

The Relationship between Electronic Banking and Financial Performance among Commercial Banks in Kenya

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Abstract

Banking industry has been in a process of significant transformation. The force behind this transformation of the banking industry is innovation in information technologies. Information and communication technology is at the centre of this global change curve of electronic banking system in Kenya today. It is against this background, this study investigated the relationship between e-banking and performance of Kenya banking system. Specifically, the study established whether there is relationship between the dependent variable i.e., performance measured by return on assets and the independent variables: investments in e-banking, number of ATMS and number of debits cards issued to customers as proxy for e-banking. The study used secondary data. The data was collected from annual report of target banks and Central Bank of Kenya. The study used both descriptive and inferential statistics in analyzing the data. In general the study revealed that e-banking has strong and significance marginal effects on returns on asset in the Kenyan banking industry. Thus, there exists positive relationship between e-banking and bank performance. In general conclusion the electronic banking has made banking transaction to be easier by bringing services closer to its customers hence improving banking industry performance.

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1 Introduction

Electronic banking is the use of electronic and telecommunication networks to deliver a wide range of value added products and services to bank customers (Steven, 2002). The use of information technology in banking operations is called electronic banking. Ovia, (2001) argue that Electronic banking is a product of e-commerce in the field of banking and financial services. In what can be describe as Business-to-consumer (B2C) domain for balance enquiry, request for cheque books, recording stop payment instruction, balance transfer instruction, account opening and other forms of traditional banking services. Banks are also offering payment services on behalf of their customer who shop in different e-shops.

The introduction of electronic banking has improved banking efficiency in rendering services to customer. Information and Communication Technology (ICT) is at the centre of electronic banking system in Kenya today (Steven, 2002). Banking industry in Kenya cannot ignore information systems because they play a critical impact in current banking system, they point out that the entire cash flow of most banks are linked to information system.

The application of information and communication technology concepts, techniques, policies and implementation strategies to banking services has become a subject of fundamental importance and concerns to all banks and indeed a prerequisite for local and global competitiveness banking (Connel and Saleh, 2004). The advancement in Technology has played an important role in improving service delivery standards in the Banking industry. In its simplest form, Automated Teller Machines (ATMs) and deposit machines now allow consumers carry out banking transactions beyond banking hours. With online banking, individuals can check their account balances and make payments without having to go to the bank hall. This is gradually creating a cashless society where consumers no longer have to pay for all their purchases with hard cash. Bank customers can pay for airline tickets and subscribe to initial public offerings by transferring the money directly from their accounts, or pay for various goods and services by electronic transfers of credit to the sellers account.

As most people now own mobile phones, banks have also introduced mobile banking to cater for customers who are always on the move. Mobile banking allows individuals to check their account balances and make fund transfers using their mobile phones. This was popularized by Safaricom through its "M-pesa" money transfer product and customers can also recharge their mobile phones via SMS. Since this innovation, banks has perfected by interlinking customers deposit accounts with mobile money transfer. This e-banking has made banking transactions easier around the World and it has fast gaining acceptance in Kenya.

Other delivery channels today in Kenya electronic banking are telephone banking, smart cards, internet banking etc. Personal computers in the banking industry were first introduced into Kenya by Barclays bank and since then internet is increasingly used by Bank's as a channel of delivering the products and services to the numerous customers (Kariuki, 2005).

Electronic banking depends on providing customers, partners, and employees with access to information, in a way that is controlled and secure (Soludo, 2005). Technology must provide security to meet the challenges encountered by E-Banking. Virtually all software and hardware vendors claim to build secure products, but what assurance does an E-Banking have of a product's security? E-Banking want a clear answer to the conflicting security claims they hear from vendors. How can you be confident about the security built into a product? Independent security evaluations against internationally-established security criteria provide assurance of vendors' security claims. Customer expectation, in terms of service delivery and other key factors have increased dramatically in recent years, as a result of the promise and delivery of the internet. Even after the "dot-com crash" these raised expectations linger.

An organization's ability to perform financially is critical to its survival in the short and in the long run. Tobin's Q is widely used as a proxy for firm performance (Gompers, Ishii and Metrick, 2003). Other researchers use earnings quality, which is a concept that is context-based and hence does not have a single definition. Earnings quality can be viewed from a number of perspectives. Schipper and Vincent, (2003) assess earnings quality from two perspectives. One perspective is decision usefulness, where "because of its context specificity, assessments of earnings quality from the perspective of decision usefulness inevitably confront a myriad of users and uses..." The second perspective of earnings quality used by Schipper and Vincent, (2003) is using the Hicksian concept of income (Hicks, 1939), which the authors recognise is not capable of empirical observation.

