THE EFFECT OF SELECTED TECHNOLOGIES ON THE FINANCIAL PERFORMANCE OF THE COMMERCIAL BANKS IN KENYA

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DECLARATION

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

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D61/60883/13

This research project has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

This project is dedicated to my parents for their constant love, encouragement and wisdom. Secondly, to my mentor for his foresight. To all the commercial banks and financial institutions in Kenya and Africa as a whole. It is intended to inform, equip and bridge the gap between the developed world and the developing world.

ACKNOWLEDGEMENT

A major research project like this is never the work of a single resource. The input of various people, in their different capacities has significantly contributed to this work, t make it possible. First, I would like to thank the almighty God for enabling me through His wisdom, insight and love in this work and indeed my entire life.

Secondly, I offer my sincere gratitude to my supervisor Mr. Joseph Barasa for his gift of relaying complex financial concepts into simpler, practical day to day useable ideas. Lastly, to the world class institution, University of Nairobi, for its commitment to excellence.

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LIST OF ABBREVIATIONS

ATM	Automated Teller Machine
CBK	Central Bank of Kenya
CEO	Chief Executive Officer
DCs	Developing Countries
R & D	Research and Development
SIN	Systems Integration and Networking
SME	Small and Medium Enterprises
SPSS	Statistical Package for Social Sciences

ABSTRACT

Technology as a whole is broad and always evolving. Humans have always been trying to find better ways of doing things, easier ways of achieving a result and this is expressed in every aspect of his environment, and the banking industry is no different. We have been pushing beyond the limit of the existing advancements to get to the better and the one that's serves us well.

This study has endeavored to draw, practically, the relationship that exists between selected technologies and financial performance of banks in Kenya. The key word being selected technologies, to achieve empirical precision, specificity was paramount, so are the methodologies employed to quantify and ascertain the legitimacy of this study. After thorough scheming tonnes of previous studies, publications, books and other sources of data, this study purposed to stand on the foundation of similar works.

Technology in banking in the foundation on which banks are crafting their product offering, which has proven to possess immense benefits for both the banks and clients as well. For instance mobile banking has become one of the most popular. The study looked at all commercial banks in Kenya and there was a positive relationship between the use of technology and financial performance.

From the findings, a positive significant rise year on year on return on assets on within the study period (2008 -2012) all of which is attributable to use of technology. Technology has been one of the major contributions of the fortune experienced by Kenya banks for almost half a decade. There is also room for further research on new technologies that have recently been introduced in the market for instance mobile banking applications and security of the technological innovations in the financial industry.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

It is of interest whether application of technology leads improved financial results. Currently there needs to be definitive proof that expenditure on technology directly boosts financial performance. In their research, Morrison and Berndt (1990) deduced that additional deployment of capital underwrote undesirably to financial yield. Their results were such that for every capital per product invested in technology it didn't necessarily result into marginal benefits. Similarly research by Strassman (1990) and Dos Santos, Peffers and Auer (1993) tend to suggest that there is no relation between expenditure on technology and resultant financial gains. Implying that there are no financial benefits in investing in ICT.

In today's fast changing world businesses find themselves having no choice but to keep up with the changes in the market and therefore, innovation has become a norm in their respective industries. It is risky for a business to not fully grasp the change in service delivery its market niche requires. It is even risker when most players in the market respond to potential challenges with a blanket solution. (Abernathy & Utterback, 2005). The global banking and financial system is at juncture of a makeover caused by increasing centralization of the world economies. Technological enhancements for instance ATMs, phone banking, Internet banking, and smartcard applications are happening at a tremendously heightened rise in the global banking industry

The Banking sector in Kenya has exhibited firm improvement over the preceding few years. There have been incredible breaks for key players in the industry. The gains net of tax of the whole banking system improved by 38.61%, which translates to Kshs 5.08 billion, from Kshs 13.15 billion in December 2005 to Kshs 18.22 billion in December 2006. This growth is evidence of the strong advancement in profit after taxes that the industry has attained for the past several years (The Kenyan Banking Sector Report, 2007). There is also an emerging strategy of the banks trying to curve out underexploited but potentially viable niches like mortgage financing, Islamic banking and SME banking among others. The distinction between the traditionally big banks and small banks is somewhat fading as far as product offering is concerned. Thus this piece ventures to verify the effects of technology on the financial performance of the commercial banks in Kenya

1.1.1 Concept of Technology

Appropriating to Fisher's study (1998) technology is narrowed down into three specific groupings: client independent (an innovation that gets a client operating and finalizing a deal with a financial institution without any mortal assistance from the institutions' agents such as ATMs, telebanking and online banking); client assisted (a bank representative will use client-assisted innovation as a point in finalizing a business deal e.g. call center's client service agents will use a Client Relationship Management (CRM) System to comprehend a client's synopsis and provide prompt replies to clients' queries on both general and detailed transactions. (Gutek & Welsh, 1999); and client transparent

(Client technology which is now the real nucleus of bank operations and clients never see but they expect it.

