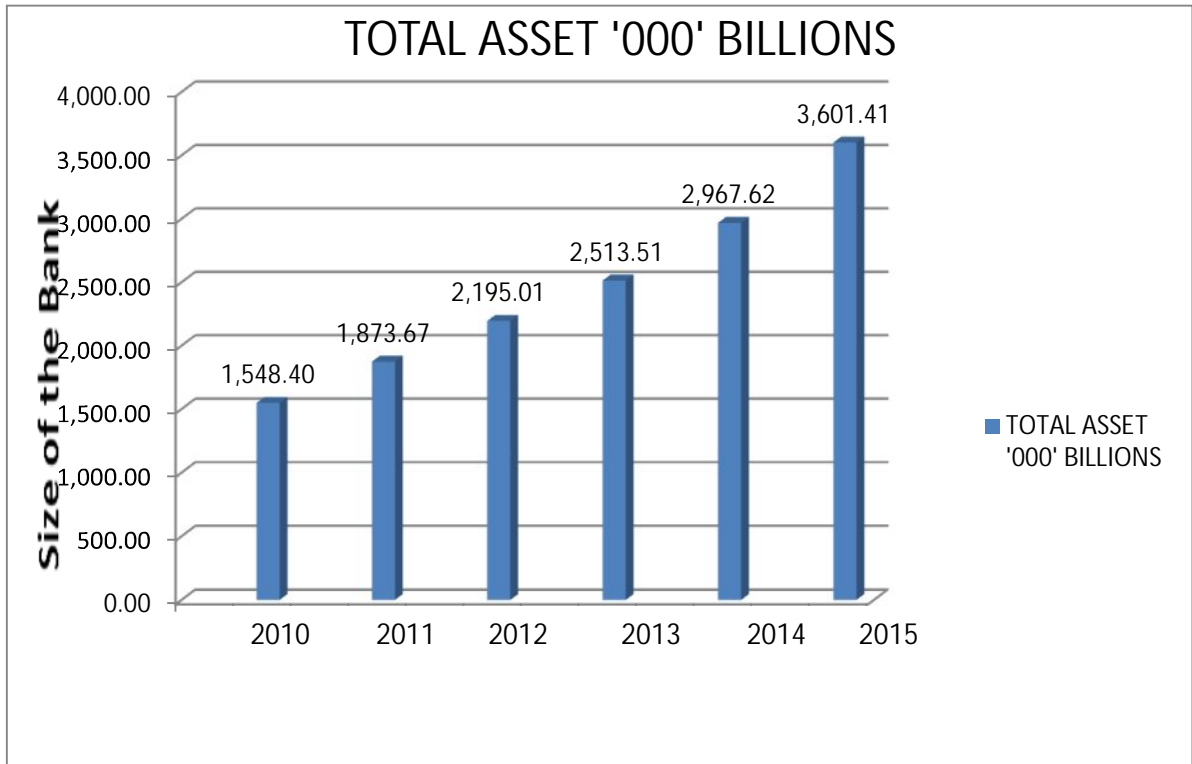


Figure 4.1: Size of the Bank

Source: Central Bank of Kenya

From the figure above, it is evident that the size of the banks increased year after a year. In the year 2010, the total assets for the banks were 1548.40. The total assets of the banks increased in the year 2011 by 21% to record a new amount of 1873.67. In the year 2015, the total assets of the banks increased by more than 100% as compared to 2010.

4.4 Regression analysis

The study sought to find out the effect of the independent variables; Internet banking, mobile banking, ATM banking, POS banking and size of the bank to the liquidity of commercial banks in Kenya.

Table 4.5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.875 ^a	.765	.821	.17412

Source: Research Data (2016)

The results of R show a strong positive relationship between electronic banking and liquidity of commercial banks. Evidently, banks that have embraced electronic banking have higher liquidity as compared to those that have not. E-banking has enabled more efficient, convenient, accessible and flexible banking with 24hour availability, which are favorable conditions for cash deposit mobilization.

From the above table, adjusted R squared was 0.821 indicating that there was variation of 82.1% on liquidity of commercial banks in Kenya due to variations in ATM banking, mobile banking, internet banking, POS banking and size of the bank at 95% confidence level. This shows that 82.1 % changes in liquidity of the commercial banks could be caused by changes in internet banking, POS banking, ATM banking, mobile banking and size of the bank.