Despite the potential benefits of ICT and e-commerce, there is debate about whether and how their adoption improves bank performance. Use of and investment in ICT requires complementary investments in skills, organization and innovation and investment and change entails risks and costs as well as bringing potential benefits. There are positive impacts of e-banking on bank turnover and profitability and to a lesser extent on employment, most notably when e-commerce is part of larger business strategies of bank. The use of e-banking can contribute to improved bank performance, in terms of increased market share, expanded product range, customized products and better response to client demand. E-banking continues to influence banks activities and their income structure. Among the activities that may be subject to stronger pressures for change are those that, up to today, have remained relatively insulated from ICT developments. This applies mainly to some retail banking activities that are suitable for standardization, and also to developments in remote banking (Kariuki, 2005).

In recent years, and taking advantage of new information technologies, two groups of new payment methods, referred to generically as electronic money (e-money), have been developed and introduced: smart cards and software-based products to make payments over the Internet. Until now, the most revolutionary systems of e-money are still at their infancy, and there is debate concerning the degree of adoption that could take place in the coming years (Soludo, 2005). In the meantime, we are witnessing the introduction of mixed products that coexist with some incipient experiences of pure digital cash. Pre-paid cards can serve as a payment mechanism by loading and storing monetary value in the chip embedded in the card. The value loaded in the card can later be used to pay for goods and services. The introduction of smart cards seeks to replace cash in most of the small transactions for which hard cash is currently used. The introduction of this new payment mechanism will go through different stages. Initially, consumer habits must change. Once reasonable acceptance is attained, point-of-sale terminals would spread rapidly.

Bhattacharya and Thakor (1993) contemporary banking theory suggest that banks, together with other financial intermediaries, are essential in the allocation of capital in the economy. A very powerful tool to explain how banks work is provided by the literature on financial intermediation. This literature is centered on information asymmetries, an assumption that “different economic agents possess different pieces of information on relevant economic variables, and that agents will use this information for their own profit” (Freixas and Rochet, 1998). The presence of asymmetric information leads to adverse selection and moral hazard problems. Adverse selection is an asymmetric information problem that takes place before the transaction occurs on it is related to the lack of information about the lenders’ characteristics. Moral hazard takes place after the transaction occurs. It is related with incentives by the lenders to behave opportunistically.

According to Connel and Saleh (2004) three different parties are involved in smart card schemes: consumers, businesses and issuers. Consumers: They may adopt this new payment instrument because of its greater convenience. For the instrument to gain acceptance, it should have some of the following characteristics: anonymity, security (reliable authentication procedures, or solutions to compensate users in case of loss, theft or malfunction), liquidity (subject to wide acceptability), low transaction costs (from paper handling and clearing), speed (time saving in transactions, faster balance updating). Businesses: Suppliers of goods and services could benefit from the use of pre-paid cards because of lower costs of handling cash and no interest lost on cash holdings. Also, substantial savings result from the transition of credit card to smart card payments: while credit cards require connection to a remote machine each time a payment is made, with smart cards all payments are processed jointly at the end of the business day. Card issuers: Both consumers and merchants will be willing to pay for smart cards because of its many conveniences. Until the

competitive pressure reduces the extra profits, smart cards can be a good business to entrepreneurs introducing new schemes.

1.1 Problem of Research

The vast majority of the recent literature on electronic money and banking suffers from a narrow focus. It generally ignores electronic banking entirely and equates electronic money with the substitution of currency through electronic gadget such as smart cards and virtual currency. For example, Freedman, (2000) proposes that electronic banking and electronic money consist of three devices; access devices, stored value cards, and network money. Electronic banking is simply the use of new access devices and is therefore ignored. Electronic money then is the sum of stored value (smart) cards and network money (value stored on computer hard drives). What is most fascinating and revealing about this apparently popular view is that electronic banking and electronic money are no longer functions or processes, but devices.

Within this rather narrow scope for electronic banking and electronic money, there are nonetheless many research that address one or more of the challenges facing it. Santomero and Seater (1996), Prinz (1999), and Shy and Tarkka (2002), and many others present models that identify conditions under which alternative electronic payments substitute for currency. Most of these models indicate that there is at least the possibility for electronic substitutes for currency to emerge and flourish on a large scale, depending on the characteristic of the various technologies as well as the characteristics of the potential users.

Berentsen (1998) considers the impact that the substitution of smart cards for currency will have on monetary policy, arguing that although electronic substitutes for currency will become widespread, monetary policy will continue to work as before because this currency substitution will leave the demand for central Bank reserves largely intact. Goodhart (2000) discusses how monetary control would work in an economy in which Central Bank currency has been partially or completely replaced by electronic substitutes.

Friedman (1999) point out that electronic banking presents the possibility that an entire alternative payment system, not under the control of the Central Bank may arise. In an extreme variant of Friedman, King (1999) argues that today computers make it at least possible to bypass the payment system altogether, instead using direct bilateral clearing and settlement; the responses to Friedman.