1.1.2 Financial Performance

There are various measures of organizational performance. However the most used is profitability. Profitability is the degree to which a business creates a profit from the factors of production: labor, management and capital. A deeper focus of profitability reveals the relationship between profits and expenditure comparative to the magnitude of capital outlay (Gilbert and Wheelock, 2007). Four functional gauges of firm profitability are the rate of return on firm assets (ROA), the rate of yield on firm equity (ROE), operating profit margin and net firm income. The ROA is the overall measure of profitability and the higher it is the more gainful the firm is becoming. The ROE measures the rate of return on the owner's equity employed in the firm business.

ROE in relative to ROA is crucial since it gives an indication as to whether the firm is making yield on the monies it has borrowed. The operating profit margin determines the returns to capital per dollar of gross firm revenue. The operating profit margin focuses on the per unit produced component of earning profit and the asset turnover ratio focuses on the volume of production component of earning a profit (Crane, 2011). Net firm income comes directly off of the income statement and is calculated by matching firm revenues with the expenses incurred to create those revenues, plus the gain or loss on the sale of firm capital assets. Net firm is a company's total earnings (or profit) which calculated by taking revenues and subtracting the costs of doing business such as depreciation, interest,

taxes and other expenses. Net firm income exists as an amount and not a ratio thus not advisable to be compared to its equivalent in other firm as the size of the firms may differ making it difficult to draw up accurate comparisons. (Gilbert and Wheelock, 2007**)**.

1.1.3 Relationship between Technology and Financial Performance

The Banking sector in Kenya is quickly evolving from the past to an era where clients are accorded efficient, fast and convenient banking services. On the same note delivery of excellent services, largely banks in Kenya are deploying vast capital in information and communication Technology (Aduda & Kingoo, 2012). Whereas as investment in technology is paramount, it should also be noted that it takes requires a lot with regards to budget allocation for the bank. As it is, aside from employee expenditures, technology is commonly second in the list of the entry in the firms' budget. Further to this, there is the challenge of card fraud, usually on lost, stolen cards and counterfeit card fraud. Thus banks have had and are required to manage these technology-associated risks. Accordingly it is imperative that e-banking innovations are crafted after thorough research on the risks associated and costs to be incurred so as to ensure optimal profitability is maintained. This can be achieved if overall associated risks are understood by the bank and its clients.

1.1.4 Commercial Banks in Kenya

The banking sector in Kenya is regulated by the Central Bank of Kenya (CBK). Commercial banks are licensed and regulated under the Banking Act cap 488; deposit-taking micro finance institutions are regulated under Micro Finance Act and the Forex Bureaus under the Central Bank of Kenya Act cap 491. For the quarter ended June 30,

2010, the sector comprised 43 commercial banks, 1 mortgage finance company, and 6 deposit taking microfinance institutions, 5 representative offices of foreign banks, 115 foreign exchange bureaus and 2 credit reference bureaus.

Commercial Banks are further classified into three different classes depending on the market share by net assets, advances, client deposits and pre-tax profits by Central Bank of Kenya. Large banks have asset size of over 15 billion shillings, medium more than 5 billion shillings and small with asset size of less than 5 billion shillings. Nineteen banks are classified as large, fourteen as medium and twelve as small (CBK, 2009). Only nine commercial banks are listed in the Nairobi Stock Exchange (Barclays Bank, CFC Stanbic Holdings, Diamond Trust Bank, Equity Bank, Kenya Commercial Bank, National Bank of Kenya, NIC Bank, Standard Chartered Bank and The Co-operative Bank of Kenya).

The industry has consistently witnessed unprecedented increase in assets (2.2tr), loans (1.3tr) and deposits at 1.7tr. Gains after tax stood at 53.2 billion as at 30th June 2012. At the same time the deposit and loan number of accounts stood at 14,893,628 and 2,051,658 respectively. This growth is chiefly because of the following key factors; competition from new market participants and unconventional e.g. Saccos and micro-finance institutions, shift in client preferences, government interference through policy (CBK amendment) Act 2000 (Donde bill) and rapid shifts in innovation (Internet banking, Short Messaging Services (SMS) banking, M- pesa and Very Small Aperture Technology (VSAT).

1.2 Statement of the problem

Not disapproving the latent gains innovation brings, there exists a dilemma as to if and how technology impacts performance of financial institutions. Its adoption will require deployment of capital in skills, organization and innovation. Inherent within it there are certain risks e.g. the cost of set up etc. its effect on the business and industry as a whole is affirmative though not a cure to all the challenges the industry faces.

Aduda and Kingoo (2012) established a positive link between E-Banking and financial Performance among Commercial Banks in Kenya. Their study, though affirmative to the aim of this study, ought to have brought about the aspect of the three groupings of technology as far as its application and adoption is concerned. These groupings are; client independent, client assisted and Client transparent technology. A study conducted in 2011 by Nyamwembe on what curtails the uptake of innovation by banks in Kenya revealed the following as the reasons why the adoption was slow; opposition to change, in-house politics and fear of cannibalizing existing products hindered adoption. He ought to have covered the impact ICT has on financial performance of commercial banks. Accordingly, this investigation seeks to undertake a critical study on the effect of selected technologies on the financial performance of commercial banks in Kenya.