Table 4.6 Test of Significance (F-Test)

	Sum of				
	Squares	Df	Mean Square	F	Sig.
Between Groups	24.321	5	4.864	10.652	0.000 ^b
Within Groups	17.146	37	0.463		
Total	41.467	42			

From the F-Test table above, it is evident that the regression model has a significance level of 0% hence low likelihood of giving erroneous predictions. The model is appropriate for making a conclusion on the data as the level of significance (p-value) is less than 5%. The calculated value was greater than the critical value; therefore ATM banking, internet banking, POS and mobile banking significantly affect the liquidity of the commercial banks in Kenya.

4.6 The regression model

Table 4.7: Coefficients of the regression model

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	0.582	.221		2.633	.000
ATM banking (X ₁)	0.478	.077	0.514	6.207	.003
POS banking (X ₂)	0.341	.116	.439	2.939	.037
Internet banking (X ₃)	0.355	.102	.352	3.481	.028
Mobile banking (X ₄)	0.322	.142	.425	2.267	.045
Size of the bank (X ₅)	0.256	.113	.301	2.274	.040

Source: Research Data (2016)

The model was obtained as;

$$Y = 0.582 + 0.478X_1 + 0.341X_2 + 0.355X_3 + 0.322X_4 + 0.256X_5$$

Taking all other variables constant, that is ATM banking, POS banking, Internet banking, mobile banking and size of the bank; the liquidity of the banks will be 0.582. A unit

increase in ATM banking increase liquidity of commercial banks by 0.478. The high effect can be associated with the ease of cash deposit compared to the traditional queuing system. A unit increase in POS banking increases liquidity of commercial banks by 0.341. A unit increase in internet banking increases liquidity of commercial banks by 0.355. This can relate to the massive usage of internet which is opening banks to wider market for new accounts and cash deposits. A unit increase in mobile banking increases liquidity of commercial banks by 0.322. An increase in mobile banking causes increase in liquidity of the banks; this can be associated with the current influx of mobile technology making mobile banking more accessible. A unit increase in size of the bank increases liquidity of commercial banks by 0.256.

4.7 Interpretation of the Findings

According to the findings, the liquidity of commercial banks in Kenya depends substantially on the progress made to electronic banking; internet banking, ATM banking, mobile banking and POS banking at 95% confidence level. The coefficient determination shows that there is a significant correlation between liquidity of commercial banks and ATM banking. As the number of ATM transactions of the banks increased, the value of the transactions also increased significantly. The more the banks embrace ATM banking, the higher the liquidity of the banks and this could be partly due to more efficient automated cash deposit rather than the long queues in the banking halls.

The study further found that Internet banking was strongly related to liquidity of commercial banks in Kenya. As the number of transactions through internet banking

increased, the total value of the transactions increased as well. More internet accessibility and banks ability to market and mobilize new accounts has increased cash deposits. Mobile phones have become a must-have to majority of adults from where they easily access banking applications and services. Similar to internet banking, mobile banking transactions increased with time and this could relate to the increase access to mobile phones over time and banks' double effort in mobile banking technology. POS banking has a positive effect on liquidity. This form of banking is mainly through banks' agents and merchants in urban areas and towns characterized by almost cancelling deposits and withdrawals. Expansion of banks enables outreach of banking services to remote areas where money moves from mattresses to accounts and this could explain why increase in size of the bank increases liquidity.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings; conclusion and recommendations of the study based on the objective which is to determine the effects of electronic banking on the liquidity of commercial banks in Kenya. Conclusions are drawn on the basis of the outcome of the study from the data collected and analyzed. From the conclusion, recommendations and areas of further research were determined and examined. The latter will fill information gaps on areas related to the study.

5.2 Summary of Findings

The study aimed at finding out the effects of electronic banking on the liquidity of commercial banks in Kenya. It was guided by independent variables; ATM banking, mobile banking, Internet banking, point of sale banking and size of the bank. From the findings, it was evident that all the independent variables had positive relationship with the liquidity of commercial banks. ATM banking had the highest effect; for every unit increase in ATM banking, banks' liquidity increases by 0.478. Increase in mobile banking increases banks' liquidity. The affordability of mobile phones and preference for virtual accounts to cash coupled with banks' investment in mobile banking explains the increasing mobile banking number and value of transactions.

Point of Sale banking has a positive relationship with the liquidity of the commercial banks. Size of the bank has the least effect on liquidity compared to other factors in consideration that is ATM banking, mobile banking, internet banking and POS banking.