Among the functions performed by banks is the provision of a payments system, the method of conducting transactions in the economy. The payments system is centered on banks and, currently, the banking system intervenes, directly or indirectly, in practically all payments, both domestic and international. Although electronic means of payments have been around for many years, continuing ICT developments mean that, increasingly, hard currency is being substituted by accounting entries that are later settled among institutions. In

this manner, cash remains the preferred means of payment for transactions involving increasingly smaller amounts. This is a consequence of a reduction in the transaction costs of paying by electronic means (credit cards, electronic purses, etc.), which result in more efficient payment systems. Besides a contribution to the efficiency of the payments system, ICT developments have also implications on liquidity. As a matter of fact, the provision of a payments system originates from the function of banks as providers of liquidity. Banks and depository institutions more generally, can be seen as “pools of liquidity” that provide customers with insurance against liquidity shocks (Diamond and Dybvig, 1983).

Electronic banking’ greatest promise is timelier, more valuable information accessible to more people, at reduced cost of information access. With the changes in business operations as a result of the Internet era, security concerns move from computer labs to the front page of newspapers. The promise of e-banking is offset by the security challenges associated with the disintermediation of data access. According to Soludo, (2005) one security challenge results from “cutting out the middleman,” that too often cuts out the information security the middleman provides. Another is the expansion of the user community from a small group of known, vetted users accessing data from the intranet, to thousands of users accessing data from the Internet. Application service providers (ASP) and exchanges offer especially stringent and sometimes contradictory requirements of per user and per customer security, while allowing secure data sharing among communities of interest.

Kenya banking sector has witnessed many changes since the beginning e-banking. Today, customers of banks have efficient, fast and convenient banking services. In line with rendering qualities and acceptable services, most banks in Kenya are investing large sum of money in information and communication Technology. While the rapid development of information technology has made some banking tasks more efficient and cheaper, technological investments are taking a larger share of bank’s resources. Currently, apart from personnel costs, technology is usually the biggest item in the budget of a bank, and the fastest growing one. Another problem associated with this financial innovation plastic card fraud, particularly on lost and stolen cards and counterfeit card fraud. Banks need to manage costs and risks associated with electronic banking.

It is therefore important that e-banking innovations are made by sound analysis of risks and costs associated so that to avoid harms on the bank performance. On one hand the bank performance is directly related to efficiency and effectiveness of electronic banking, but on the other tight controls and standards are needed to prevent losses associated with electronic banking. The banks have to balance these two options in order not to impair its overall prosperity. This is only possible if overall effects of electronic banking on the banks and its customers are understood.

Despite the potential benefits of ICT and e-commerce, there is debate about whether and how their adoption improves bank performance. Several attempts

have been made to investigate the impact of electronic banking on bank performance. Studies by Kariuki (2005) 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 e-banking 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. While Davenport (2003) and Oshikoya (2007) and Jean-Azam (2006) suggest that use of and investment in ICT requires complementary investments in skills, organization and innovation and investment and change entails risks and costs which might reduce bank profits in shorter. Hence there is need to use some of relative measure such as return on assets to uncover the impact of ICT investment on banking performance. This was gap being addressed in this study.

1.2 Research Focus

Existing studies has looked the ICT and financial system holistically specifically looking on E-banking. The vast majority of the recent literature on electronic money and banking suffers from a general focus. It generally ignores electronic banking entirely and equates electronic money with the substitution of currency through electronic gadget such as smart cards and virtual currency. For example, Freedman (2000) proposes that electronic banking and electronic money consist of three devices; access devices, stored value cards, and network money. Electronic banking is simply the use of new access devices and is therefore ignored. This has prompted a fresh look on this subject.

E-banking has produced changes in the structure of bank income. As a result of increased competition that has lowered margins in lending operations (the banks' traditional business) banks have diversified their sources of income and rely increasingly on income from fees services rather than interest rate spreads. Fees charged for services include typical banking activities like payment transactions, safe custody and account administration (Hallam-Baker, (1996). These activities are, in general, less volatile than fees and commissions charged on activities which are affected by economic and cyclical developments (e.g. underwriting activities, brokerage services, treasury management, transactions on derivatives, private banking, credit card business). This change is also reflected in the increasing size of off-balance sheet items in the banks' financial accounts.

Technology allows these same products -for example a loan to a company- to be traded in capital markets (securitization) instead of remaining in the bank's balance sheet. Another result of the new environment has been the process of disintermediation. This process has various dimensions. By disintermediation we normally refer to banks losing share of financial intermediation to institutional

investors (investment funds, insurance companies and pension funds). This is true for both bank assets and liabilities, although it is in the collection of savings where this process has been the most pronounced with mutual funds, pension funds and life-insurance policies capturing funds at the expense of bank deposits. At the core of the European universal banking industry is the payments system, and the core of the payments system is the demand deposit (checking or current deposit account) (Boot et al, 1991). Demand deposits are characterized by their liquidity feature, which gives customers the possibility of withdrawing funds when needed. Banks have various means to charge for the provision of liquidity. They can do so through charging customers directly (management fees, or low interest paid on funds) or indirectly. This latter will occur when deposits serve as a means of selling other bank products, or because deposits can be seen as inputs to the production of other services.