The effect of innovation on examining productivity and efficiency of players in these industry remain under tapped, empirically unproven and there exists an ignorance as to what really brings about innovation in this industry. Realizing that technology is very broad and evolving by the day, I seek to study the effects of selected technologies or

advancements in technology on the financial performance of commercial banks in Kenya?

1.3 Research Objectives

To investigate the effect of selected technologies on the financial performance of commercial banks in Kenya.

1.4 Value of the Study

This research is geared to benefit the commercial banks in Kenya as it will shed light on what technological methodologies to employ and invest in so as to thrive in their competitive space and niche.

Findings from this study will be of benefit to researchers, students and the regulator as it will aid in shedding light on the existing gap on the dilemma around the debate on the impacts of technology on the financial performance of commercial banks in Kenya. Additional as technology evolves the study can be used as a foundation for future studies on the subject matter.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This segment of the study is focused on the starters and initiators of this debate and thereby examines the literature available on the study In addition, the chapter commences by reviewing the theories that informed the discussion on technology. It will also evaluate specific studies, around the world and finally narrow down to Kenya, on the relationship between technology and financial performance of commercial banks. It then dwelt on the empirical studies that discuss the link between technology and performance of commercial banks.

2.2 Theoretical Review

This section explores the various concept that can explain the effect of technology on the performance of commercial banks. For the sake of this study, three theories will be employed to guide this study. They include diffusion of innovation theory, Disruptive Innovation Theory, Schumpeterian Theory of Creative Destruction.

2.2.1. Diffusion of Innovation Theory

Rogers' (1995) Diffusion of Innovation (DOI) theory. This according to the author, this entails the way an improvement is transferred over a period of time within a sample population. (Rogers, 1995). Mostly an improvement is an advancement over what was existing prior.

What determines how fast it's adopted varies from how the population perceive it to be solving earlier problems and how easy to operate they imagine it to be. This factor forms the innovation's competitive advantage.

The diffusion theory is applicable for the reason that it expounds the purpose why banks adopt technology and its improvements. For an institution that views technological advantages as beneficial to them and easy to use, they will tend to adopt it faster and if they have the related infrastructure then they will begin to reap the benefits thereof quicker than those who are of the opposing view. This will apply to a commercial bank in Kenya as well.

2.2.2 Disruptive Innovation Theory

This theory is lauded as a game changer in the last century as is proposed doing away with conventional ways of doing business as far as banking is concerned. The initiator Havard professor Clayton Christensen in his book *The Innovator's Dilemma* (Harvard Business School Press) examined and found out the reason innovations that were unconventional sort of strengthened the position prior existing models. His study explained extensively the disk drive industry as it was the most advanced then and was able to show this theory through the following progressive increase in disk space from a memory capacity packed into a square inch of disk from 50 kilobytes in 1967 to 1, 7 megabytes in 1973, 12 megabytes in 1981 and 1100 megabytes in 1995, a 35% annual increase.

2.2.3 Schumpeterian Theory of Creative Destruction

Schumpeter (1928, 1939, 1942) proposed that in an industry they come a time where there is need to do away with the old and adopt the new. This process of doing away with the old was inherently initiated by the system or the industry or the demands of the changing times.

Schumpeter (1928) explained that the process was inevitable and even though it caused short tern discomfort e.g. Loss of jobs due to machines taking over etc it brough about with it the benefit of long term growth. Then after exploitation of the gains from the new way of doing things then the cycle would begin again after a certain period of time. This cyclic movement would continue for a while and then stabilizes for some time before it began again. He was cognizant of the forces social and environmental and economic force at play to facilitate this very crucial change. Thereby explaining why he would name it creative destruction as it would destroy so that it can build a better version of itself.

2.3 Determinants of Financial Performance

Khrawish (2011) proposes that, gain is the utmost purpose of commercial banks. Banks have other goals as well e.g. social responsibility goals. For reason of the problem, focus will be beamed on profitability.

The profitability of commercial banks can be measured using variety of ratios used; Return on Asset, Return on Equity and Net Interest Margin are the primary ratios. ROE is a financial ratio that explains how much profit a company earned compared

to the total amount of shareholder equity invested or found on the balance sheet. ROE is the ratio of Net Income after Taxes divided by Total Equity Capital .ROA is also another major ratio that indicates the profitability of a bank. It is a ratio of Income to its total asset It measures the ability of the bank management to generate income by utilizing company assets at their disposal (Khrawish, 2011).

Appropriating to Fisher's study (1998) technology is narrowed down into three specific groupings: client independent (an innovation that gets a client operating and finalizing a deal with a financial institution without any mortal assistance from the institutions' agents such as ATMs, telebanking and online banking); client assisted (a bank representative will use client-assisted innovation as a point in finalizing a business deal e.g. call center's client service agents will use a Client Relationship Management (CRM) System to comprehend a client's synopsis and provide prompt replies to clients' queries on both general and detailed transactions. (Gutek & Welsh, 1999); and client transparent (Client technology which is now the real nucleus of bank operations and clients never see but they expect it.

2.3.1 ATMS

ATM stand for automated teller machines. They were first initiated as cash withdrawing machines and as a result of improvements on it can now offer an array of services for instance, depositing funds, money movement from one tab to another and tab payments. ATMs have proved to be cost efficient money wise and time wise both for the clients and the banks. As (Rose, 1999) deduced they serve more humans per time than bank cashiers

thereby saving the both the bank and clients time and not to mention the cost. Additionally ATMs still operate even after banking hours, weekends and national holidays.