The data revealed that there was a statistically notable relationship between e-banking and liquidity of commercial banks in Kenya. E-banking is associated with benefits of speed, flexibility, convenience, effectiveness, accessibility, accuracy, variety of products and automation with value-add banking services hence attracting more clients especially the young and productive age. Electronic banking has enabled opening up of formal banking rather than the procedural and more inaccessible branches.

5.3 Conclusion

The purpose of the study was to find out the effects of ATM banking, internet banking, mobile banking and POS banking on the liquidity of commercial banks in Kenya. The study found out that there was a statistically notable relationship between electronic banking and liquidity of Kenyan commercial banks. The study concludes that there was a strong positive relationship between electronic banking and liquidity of commercial banks in Kenya.

Increase in size of the bank also increases liquidity of the commercial banks. 82.1% of the changes in liquidity are influenced by the degree of banks' automation of processes and products. ATMs and POS machines together with mobile phones and internet give banks a technological platform for speedy, convenient and flexible banking. They have enabled a wide customer view and are generally affordable, a phenomenon that has encouraged banking of the unbanked. Many banks have embraced E-B as a performance strategy, mainly to onboard as many customers as possible and attract cash deposits. Banks get most income from interest on loans. The loans are lent from customers' deposits therefore liquidity of banks is a key determinant of their performance.

5.4 Recommendations

The banks should adopt electronic banking to reap the benefits of accessibility of banking products, reduced cost, efficiency and flexibility. Mobile banking has the highest positive effect on liquidity therefore banks should invest more on mobile banking.

Increase in size of the bank increases liquidity. However E-B is slowly replacing brick and mortar banking therefore instead of establishing more branches, banks can invest in marketing electronic banking to onboard more customers and increase the loan asset.

5.5 Limitations of the study

The study was limited to effects of electronic banking on the liquidity of commercial banks in Kenya. There are other factors that affect the liquidity of the commercial banks such as competitiveness of the bank, monetary policies, CBK liquidity ratio, unemployment, banking crises, CBK regulations, other products offered by the bank, number and type of customers as well as the market share of the bank. For instance, the type of clientele can determine how much cash a bank has. A bank that has a high population of low income earners could be less liquid compared to another that has few clients but with large deposits.

The study highly depended on secondary data from CBK and commercial banks. The data was subject to the degree of precision and accuracy of these reports. The study was also limited to a period of 5 years that is from 2010 to 2015. Further, the study was limited to the 43 commercial banks in Kenya. Other non-bank institutions which use electronic banking like mobile phone money transfer were not considered in the study.

5.6 Areas of Further Research

The study was conducted in order to establish the effects of electronic banking on liquidity of commercial banks in Kenya. However, E-banking, liquidity and performance of banks are intertwined. Future research on impact of liquidity on financial performance of Kenyan commercial banks could be vital in explaining why liquidity should be regarded as a key determinant of financial performance the banks. Again, some companies are liquid but not profitable. Others are illiquid but profitable. A research should be done to establish whether this is true for the banks.

Further research should be conducted to find out other factors that influence the banks to adopt electronic banking as there are other causes other than liquidity such as to increase the market share and to gain competitive advantage. The study was only limited to commercial banks in Kenya an indication that other studies should be carried on the factors affecting liquidity of other financial institutions like the micro lending institutions, telecommunication, financial markets and insurance companies.

REFERENCES

- Abubakar, A., Shagari, J. N. & Olusegun, K. L. (2015). The Relationship between Electronic Banking and Liquidity of Deposit Money Banks in Nigeria. *International Journal of Economics, Commerce and Management*. 3(9), 830-847.
- Adebayo, O., David, A. O. & Samuel, O. O. (2011). Liquidity Management and Commercial Banks Profitability in Nigeria. *Research Journal of Finance & Accounting*, 2(8), 24-39.
- Aduda, J., Masila, J. M. & Onsongo, E. N. (2012). The Determinants of Stock Market Development: The Case for the Nairobi Stock Exchange. *International Journal of Humanities and Social Science*, 2(9), 2221-0989.
- Ajzen, I. & Fishbein, M. (1980). Understanding attitudes and predicting social behavior. Englewood Cliffs, NJ: Prentice-Hall.
- Akerlof, G. (1970). The Market for Lemons: Quality Uncertainty and the Market Mechanism. *Quarterly Journal of Economics* 48, 488-500.
- Allen, F. & Santomero, A. M. (1998). The Theory of Financial Intermediation. *Journal of Banking & Finance*, 21(8), 1461-1485.
- Allen, F. (2010). Handbook of Liquidity and Crises. New York: Oxford University Press.
- Basel Committee on Banking Supervision. (2003). Risk Management Principles for Electronic Banking: Bank for International Settlement. *Journal of Business*, 18(5), 93-147