Some implications of these trends for relationship banking can be found, for instance, in Berlin and Mester (1998). They suggest a complementarity between deposit taking and lending in the sense that rate-insensitive core deposits allow for inter-temporal smoothing in lending rates. If this were the case, increased competition on deposits would threaten the viability of relationship lending. Another instance of possible implications for relationship banking refers to lower switching costs and duration, and is studied for instance in the loan commitment literature where it is emphasized the importance of inter-temporal tax-subsidy schemes in pricing to resolve moral hazard as well as the complementarity between deposit taking and commitment lending (Kashyap et al., 1999).

Despite the potential benefits of ICT and e-commerce, there is debate about whether and how their adoption improves bank performance. Use of and investment in ICT requires complementary investments in skills, organization and innovation and investment and change entails risks and costs as well as bringing potential benefits. The impact of ICTs and e-business strategies on bank performance are positive overall, but that ICTs are not a panacea in themselves. This study showed the positive impacts of e-banking on their turnover and profitability and to a lesser extent on employment, most notably when e-commerce is part of larger business strategies of bank. Further (Kariuki, 2005) provides evidence that the use of e-banking can contribute to improved bank performance, in terms of increased market share, expanded product range, customized products and better response to client demand.

It is against this background, this study investigated how difference electronic channels enhance the delivery of consumers and retails products, and also how banks choose to support their electronic banking component/services internally, such as internet services provider, internet banking software, core banking vendor, managed security service provider, bill payment provider, credit business and credit scoring company, which e-Banking systems rely on. This research concentrates on the effects of e-banking on the banking sector. The aim was to identify and understand the changes that e-banking causing on the banking

sector, in order to examine in detail how the recent (and foreseeable) advances in ICT are affecting the sector and can affect its future evolution. As ICT are having a strong influence on the evolution of the banking, the study investigate influence e-banking has on the banking sector and the payments system. Therefore, the purpose of this study was to investigate the relationship between e-banking and bank performance, specifically among the commercial banks in Kenya.

2 Methodology of Research

2.1 General Background of Research

This is causal study. A casual study involves an investigation of what causes the other among different variables. Causality approach to this study is most preferred because the study will be investigating whether investment in e-banking by banks causes increase or decrease in banking profits. This study adopted both descriptive and explanatory research design. First, the study described the trend of bank performance, adoption, use and investment of ICT in banking sector. Second, the explanatory approach was used investigate existing relationship between bank performance and e-banking, and carefully tests causal research objective of the study (Chandran, 2004).

2.2 Sample of Research

Cooper and Emory (1995) define population as the total collection of elements about which the researcher wishes to make some inferences. Element is the subject on which the measurement is being taken and is the unit of study, according to Cooper and Emory (1995). The population of interest in this study consisted of all 43 commercial banks operating in Kenya. In pursuance of the objective of the study; attention focused on all commercial banks. The managers of ICT department, card centre and operations at head office of these banks were target respondents. There was no need to sample since the study population is few (43 banks). However, only 27 commercial banks responded to our data request. Therefore, only 27 commercial banks were studied; 63% of the target population.

2.3 Instrument and Procedures

The study used secondary data. A secondary data collection framework was developed and sent to the operation managers of commercial banks. The instrument was considered appropriate for the study because all the respondents are literate. It is also less costly in terms of time, and it is more flexible for busy

respondents. Respondent were assured that information collected is meant for academic purposes only. Data collected from banks were complemented by secondary data from annual report of target banks and Central Bank of Kenya annual report. The data covered the period 2006 to 2010.

The research values of voluntary participation, anonymity, and protection of the respondents from any possible harm was upheld during the study. As a matter of fact, 1) the researcher ensured that the respondents participate voluntarily in the study. Therefore the study was conducted in a manner that does not significantly disrupt their daily routine. For instance, appointments and call backs whenever inevitable were made assure respondents that data that was collected were used for academic purposes only and that is treated with strict confidentiality.

A pilot study was conducted to evaluate the validity and reliability of the research instrument. The purpose of pre-testing was to assess the clarity of the items on the instrument so that those items found to be inadequate in measuring the variables could either be discarded or modified to improve the quality of the research instrument. During the pre-test study, the researcher discussed each item on the questionnaire with the respondent to determine its suitability, clarity and relevance for the purpose of the study. Modifications where found necessary were made on the instrument before it is finally used to collect data for the study. Reliability of the data was assured since the study relied on published data from central bank and commercial banks annual reports.

2.4 Data Analysis

The study used both descriptive and inferential statistics in analyzing the data. Analysis was done with the help of Statistical package for social scientists (SPSS version 14). First, data collected was cleaned, sorted and collated. Then, data will be entered into the computer, after which analysis was done. Descriptive statistics such mean score, frequencies and percentages for each variable were calculated and tabulated using frequency distribution tables, or pie charts and/or bar charts. In order to test the relationship between the variables the inferential tests including the Pearson Product-Moment Correlation Coefficient and regression analysis were used.