2.3.2 Telephone Banking

Phone banks are offered by banks whereby a client can phone in to make inquiries about their account status and even transact. For security purposes the institution will require clients to answer certain questions about themselves just to verify that it is actually the client intending to transact (Cronin, 1997). Despite the fact that it is only available during banking hours, it is convenient for the client as it saves time since they can phone in from the office or comfort of the home. It is cost effective for the bank comparative to having a fully running branch. The only down side is that it cannot dispense cash.

2.3.3 Personal Computer Banking

Using a secure online software channel or link installed in their personal computers, clients can access their bank accounts and have available to them an array of numerous services on line making this a very personal banking experience. It is available for use all the time the client wishes to transact (Abor, 2005).

2.3.4 Internet Banking

This is the most convenient service over the internet since clients using the banks website can access their accounts and perform any banking service they desire to transact. It is available all day and all night virtually any time. The bank can also communicate with

the client via email etc. anytime. It is a very private type of banking as the client has to log in from anywhere as long as there is a secure internet connection. Handbook (2001).

2.3.5 Branch Networking

This form of networking affords bank branches distributed over an area or even a country the ability to operate as a unified single unit. This ensures security, efficiency, and productivity and customer satisfaction as they are served just as though they were at the head office client's records and details can be pulled from the virtual network irrespective of the branch the client has visited (Abor, 2005).

2.3.6 Electronic Funds Transfer at Point of Sale (EFTPoS)

Using a secure network client can make purchases virtually from anywhere as they can move funds from their account into anther account while making payments. A client's credit or debit card is swiped through a gadget and the payment is done at the point of purchase. This proves to be convenient especially when shopping, traveling etc. saves the client time and is available anytime of the day or night.

2.4 Empirical Studies

Aragba-Akpore (1998) did a study on the adoption of ITC in Nigerian banks and deduced that the banks are increasingly depending on it for operations. Most banks were making that shift to adopt the technology. He discovered that Diamond Bank Limited adopted the system Diamond Integrated Banking Services (DIBS) and Electronic Smart Card Account in all States the bank operated in. Ovia (2000) deduced that it is becoming

increasingly apparent that IT is becoming the highest budgeted for item in the banks strategic planning than any other industry in that country.

The works of Irechukwu (2000), he points out that there has been a shift in banking services that now client can open account online and conduct other vital transactions on the same. Unlike the aforementioned studies, Mantel (2000) paid attention to the banks side for instance e-payments – experimentally assessing clients' profile. He found this profile to include to be: older, female, higher income, and homeowners.

The research basis with regard to ICT in the banking industry has chiefly focused on the factors affecting adoption of new innovations and how they have affected overall bank performance. The thriving of a business in the information is largely anchored on how fast it is in improving their invention capability. By adopting latest technological innovations banks will rise their efficiency and overall performance. (Agboola, 2001) suggests they consider using ICT to better their service delivery.

Most studies, earlier on concentrated not on the service industry but on manufacturing industries. In recent times more attention is being beamed on the service sector. (Gallouj, 2002; Howells and Tether, 2004; Miles, 2004). Sebastian and Lawrence (2004) in their study titled "Client Focus in Banking Services" had highlighted on significance of client relationship management. The focus of the banks should be to retain the existing clients and obtain the new clients. To achieve this, banks have had to efficiently utilize technology without compromising on cost of the product and service delivered. To gain clients banks ought to marry both technology and creative marketing approaches the

modern banking should integrate technology and deploy marketing strategies that optimizes earnings and client contentment.

DeYoung, Lang, and Nolle (2007) and Hernando and Nieto (2007) reported that after employment of the Internet, there was increased profitability in the U.S. community bank profitability – primarily through deposit-related charges and also reduced costs in some banks in Spain.

2.5 Summary of Literature Review

Seven year ago a researcher conducted an investigation on technology and financial performance of 43 commercial banks in Kenya. Since then key mile stones have been achieved as far as technological benefits to banks and service delivery to clients is concerned. Given these deductions, it is paramount that a study be conducted, in the Kenyan setup in particular, to prove the effects of selected technology innovations on commercial banks' financial performance.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Here I aim to deliberate on the study strategies which will be employed with a view of achieving the goal of the study. Additionally, research design, illustration populace, experimenting size, illustrating methodologies, statistics gathering tools, statistics gathering processes and statistics probing methodologies will be exploited.

3.2 Research Design

The research intends to employ descriptive survey. To guide me come up with a comprehensive problem statement I will employ descriptive research as suggested by Mugenda and Mugenda (2003). Thus it will clearly shed light on the relation between the independent variables and the independent variables.

3.3 Population and Sample

The target population will be the 43 commercial banks from tier one, two and three levels given the newest database from Central Bank of Kenya (Appendix I).

3.4 Data Collection

Segment entails how statistics shall be gathered and examined inclusive of the methodologies and machinery employed. The study thereafter will do analysis using SPSS. A five year period is selected.