- Bashir, A. M. (2003). Determinants of profitability of Islamic Banks: Some Evidence from the Middle East. *Islamic Economic Studies*, 11(1), 32-57.
- Birch, D. & Young, M. A. (1997). Financial Services and the Internet-What does Cybespace mean for the financial services industry? *Internet Research: Electronic Networking Applications and Policy*, 7(2), 120-128.
- Calomiris, C. W., Heider, F. & Hoerova, M. (2015). A Theory of Bank Liquidity Requirements. *Columbia Business School Research Paper No.* 14-39.
- Central Bank of Kenya (2015). Bank supervision annual Report 2015. www.centralbank
- Ceylan, O. Emre, O. & Asli, D. H. (2008). The Impact of Internet-Banking on Bank Profitability the Case of Turkey. *Oxford Business & Economics Conference Program*.
- Chiu, B., Tombazzi, M. & Leung, A. (2010). Liquidity Management Techniques and Best Practices: General Principles, Specific Applications.
- Choudhry, M. & Masek, O. (2013). An Introduction to Banking: Liquidity Risk and Asset-Liability Management. Hoboken, N.J: Wiley.
- Davis, F.D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), 318-339.
- Davis, F. D., Bagozzi, R. P. and Warshaw, P. R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, 35(8), 982-1003.

- Delechat, C. C., Henao, A. C., Muthoora, P. S. & Vtyurina, S. (2012). The Determinants of Banks' Liquidity Buffers in Central America. Washington: International Monetary Fund.
- DeYoung, R., Lang, W. W. and Nolle, D. E. (2007). How the Internet Affects Output and Performance at Community Banks. *Journal of Banking and Finance*. 31, 1033-1060
- Diamond, D. W. and Dybvig, P. H. (1983). Bank runs, deposit insurance, and liquidity. *Journal of Political Economy*. 91 (3), 401–419.
- EFMA and McKinsey & co. (2011). The state and Future of Mobile Banking in Europe.
- Ehrmann, M. & Worms, A. (2004). Banks Network and Monetary Policy Transmission. *Journal of the European Economic Association*. 2(6), 1148-1171.
- Gambacorta, L. & Marquez-Ibanez, D. (2011). The bank lending channel: Lessons from the crisis. Basel: BIS.
- Ghodrati, H. & Khah, M. S. (2014). A Study on the Relationship between Electronic Banking and Liquidity Management on Iranian Banks. *Management Science Letters*, 4(6), 1259-1270.
- Glykas, M. (2010). Fuzzy Cognitive Maps: Advances in Theory, Methodologies, Tools and Applications. Berlin: Springer.
- Gomez, C. (2011). Banking and Finance: Theory Law and Practice. New Delhi: PHI Learning.

- Gonzalez, M. E. (2008). An Alternative Approach in Service Quality: An E-Banking Case Study. *Quality Manage.* 2(2), 78-109.
- Hasan, I., Maccario, A. and Zazzara, C. (2002). Do Internet Activities Add Value? The Italian Bank Experience. *Working Paper*, Berkley Research Center, New York
- Hirschleifer, J. & Riley, J. G. (1979). The Analytics of Uncertainty and Information: An Expository Survey, *Journal of Economic Literature*, 17, 1375- 1421.
- IMF Policy Discussion Paper, International Monetary Fund, Washington, D. C. (2002)
- Information Resources Management Association. (2015). Banking, finance, and accounting: Concepts, methodologies, tools, and applications.
- Kambua, D. B. (2013). The Effect of Agency Banking on Financial Performance of Commercial Banks in Kenya. *An unpublished MBA project from University of Nairobi.*
- Kamukama, N. & Tumwine, S. (2012). Mobile Money Services: A Threat to Uganda's Commercial Banks. *African Journal of Accounting, Economics and Banking Research*, 8(8), 33-46.
- King, B. (2013). Bank 3.0: Why Banking is No Longer Somewhere You Go, But Something You Do. Singapore: John Wiley & Sons Singapore Pte. Ltd.
- Kombe, S. K. & Wafula, M. K. (2015). Effect of Internet Banking on the Financial Performance of Commercial Banks in Kenya a Case of Kenya Commercial Bank. *International Journal of Scientific and research Publications*, 5(5), 2250-3153