First, Pearson Product-Moment Correlation Coefficient as measures of association was used examines the relationship between the electronic banking and performance. The relations was explored with the use of Pearson's correlation coefficient. Pearson's correlation coefficient calculates a relationship between two variables. Correlation co-efficient is definition as a measure of the strength of linear association between two variables. Correlation is always between -1.0 and +1.0. If the correlation is positive, we have a positive relationship. If it is negative, the relationship is negative.

Second, regression analysis was used to analysis the impact of electronic banking on bank performance. The study used regression specification. Given the five -year panel structure of the sample data to be gathered, regression analysis was conducted to investigate the relationship between electronic banking on bank performance. The regression model that was evaluated is represented as follows:

$$PERF_{it} = \beta_1 EB_{it} + \beta_2 CDS_{it} + \beta_3 ATMS \quad (1)$$

Equation 1 defines the regression equation to be used in this study, where *PERF* is financial performance represented by return on assets, *EB* is the variable investment in electronic banking measured in Kshs, *CDS* is the variable number of debit/cards issued by banks, and *ATMS* is the variable depicting the number of *ATMS* systems install by the banks; and

β_j , $j = 1, 2, 3$ are the slope coefficients whose sign depict the relationship between return on assets as a measure of bank and electronic banking proxied by investment in electronic banking measured in Kshs, number of debit/cards issued by banks, and number of *ATMS* systems installed by the banks. A negative/positive relationship is expected between electronic banking proxy measures and bank performance proxy.

Table 1: Expected relationship between electronic banking proxy measures and return on assets as measure of bank performance

Expected Sign	Variable Symbol	Measurement
+	CDS	Number of debit/cards issued by banks
+	ATMS	Number of <i>ATMS</i> systems install by the banks
+ or -	EB	Investment in electronic banking measured in Kshs

3 Results of Research

The study sought to establish whether there exist a relationship between the banking performance and e-banking in Kenyan banking industry. Bank performance was measured by return on asset while e-banking was measured by expenditure on ICT investments (e-banking) (In millions Kshs), number of debits cards issued to customers and number of *ATMs* installed by the Bank. The researcher calculated return on assets by dividing banks' net profit after taxation by the total assets held by the bank over the study period. The following section

presents the descriptive statistics for all the variables used. Table 4.1 reveals that all the variables were on upward trend over the study period: 2006 and 2010.

Table 2: Presentation of Statistics of Variables Used

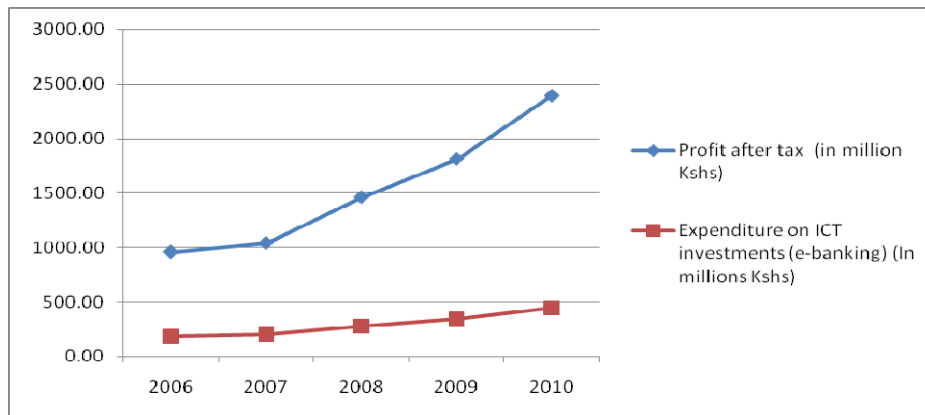
Year	Total assets of the bank (In Million Kshs)	Profit after tax (in million Kshs)	Expenditure on ICT investments (e-banking) (In millions Kshs)	No. of ATMs Installed by the Bank	No. of debits cards issued to customers	Return on Assets
2006	52410.07	957.53	185.84	85	1154829	0.018
2007	62009.22	1038.79	202.90	95	1286494	0.017
2008	82317.77	1459.17	276.66	101	1364638	0.018
2009	96113.22	1811.15	344.63	107	1447414	0.019
2010	121662.28	2390.15	445.39	115	1553999	0.020
Mean	82902.51	1531.36	291.08	100.35	1361474.70	0.02
Max	121662.28	2390.15	445.39	114.54	1553998.52	0.02

Source: Research Data

Bank performance was measured by return on assets. The researcher calculated return on assets by dividing banks' net profit after taxation by the total assets held by the bank over the study period. From the research data, returns on assets of commercial banks declined from 2006 to 2007 before increasing steadily from 2007 to 2010. This study uses the number of ATMS installed by commercial banks as a measure of e-Banking. Number of ATMS installed indicates financial innovation within the banking sector. The findings show that Number of ATMS has been increasing steadily since 2005, and hence contributing to development of the banking industry as it improve financial liquidity to the population. Number of debit cards issued to customers by commercial banks was used to a measure of e-Banking. The variable explains the level of transactions with banking sector. It was established that from 2006 to 2010, the debit cards issuance were in upward trend.