The study will use financial performance (Measured by ROA) as well as factors such as mobile banking (Measured by Cumulative number of clients registered per year), Internet Banking (Measured by number of transactions per year, Electronic funds transfer at the point of sale terminal (measured by number of transactions per year), Branch networking (number of branch networks per year) to perform comparative analysis between the period before adoption of the various aspects of technology under study and the period after.

3.5 Data Validity and Reliability

Validity will show data accuracy (Borg and Gall, 1996). The able guidance of the supervisor will be sought should there be need to amend the methodology. In the event I should require assistance, I seek the able guidance of a professional otherwise I endeavor to conduct it myself.

3.6 Data Analysis

Statistics gathered, shall be clearly organized and examined for purpose of clarity, using SPSS software.

3.6.2 Variable Measurement

The variables will be measured based on the following;

Table 3.1: Variable Measurement

Variable	**Measurement**
Financial performance	Return on Assets
Mobile Banking	Cumulative number of Clients registered in an year
Internet Banking	Number of transactions in an year
Electronic Funds Transfer at Point of Sale Terminals	Number of transactions in an year
Branch Networking	Number of branch networks in an year

To examine relation of the each independent variable T-statistic will be employed to check how it impacts the performance of banks. A t-test is any statistical hypothesis test in which the test statistic follows a Student's t-distribution under the null hypothesis. It can be used to determine if two sets of data are significantly different from each other. Financial Performance will be measured using Return on Asset of commercial banks. In order to find out the relevance effect of each aspect of technology studied on financial performance, the results of the study must also be significant. Results are said to be statistically significant within the 0.05 level, which means that the significance value must be smaller than 0.05. The significance will be determined by the t-value, which indicates how many standard error means the sample diverges from the tested value.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

The purpose of the study was to establish the effect selected technologies have on the financial performance of commercial banks in Kenya. Data was gathered from the central Bank of Kenya publications and respective banks' website. The data sources included financial statements, annual statements for a period of 5 years (2008-2012) as well as other publications. Data was collected based on the variables of the study, that is Financial performance depicted by Return on Assets; Mobile Banking depicted by the number of Clients registered in an year; internet banking indicated by the number of transactions in an year; electronic funds transfer at point of sale terminals indicated by the amount transferred or number of transactions in an year as well as branch Networking indicated by the number of branch networks implemented in an year.

4.2 Descriptive Statistics

Table 4.1 Return on Assets (Financial Performance)

Year	N	Mean	Std. Deviation
2009	43	2.34	3.18072
2008	43	2.68	1.62044
2010	43	3.21	3.69108
2011	43	3.97	3.04215
2012	43	4.58	3.42043

The findings as shown in table 4.1 shows the distribution of Return on Assets values over a period of 5 years. The lowest value for ROA was 2.34 in year 2009 while the highest as 4.58 in 2012. There is difference on the performance of the banks indicated by the high scores in standard variation.

The increase in ROA values from 2009 signals that the bank's performance has been very good over the shown period in the industry.

4.2.1 Mobile Banking

The findings on the number of clients registered in a year are as presented in the table below.

Table 4.2: Mobile Banking (Number of Clients Registered in an Year)

Year	**Number of Clients registered in a year (000') Cumulatively.**	
	Mean	Std. Dev.
2008	2001	1537
2009	2214	1690
2010	2449	1859
2011	2688	2045
2012	3223	2454

The mean suggests an increase in number of registrations within the banks while the standard deviation speak to the variation with in the banks themselves. E.g. Size of customer base, creative marketing strategies launched etc.

4.2.2 Internet Banking

Presented below is descriptive statistics on the number of transactions in a year.

Table 4.3 Internet Banking (Number of Transactions in a Year)

Year	Number of transactions in an year (in millions)	
	Mean	**Std. Dev.**
2008	2.70	0.203
2009	2.70	0.160
2010	2.80	0.148
2011	2.87	0.135
2012	2.97	0.180

The mean suggests a rise from 2.7 million to 2.97 million while the stand deviation is below 1 which speaks to little variation which means most bank had resembling number of movements.

4.2.3 Electronic Funds Transfer at Point of Sale Terminals

The table below shows descriptive statistics on the number of transactions for the electronic funds transfer at point of sale terminals in a year for the banks.

Table 4.4: Electronic Funds Transfer at Point of Sale Terminals

Year	**Number of transactions in an year (in millions)**	
	Mean	**Std. Dev.**
2008	1598.01	233.40
2009	1077.82	513.10
2010	2114.21	363.97
2011	2737.63	762.31
2012	3473.74	933.27

The average number of transactions was 1.5 million in 2008, which fell to 1.1 million and later rose to 2.1 million before rising to 2.7 and later to 3.4 million in 2012. This variation is also depicted by the standard deviation.

4.2.4 Branch Networking

Table 4.5 summarizes the findings of the number of branch networks implemented in a year.

Table 4.5: Branch Networking (Number of Branch Networks in a Year)

Year		
	Mean	**Std. Dev.**
2008	32	1.35
2009	35	3.86
2010	38	4.62
2011	43	8.75
2012	46	4.01

From the findings, there is no much variation in the number of branch networks implemented in a year for the banks. The findings indicate a consistent increase in the averages from 32 in 2008 to 46 in 2012. The standard deviations also shows minimal variation.