- Kondabagil, J. & Kondabagil, J. (2007). Risk Management in Electronic Banking: Concepts and Best Practices. Singapore: John Wiley & Sons Asia
- KPMG, (2011). Monetizing Mobile: How Banks are Preserving their Place in the Payment Value Chain.
- Lucchetta, M., (2007). What Do Data Say About Monetary Policy, Bank Liquidity and Bank Risk Taking?. *Economic Notes by Banca Monte dei Paschi di Siena SpA*, 36(2), 189-203.
- Luckett D. (1980). Approaches to Bank Liquidity Management. *Economic Review, Federal Reserve Bank of Kansas City*.
- Maiyo. J. (2014). The Effect of Electronic Banking on Financial Performance of Commercial Banks in Kenya. *Unpublished MBA project University of Nairobi*.
- Maore. D. (2006). Determinants of the Liquidity of the Commercial Banks in Kenya Using a Multiple Linear Regression Model. *Unpublished MBA project University of Nairobi*.
- Mbiti, I. & Weil, D. N. (2011). Mobile Banking: The Impact of M-Pesa in Kenya. Cambridge, Mass: National Bureau of Economic Research.
- McLuhan M. (1969) Technological Determinism., *The Playboy Interview*, retrieved from MassCommTheory.com.
- McLuhan, M. (1964). Understanding Media: The Extensions of Man. New York: McGraw-Hill

- Mcluhan, M. (1962). *The Gutenberg Galaxy: The making of Typographic Man*. Toronto: University of Toronto Press.
- Morawczynski, O. & Pickens, M. (2009). *Poor People Using Mobile Financial Services: Observations on Customer Usage and Impact from M-PESA*.
- Njogu, J. N. (2014). *The Effect of Electronic Banking on Profitability of Commercial Banks in Kenya. Unpublished MBA Project, University of Nairobi*.
- Ogare, H. O. (2001). *Effect of Electronic Banking on Financial Performance of Commercial Banks in Kenya. Unpublished MBA project University of Nairobi*.
- Pandey, I. M. (2010). *Financial Management*. New Delhi: Vikas
- Pearce, J. A. & Robinson, R. B. (2000). *Strategic management: Formulation, Implementation and Control*.
- Pyun, C. S., Scruggs, L. and Nam, N. (2002). *Internet Banking in the US, Japan and Europe. Multinational Business Rev 7381*.
- Rauf, S., Qiang, F. & Sajid, K. U. (2014). *Is Internet Banking a Determinant of Liquidity and Asset Quality?: Empirical Evidence of Pakistan Banking Sector. European Journal of Business and Management, 6(6), 43-48*.
- Ray, P. & Academic Foundation. (2008). *Commercial Banks and Monetary Policy in India*. New Delhi: Academic Foundation.
- Saloner, G. & Shepherd, A. (1995). *Adoption of Technologies with Network Effects: An Empirical Examination of the Adoption of the Automated Teller Machine. The RAND Journal of Industrial Economics, 26(3), 479-501*

- Sarlak, M. A., & Hastiani, A. A. (2011). E-Banking and Emerging Multidisciplinary Processes: Social, Economical and Organizational Models. Hershey, PA: Business Science Reference.
- Sasidharan, K. & Mathews, A. K. (2008). Financial services and system. New Delhi: Tata McGraw-Hill.
- Sathye, M. (1999). Adoption of Internet banking by Australian consumers: An Empirical Investigation. *International Journal of Bank Marketing*, 17(7), 324-33
- SCN Education BV. (2001). Electronic Banking: The Ultimate Guide to Business and Technology of Online Banking. Wiesbaden: Vieweg+Teubner Verlag.
- Smith, M. R. (1994). Does Technology Drive History?: The Dilemma of Technological Determinism. Cambridge, Mass MIT Press.
- Sowunmi, F. A., Amoo, Z. O., Olaleye, S. O. & Salako M. A. (2014). Effect of Automated Teller Machine (ATM) on Demand for Money in Isolo Local Government Area of Lagos State, Nigeria. *Journal of Applied Business and Economics*, 16(3), 171-180.
- Stoica, O., Mehdian, S., & Sargu, A. (2015). The impact of internet banking on the performance of Romanian banks: DEA and PCA approach. *Procedia Economics and Finance*, 20, 610-622.
- Wright, A. & Ralson, D. (2002). The lagging development of small Business Internet Banking in Australia. *Journal of Small Business Management*, 40(1), 51-84.
- Xiao, J. J. (2008). Handbook of consumer finance research. New York: Springer.