3.1 Profit after Tax and Expenditure on e-Banking Investments

The finding of this analysis reveals that both commercial banks' profit after tax and expenditure on e-banking investments rose steadily throughout the five year period under consideration: 2006 to 2010.



Source: Research Data

Figure 1: Graphing profit after tax and Expenditure on e-banking Investments (Amount in Kshs Millions)

To empirically determine the relationship between cost of good governance and performance of firms under review, first was correlation matrix and then regression analyses were used. The following sub-section outlines the results of the data analysis.

3.2 The Relationship between Bank Performance and e-Banking

Pearson correlation is used to evaluate the relationship between the variables. The correlation matrix is an important indicator that tests the linear relationship, between the variables. The matrix also helps to determine the strength of the variables in the model, that is, which variable best explains the relationship between bank performance and e-banking. This is important and helps in deciding which variable(s) to drop from the equation. Table 4.2 presents the correlation matrix of the variables in levels. The table shows that there is positive correlation between return on asset and expenditure on ICT investments (e-banking) (In millions Kshs) and number of debits cards issued to customers.

However, return on asset is negatively related to No. of ATMs installed by the Bank, though the strength of relationship is low at -0.017 . The Pearson correlation coefficient between return on asset and expenditure on ICT investments (e-banking) (In millions Kshs) and number of debits cards issued to customers is 0.631 and 0.715 respectively. These correlation coefficients indicate strong power of the relationships between the associated variables and return on assets.

Table 3: Pearson correlation co-efficient between variables

	Return on Assets	Expenditure on ICT investments (e-banking)	No. of ATMs Installed	No. of debits cards issued to customers
Return on Assets	1			
Expenditure on ICT investments (e-banking)	.631	1		
No. of ATMs Installed	-.017	.903(*)	1	
No. of debits cards issued to customers	.715	.137	.349	1

* Correlation is significant at the 0.05 level (2-tailed)

The findings in table 3 indicate that bank performance is determined by e-banking proxied by expenditure on ICT investments (e-banking) (In millions Kshs) and number of debits cards issued to customers.

In order to establish the relationships and effects of e-banking on bank performance regression analysis was conducted. Investments in e-banking, number of ATMS and number of debits cards issued to customers were used as proxy for e-banking and returns on assets were used as proxy for bank performance.

Table 4 below summarizes regression results. As indicated in the regression statistics R-squared was 0.724. This means that 72% variations from the expected and actual output (dependent variable: bank performance) are explained by the independent variable (e-banking). These indicate good fit of the regression equation used. Thus, this is a good reflection of the true position that bank performance can be explained by investments in e-banking, number of ATMS and number of debits cards issued to customers all used as proxy for e-banking. Analysis of Variance shows that f-calculated is greater than f – critical ($2.577 > 0.228$). This implies that the regression equation was well specified. Co-efficient of the regression shows that there is relationship between performance of the bank and e-banking.

Estimated Equation:

$$\text{Return on Assets} = 3.336 + 4.209 * \text{Investments in e-banking} \\ + 1.435 * \text{Number of debits cards issued to customers}$$

Table 4 above represents the regression results for the existence of a short run relationship among the variables. The results shows that the coefficients of expenditure on ICT investments (e-banking) (In millions Kshs) and number of

ATMS and number of debits cards issued to customers have the correct sign and are statically significance. This implies that these variables have a positive relationship and effects with/on the bank performance. However, the variables number of ATMs installed by the bank has no relationship with bank performance since the coefficients are statically insignificance.

Table 4: Summary of Regression Analysis Results

Regression Model Summary: Dependent variable Return on Assets			
R Squared		0.7204	
Adjusted R Squared		0.6409	
Observations		5	
ANOVA (Analysis of Variance)			
	<i>Degree of freedom</i>	<i>Sum of Squares</i>	<i>Mean Square</i>
Regression	4	3.299	1.099
Residual	1	1.281	0.426
Total	5	4.580	
<i>Calculated F</i>		2.577	
<i>Significance F</i>		0.2286	
Output of Regression – Co-efficient			
<i>Predictor-Independent Variable</i>	<i>Coefficients</i>	<i>Standard Error</i>	<i>t -Statistics</i>
(Constant)	3.336	1.154	2.891*
Expenditure on ICT investments (e-banking)	4.209	2.175	1.935**
No. of ATMs Installed by the Bank	-5.313	-7.836	0.678
No. of debits cards issued to customers	1.435	0.716	2.004*

Note: * significance at 1%, ** significance at 5%

4 Discussion

The result reveals that the coefficient of investments in e-banking measured by expenditure on bank ICT investments (e-banking) (In millions Kshs) has the correct sign and is significant. This indicate that investments in e-banking has a positive relationship with bank performance at 1% level, which is in line with theory as reflecting financial innovation in the banking development. An

increase in investment in e-banking by one Kenya shillings leads bank profitability increment by Kenya shillings 4.209. This is expected. This shows that ICT investment has had a strong influence on the structure and the activities of the banking sector; this allows transactions to be conducted more efficiently, technology allows banks to market their products more effectively. For example, banks build up sophisticated databases containing information about their consumers, and through data mining they are then able to target their commercial efforts more precisely, knowing which range of products individual consumers might be interested in buying. Technology also affects the very products that banks sell. This has led to increased bank income.