From the annual averages of the thirty banks, it is evident that financial performance increased with increase in number of clients registered in a year; number of transactions in a year; amount transferred or number of transactions in a year as well as number of branch networks implemented in a year. Thus, financial performance of the banks (depicted by ROA) also appeared in tandem with every increase and consequently in a positive relationship with technological innovations.

4.3 Correlation Analysis

To measure the degree of relation between the variables, Karl Pearson's coefficient of correlation was employed. Commonly represented by r, it normally determines the degree of closeness between two linear variables and varies from +1 to -1. The mid figure zero (0) means there is no relation between the variables. > 0 denotes an affirmative relationship which means if there is a up movement in one variable then there will be a similar movement in the other variable while < 0 means a negative association meaning that if one value surges the other value decreases.

To establish reaction between the variables of the selected technologies and financial performance the Pearson's coefficient was employed. See results below;

Table 4.6: Pearson's Correlation Coefficient Matrix

	Mobile Banking	Internet Banking	Electronic Fund transfer at POS	Branch Networking	Financial Performance
Mobile Banking	1				
Internet Banking	.395**	1			
Electronic Funds Transfer at Point of Sale Terminals	0.13	.381**	1		
Branch Networking	.283**	.318**	.375**	1	
Financial Performance	.350**	.313**	.243*	.309**	1

** Correlation is significant at the 0.01 level (2-tailed)

4.3.1 Relationship between the Variables

Results from table 4.6 above reveal that there is a significant positive relationship between Mobile Banking and financial Performance (r = .350**, P-value < 0.01). This implies that Mobile Banking as a technological innovation influences financial performance in Kenyan commercial banks.

The findings also disclosed a significant positive relationship between internet banking and financial Performance (r = .313**, P-value < 0.01). Thus, implying that internet banking as a technological innovation influences financial performance in Kenyan commercial banks.

The findings indicated a significant positive relationship between Electronic Funds Transfer at Point of Sale Terminals and financial Performance (r = .343**, P-value < 0.01) thus, depicting that Electronic Funds Transfer at Point of Sale Terminals as a technological innovation influences financial performance in Kenyan commercial banks.

The results in table 4.6 above indicate that there was a significant positive relationship between mobile banking and Internet banking (r = .395**, P-value < 0.01). A significant positive relationship was observed between Internet Banking and Branch Networking (r = .283**, P-value < 0.01). In addition, there is a significant relationship between Electronic Funds Transfer at Point of Sale Terminals and Branch Networking (3.75**). The findings imply that there is interrelationship in the various technological innovations in the banking industry

such a change in one technology affect the other. Since the correlations among the predictive variables was not very strong there was little evidence of multicollinearity among them and thus all the variables were incorporated into the subsequent regression analysis.

4.4 Regression Analysis

Regression analysis is the statistical technique that identifies the relationship between two or more quantitative variables: a dependent variable, whose value is to be predicted, and an independent or explanatory variable (or variables), about which knowledge is available. The technique is used to find the equation that represents the relationship between the variables. Multiple regressions provide an equation that predicts one variable from two or more independent variables. The study adopted multiple regression guided by the following model:

$Y= \beta 0+ \beta 1X1+\beta 2X2+ \beta 3X3+ \beta 4X4+\varepsilon$

Where:

Y is the dependent variable (financial performance i.e. ROA) β0

is the regression constant β1, β2, β3, β4, and β5 are the

coefficients of independent variables,

X1 is Mobile Banking

X2 is Internet Banking

X3 is Electronic Funds Transfer at Point of Sale

Terminals X4 is Branch Networking ε is the Error Term.

Table 4.7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
d1 I	.847[a]	.7174	.687	.23655

a. Predictors: Mobile Banking, Internet Banking, Electronic Funds Transfer at Point of Sale Terminals and Branch Networking

In this study, the coefficient of determination (the percentage variation in the dependent variable being explained by the changes in the independent variables) R2 equals 0.7174, that is, Mobile Banking, Internet Banking, Electronic Funds Transfer at Point of Sale Terminals and Branch Networking explain 71.7 percent of the variance in financial performance.

Table 4.8: Analysis of Variance

Model		Sum of Squares				
			df	Mean Square	F	Sig.
1	Regression	.992	3	.331	6.912	.000[a]
	Residual	1.455	26	.056		
Total		2.447	29			

a. Predictors: (Constant), Predictors: Mobile Banking, Internet Banking, Electronic Funds Transfer at Point of Sale Terminals and Branch Networking

b. Dependent Variable: Financial Performance

In this case, the significance value of the F statistic is 0.003 indicating that all the predictor variables (Mobile Banking, Internet Banking, Electronic Funds Transfer at Point of Sale Terminals and Branch) explain a variation in financial performance and that the overall model is significant