APPENDICES

APPENDIX I: Introduction Letter



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Mombasa, Kenya

DATE: 8TH SEPTEMBER 2016

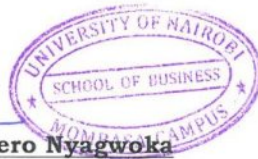
TO WHOM IT MAY CONCERN

The bearer of this letter, **Njilu Karen Kajuju** of Registration Number **D61/68459/2013** is a Master of Business Administration (MBA) student of the University of Nairobi, Mombasa Campus.

She is required to submit as part of her coursework assessment a research project report. We would like the student to do her project on ***The Effect of Electronic Banking on Liquidity of Commercial Banks in Kenya***. We would, therefore, appreciate if you assist her by allowing her to collect data within your organization for the research.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organization on request.

Thank you.



Zephaniah Ogero Nyagwoka

Administrative Assistant, School of Business-Mombasa Campus

APPENDIX II: List of Commercial Banks in Kenya

(Source, 2015: Central Bank of Kenya)

1. ABC Bank (Kenya)
2. Bank of Africa
3. Bank of Baroda
4. Bank of India
5. Barclays Bank Kenya
6. CFC Stanbic Holdings
7. Chase Bank Kenya
8. Citibank
9. Commercial Bank of Africa
10. Consolidated Bank of Kenya
11. Cooperative Bank of Kenya
12. Credit Bank
13. Development Bank of Kenya
14. Diamond Trust Bank
15. Dubai Bank Kenya
16. Eco bank Kenya
17. Equatorial Commercial Bank
18. Equity Bank
19. Family Bank
20. Fidelity Commercial Bank Limited
21. First Community Bank
22. Giro Commercial Bank
23. Guaranty Trust Bank Kenya
24. Guardian Bank
25. Gulf African Bank
26. Habib Bank
27. Habib Bank AG Zurich
28. Housing Finance Company of Kenya
29. I&M Bank
30. Imperial Bank Kenya
31. Jamii Bora Bank
32. Kenya Commercial Bank
33. K-Rep Bank
34. Middle East Bank Kenya
35. National Bank of Kenya
36. NIC Bank
37. Oriental Commercial Bank
38. Paramount Universal Bank
39. Prime Bank
40. Standard Chartered Kenya
41. Trans National Bank Kenya
42. United Bank for Africa
43. Victoria Commercial Bank

APPENDIX III: CBK Report

(Source: Central Bank of Kenya)

	CBK REPORT- JAN TO DEC			
	ATM	MOBILE BANKING	POS	INTERNET BANKING
NO. OF BANKS SURVEYED - 43				
2010				
NUMBER OF TXN '000' MILLIONS	5,507.32	311.05	5,496.36	0.24
VALUE OF TXN '000' MILLIONS	117,627.00	732.52	43,615.00	9.45
2011				
NUMBER OF TXN '000' MILLIONS	6,827.41	433.00	6,570.15	0.46
VALUE OF TXN '000' MILLIONS	140,825.00	1,169.15	64,523.00	13.87
2012				
NUMBER OF TXN '000' MILLIONS	7,283.75	577.3742	11,302.79	0.58
VALUE OF TXN '000' MILLIONS	156,892.00	1,544.81	111,372.00	15.90
2013				
NUMBER OF TXN '000' MILLIONS	9,040.82	732.5971	15,764.92	0.67
VALUE OF TXN '000' MILLIONS	171,930.00	1901.559	103,468.00	17.78
2014				
NUMBER OF TXN '000' MILLIONS	6,666.99	911.31	11,635.36	0.76
VALUE OF TXN '000' MILLIONS	38,094.00	2,371.79	62,183.00	18.98
2015				

NUMBER OF TXN '000' MILLIONS	2,123.82	1,114.18	13,170.83	0.98
VALUE OF TXN '000' MILLIONS	10,279.00	2,816.10	70,716.00	19.67