Again E-banking has produced changes in the structure of bank income. As a result of increased competition that has lowered margins in lending operations (the banks' traditional business) banks have diversified their sources of income and rely increasingly on income from fees services rather than interest rate spreads. Fees charged for services include typical banking activities like payment transactions, safe custody and account administration. These activities are, in general, less volatile than fees and commissions charged on activities which are affected by economic and cyclical developments (e.g. underwriting activities, brokerage services, treasury management, transactions on derivatives, private banking, credit card business). This change is also reflected in the increasing size of off-balance sheet items in the banks' financial accounts.

In addition, there is a positive relationship between number of debits cards issued to customers as proxy of e-banking and bank performance. 1% increase in number of debits cards issued to customers by the banks leads to 1.435% increase in the bank profitability. The introduction of cards has seen business increase their businesses. There are three different parties are involved in smart card schemes: consumers, businesses and issuers.

1) Consumers: They may adopt this new payment instrument because of its greater convenience. For the instrument to gain acceptance, it should have some of the following characteristics: anonymity, security (reliable authentication procedures, or solutions to compensate users in case of loss, theft or malfunction), liquidity (subject to wide acceptability), low transaction costs (from paper handling and clearing), speed (time saving in transactions, faster balance updating).

2) Businesses. Suppliers of goods and services could benefit from the use of pre-paid cards because of lower costs of handling cash and no interest lost on cash holdings. Also, substantial savings result from the transition of credit card to smart card payments: while credit cards require connection to a remote machine each time a payment is made, with smart cards all payments are processed jointly at the end of the business day.

3) Card issuers. Both consumers and merchants will be willing to pay for smart cards because of its many conveniences. Until the competitive pressure reduces

the extra profits, smart cards can be a good business to entrepreneurs introducing new schemes.

5 Conclusions

The result indicated that bank performance (measured by return on assets) are explained by independent variable the e-banking measured by Investments in e-banking and number of debits cards issued to customers. This indicates E banking has strong and significance marginal effects on returns on asset in the Kenyan banking industry. Thus, there exists positive relationship between e-banking and bank performance. Based in the summary of the major findings the following conclusions are drawn: the adoption of electronic banking has enhanced Kenyan banking industry by making it more productive and effective; Electronic Banking also has a strong positive relationship on the overall banking performance by making workers performance more effective and efficiency; The adoption of electronic banking has enhanced the fortune of the Kenyan commercial banks. This is especially achieved through charges on the use of debit cards and ATM withdrawal charges; the electronic banking has improved the bank customer relationship by rendering effective services throughout the day and night in every week. Customers can now have access to their account outside working hours to make withdrawal to attend to their needs; the electronic banking guideline introduced by CBK strongly helps in effective electronic banking system. Withdrawal can be made anywhere at any time and using any bank ATM machine, customer cannot withdrawal more than some certain amount to allowed other customers have access to cash and money, can be transfer from one place to another through electronic means.

In general conclusion the electronic banking has made banking transaction to be easier by bringing services closer to its customers hence improving banking industry performance.

6 Suggestions of Areas for Further Research

The study also reveals that there is evident that e-banking increases the bank performance. In order to give the growing trends of Information and Communication Technology (ICT) which involves e-banking and e-commerce in banks a vision in the right directions, the following strategies are recommended for further follow up and implementation; The banks must be focused in terms of their needs and using the right technology to achieve goals, rather, than acquiring technology of internet banking because other banks have it. Government participation in ensuring focused telecommunication industry must be visible to reduce or remove avoidable costs of implementing e-commerce and internet

banking. Regulatory authorities like Central Bank of Kenya must stipulate standards for the banks to follow to avoid making Kenya Banking Sector a dumping ground for the outdated technological infrastructures. Training and Manpower development is another major problem mitigating against the growth of e-commerce in the country. Government must make right IT policy by ensuring that Computer, Communication equipments and other IT infrastructures to a large extent are manufactures in the country so that our people can acquire first hand necessary skills. Government Policy that will guide against Money laundering, fraud and Security risks posed by e-banking are inevitable. To counter the legal threat and security posed to net banking and e-commerce, the necessary legal codes backing the industry must be established; this will enhance the growth of the industry.