Table 4.9: Regression Coefficient Results

		Unstandardized	Standardized	Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	.260	0.046001		5.6521	.000
	Mobile Banking	0.875	0.074601	.254	11.729	.000
	Internet Banking	0.823	0.21784	.300	3.778	.000
	Electronic Funds Transfer at POS	0.551	0.248534	.113	2.217	.000
	Branch Networking	0.670	0.088007	-.167	7.613	.000

a. Dependent Variable: Financial Performance

Table 4.9 presents results of the multivariate regression of technological innovations on Financial Performance. From the findings, the coefficients on Financial Performance are positive and significant in all the four variables, indicating that banks have efficient financial performance when technological

innovations is efficient in terms of mobile banking, internet banking, electronic funds transfer at POS and branch networking. The coefficient on Mobile Banking is 0.875 and is significant. Internet Banking has 0.823, Branch Networking has 0.67 while Electronic Funds Transfer at POS had 0.551

4.5 Discussion of Findings

The objective of the study was to establish the effects of technological innovations on financial performance of commercial banks in Kenya. The objective was assessed by use of secondary data and the subsequent analyses based on the variables of the study. From the findings, in mobile banking as depicted by the number of clients registered on the mobile banking service, had a significant effect on financial performance of the commercial banks. The mean increase in the number of clients from 2016 million in year 2008 to 3220 million in 2010 indicate a growth in mobile banking transactions and consequently improved banks' financial performance. The findings regarding mobile banking are similar to those found in Kenya by Misati, Njoroge, Kamau and Ouma (2010) whose study revealed that mobile banking had expanded the range of services that a bank could offer and hence expanded incomes for banks. Similar findings were shown in a study in Uganda by Porteus (2006) and another one in Tunisia by Mabrouk and Mamogholi (2010) who concluded that mobile banking helped to increase bank incomes and profitability. The study also found a significant positive relationship between Mobile Banking and financial Performance ($r = .350^{**}$, P-value < 0.01). This growth in mobile payments supports the findings of this study and those of

other corroborating studies. Mobile banking has experienced high penetration levels in Kenya because it offers an alternative service delivery channel for banks which is both accessible and affordable to many clients. The ease and speed with which clients can transact on mobile phones has made mobile banking very popular to both the banks and the clients.

The study findings revealed that the internet banking averages for number of transactions in a year (in millions) for the commercial banks rose from 2.70 to 2.97 million. It is also evident that the banks had almost a similar number of transactions as the standard deviation is so small (less than 1) depicting minimal variability. The findings also disclosed a significant positive relationship between internet banking and financial Performance ($r = .313^{**}$, P-value < 0.01). The findings of this study show that internet banking is used by bank as a convenience platform to enable clients to transact as opposed to it being an avenue for banks to make more revenue. These findings are consistent with previous studies done by Pooja and Singh (2009) and Molhotra and Singh (2009) in India, Simpson (2002) in USA, Sullivian (2000) in USA and Arnaboldi and Claeys (2008) in Finland, Spain, Italy and UK where they all concluded that internet banking improved bank incomes and Profitability.

The findings on EFT depicted a variation in the number of transactions for the electronic funds transfer at point of sale terminals in a year for the banks. The average number of transactions was 1.5 million in 2008, which fell to 1.1 million and later rose to 2.1 million before rising to 2.7 and later to 3.4 million in 2012. This variation is also depicted by the

standard deviation. Compared to cheques clearing system, EFT system has the ability to improve the velocity of money within the bank payment system and hence more money is moved within the economy within a short period. This presents an opportunity of banks to make more money. EFT transaction charges are also higher compared cheque clearance charges and hence EFT system is capable of netting in more income for banks.

The findings further indicated a significant positive relationship between Electronic Funds Transfer at Point of Sale Terminals and financial Performance ($r = .343^{**}$, Pvalue < 0.01) thus, depicting that Electronic Funds Transfer at Point of Sale Terminals as a technological innovation influences financial performance in Kenyan commercial banks. These finding corroborate those ones of Sana, Mohammad, Hassan and Momina (2011) in a study done in Pakistan which concluded that electronic banking lead to better incomes for the banks. Agboola (2006) in a study done in Nigeria concluded that EFT not only improved a banks image but also its incomes and subsequently profitability.

The findings showed that there is no much variation in the number of branch networks implemented in a year for the banks. The findings indicate a consistent increase in the averages from 32 in 2008 to 46 in 2012. The standard deviations also shows minimal variation. This implies that branch networking offers quicker rate of interbank transactions as the consequence of distance and time are eliminated. Hence, there is more productivity per time period. Also, with the several networked branches serving the client populace as one system, there is simulated division of labor among bank branches with its associated positive impact on productivity among the branches. Furthermore, as it

curtails client travel distance to bank branches it offers more time for clients' productive activities. From the annual averages of the thirty banks, it is evident that financial performance increased with increase in number of clients registered in a year; number of transactions in a year; amount transferred or number of transactions in a year as well as number of branch networks implemented in a year. Thus, financial performance of the banks (depicted by ROA) also appeared in tandem with every increase and consequently in a positive relationship with technological innovations. These findings are consistent with a study conducted in India by Pooja and Singh (2009) which concluded that internet usage in banks led to more income and profits. Dew (2007) also found that internet usage led to more income.