This study was done only on the commercial banks in Kenya. The study can also be extended to other financial markets such as capital and insurance companies in order to understand the implication of ICT on the overall financial markets in Kenya. Similar the studies can be done for other bank industry in other countries. This study studied was confined to commercial banks yet the current banking innovation such as electronic money is targeted to include the rural marginalized mostly served by micro finance institution in the banking net. There is need therefore to study to study adoption and use of ICT by Micro finance institutions. There has been drive to use ICT avail financial service to rural areas. However, the success of this drive is not yet known. Therefore, another study can be carried to evaluate whether e-banking has helped to bring banking services close to people especially in rural areas. There is need to identify and understand the changes that ICT are causing on the banking sector and the payments systems, in order to examine in detail how the recent (and foreseeable) advances in ICT are affecting the sector and can affect its future evolution. Therefore a study on the effects of ICT on the banking sector and the payments system is recommended.

References

- [1] A. Berentsen, Monetary Policy Implications of Digital Money, *Kyklos*, **51**, (1) (1998), 89-118.
- [2] M. Berlin and L. Mester, Deposits and relationship lending, *Review of Financial Studies*, **12**, (1999), 579-608.
- [3] S. Bhattacharya and A. Thakor, Contemporary Banking Theory, *Journal of Financial Intermediation*, **3**, (1993), 2-50.
- [4] A. Boot, A. Thakor and G. Udell, Credible commitments, contract enforcement problems and banks: Intermediation as credibility assurance, *Journal of Banking and Finance*, **15**, (1991), 605-632.

- [5] C. Chandran, *Research Methods with Illustrations from Christian Ministries*, Starbright services Ltd, 2004.
- [6] F. Connel and M.N. Saleh, Six Puzzles in Electronic Money and Banking, *IMF Working Paper*, IMF Institute, **19**, (February, 2004).
- [7] D. Cooper and C. Emory, *Business Research Methods*, Chicago, Irwin, 1995.
- [8] T.H. Davenport, *Process Innovation: Reengineering Work through Information Technology*, Boston, Harvard Business School Press, 2003.
- [9] D. Diamond and P. Dybvig, Bank runs, deposit insurance and liquidity, *Journal of Political Economy*, **91**, (1983), 401-419.
- [10] C. Freedman, Monetary Policy Implementation: Past, Present, and Future – Will Electronic Money Lead to the Eventual Demise of Central banking?, *International Finance*, **3**(2), (2000), 211-227.
- [11] X. Freixas and J.C. Rochet, *Microeconomics of banking*, MIT Press, 1998.
- [12] B. Friedman, The Future of Monetary Policy: The Central Bank as an Army with Only a Signal Corps?, *International Finance*, **2**(3), (1999), 321-338.
- [13] P. Gompers, L. Ishii and A. Metick, Corporate Governance and Equity Prices, *Quarterly Journal of Economics*, **118**, (2003), 107-155.
- [14] E. Goodhart, Can Central Banking Survive the IT Revolution?, *International Finance*, **3**(2), (2000), 189-209.
- [15] P. Hallam-Baker, User Interface Requirements for Sale of Goods, World Wide Web Consortium, (1996).
- [16] J. Hicks, Annual survey of economic theory: The theory of monopoly, *Econometrica*, **3**, (1935), 1-20.
- [17] O. Jean-Aza, Regulatory Issues in Electronic Money: A Legal-Economics Analysis, *Netnomics*, **1**, (2006), 53-70.
- [18] N. Kariuki, Six Puzzles in Electronic Money and Banking, *IMF Working Paper*, IMF Institute, **19**, (February, 2005).
- [19] A. Kashyap, R. Rajan and J. Stein, Banks as liquidity providers: An explanation for the Co-existence of Lending and Deposit-Taking, *Working Paper*, University of Chicago, (1999).
- [20] M. King, Challenges for Monetary Policy: New and Old, *Bank of England Quarterly Bulletin*, (November, 2002), 397- 415.
- [21] F. Oshikoya, What will Technology do to Financial Structure?, *NBER Working Paper*, **6892**, (2007).
- [22] J. Ovia, Internet Banking: practices and potentials in Nigeria, *A paper presented at a seminar organised by the Institute of Chartered Accountants of Nigeria (ICAN) Lagos Sheraton Hotel & Towers, Ikeja*, (September 05, 2001).
- [23] A. Prinz, Money in the Real and the Virtual World; E-Money, C-Money, and the Demand for CB-Money, *Netnomics*, **1**, (1999), 11-35.
- [24] A.M. Santomero and J.J. Seater, Alternative Monies and the Demand for Media of Exchange, *Journal of Money, Credit and Banking*, **28**, (1996), 942-960.

- [25] K. Schipper and L. Vincent, Earnings quality, *Accounting Horizons*, **17**, (2003), 97-110.
- [26] C.C. Soludo, A keynote address delivered at the inauguration of the National Payments System Committee (NPSC) at Central Bank of Nigeria head office, Abuja, (May, 2005).
- [27] A. Steven, *Information System: The Information of E-Business*, New Jersey, Natalie Anderson, pp. 11-36, 2002.
- [28] J. Tarkka, The Market for Electronic Cash Cards, *Journal of Money, Credit and Banking*, **34**, (2002), 299-314.