From the findings there was a significant positive relationship between mobile banking and Internet banking; between internet Banking and Branch Networking as well as between Electronic Funds Transfer at Point of Sale Terminals and Branch Networking. The findings imply that there is interrelationship in the various technological innovations in the banking industry such a change in one technology affect the other. This is consistent with studies by Kariuki (2005) who showed the positive impacts of ICT on their banking performance using bank turnover and profits as measure of performance. He established that banks those with high profit growth are more likely to be using greater numbers of advanced ICTs. He concluded that ebanking leads to higher profits though in long-term but not in short-term due to high ICT investment cost. All this studies used profit and turnover as measures of bank performance.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This segment showcases the synopsis of the statistics outcomes on the effects of selected technological innovations on financial performance of commercial banks in Kenya, the conclusions and recommendations are represented herein.

5.2 Summary of Findings

The study found out that a steady rise in ROA values from 2009 indicates that the bank's financial performance has been very well over the last 3 years in Kenyan financial industry. Mobile banking as depicted by the number of clients registered on the mobile banking service being seen possessing a significant effect on productivity of the institution. Found to have a significant effect on financial performance of the commercial banks. The relationship between Mobile Banking and financial Performance was also established as a positive one. The same case was found with internet banking which was seen to have positively contributed to the profits of the banks more than the previous system of cheque clearance.

The study as well established a significant positive relationship between Electronic Funds Transfer at Point of Sale Terminals and financial Performance. As for branch networking, as the results show it positively contributes to the profitability of banks.

The study additionally found that there is interrelationship in the various technological innovations in the banking industry such a change in one technology affect the other. From the study it was evident that financial performance increased with increase in number of clients registered in a year; number of transactions in a year; amount transferred or number of transactions in a year as well as number of branch networks implemented in a year.

5.3 Conclusion

Drawing from the results it is empirically clear that; uptake of technology has and will continue to positively contribute to profitability of commercial banks in Kenya. There is a clear affirmative relation between the two independent and dependent variables.

5.4 Recommendations

As the industry develops and more advancements are coming up banks ought to quicken their uptake of this technology. This can be done through approvals of new technologies and lessening the hurdles along the way. Also much needs to be done to full proof the innovations to ensure they are secure.

5.5 Suggestions for Further Research

I propose a study be conducted on mobile banking applications as they are the next major shift from online banking. A study ought to be undertaken to ensure that the inherent risks with new innovations are minimized, if not eliminated, as security of the same is key.

5.6 Limitations of the Study

This statistics study has minimal limitations. First, it is possible that the nature of data from the annual statements affected the results in an unanticipated manner or limits the power of the tests to detect associations. This may be created by variation of statistical figures illustrating the key variables measurements.

This was solved by employing secondary data which ensured a more accurate correlation was achieved.

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APPENDICES

APPENDIX I: POPULATION

	BANK	OVERALL RANK 2011	OVERALL RANK 2010	OVERALL RANK 2009	GRAND RANKING
1	Equity Bank	1	2	2	1
2	Barclays Bank of Kenya	2	1	3	2
3	Kenya Commercial Bank	6	3	1	3
4	Imperial Bank Ltd	4	5	4	4
5	Standard Chartered Bank	3	7	9	5
6	Commercial Bank of Africa	15	9	5	6
7	Stanbic Bank Ltd(CFC STANBIC)	19	4	6	7
8	National Bank of Kenya	16	6	8	8
9	Co-operative Bank of Kenya	9	16	7	9
10	Bank of Baroda Ltd	7	17	13	10
11	NIC Bank ltd	8	11	18	11
12	I & M Bank	5	23	12	12
13	Citibank Kenya Branch	10	10	22	13
14	Habib Bank AG Zurich	28	8	10	14
15	Diamond Trust Bank Ltd	12	21	15	15
16	Transnational Bank Ltd	25	15	11	16
17	Oriental Comm (Delphis) Bank	24	14	20	17
18	Housing Finance Co of Kenya	21	24	14	18

19	Bank of India Ltd	11	20	30	19
20	Fidelity Commercial Bank	23	13	29	20
21	Family bank	29	12	27	21
22	Prime Bank Ltd	13	35	25	22
23	Victoria Commercial Bank	17	26	31	23
24	Chase Bank Ltd	20	33	21	24
25	Credit Bank Ltd	39	18	19	25
26	Paramount Universal Bank	31	27	24	26
27	Giro Commercial Bank	18	28	37	27
28	Bank Of Africa Kenya	30	22	32	28
29	African Banking Corporation	14	31	40	29
30	K-Rep Bank Ltd	27	30	33	30
31	Guardian Bank Ltd	33	41	16	31
32	Consolidated Bank	35	38	17	32
33	Development Bank	36	32	23	33
34	Gulf African Bank Limited	38	29	26	34
35	Habib Bank Ltd	22	40	38	35
36	Jamii Bora Bank Ltd	42	25	34	36
37	Dubai Bank Kenya Ltd	41	19	43	37
38	Fina Bank Limited	26	37	41	38
39	Middle East Bank (K)	34	34	39	39

40	First Community	37	36	36	40
41	EcoBank K Ltd (EABS Bank)	32	39	44	41
42	Equatorial Commercial Bank	40	43	35	42
43	UBA Kenya Bank Ltd	43	42	42	43

Source: Central Bank of Kenya, 2012.