

## **FINANCIAL INNOVATIONS AND PERFORMANCE OF COMMERCIAL BANKS IN KENYA**

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### **Abstract**

*Kenya's banking system has not been exception as far as financial innovations is concerned. The major impetus for financial innovation has been globalization of financial systems, deregulation, and great advances in technologies. The objective of this study was to establish the effect of financial innovations on financial performance of commercial banks in Kenya. This study relied on secondary data. It adopted a census where all the 44 banks were used in the study and there was no sampling since the population size was small. The study found out that there is a strong relationship between financial innovations and financial performance. The study concludes that financial innovations positively affect financial performance. Based on these results, the study recommends that financial innovation information should be available particularly to regulatory and advisory bodies for guidance to the commercial banks on the need*

*to craft and employ sound strategies geared towards continuously embracing innovativeness since innovation leads to improved financial performance. In addition, the study also recommends that firms should create an enabling environment for the employees to be innovative in their operations in order to utilize its competitive advantage so as to increase financial performance and growth of the sector.*

*Keywords: Financial Innovations, Financial Performance, Commercial Banks, Kenya*

## **INTRODUCTION**

Over the last decade, the role of banking in the process of financial intermediation has been undergoing a profound transformation, owing to changes in the global financial system. Kenya's banking system has seen some major financial innovations in the past decade as well as steps to promote financial inclusion. The major impetus for financial innovation has been globalization of financial systems, deregulation, and great advances in technologies. In increasingly integrated financial systems facing higher volatilities, more competition and wide varieties of risks, financial innovation has become an essence to provide new products and strategies to better suit different circumstances of time and market and to meet different requirements of participants in financial system.

Financial innovations arise due to several reasons. Gorton and Metrick (2010) summarize the reasons for the growth of modern financial innovation as; reduction in bankruptcy costs, tax advantages, reduction in moral hazard, reduced regulatory costs, transparency and customization. A highly turbulent environment leads to successful innovation creating a unique competitive position and competitive advantage and lead to a superior performance (Roberts and Amit, 2003). This can only be maintained by ceaseless innovation and improvement of the product and the process (Porter, 2004). According to Ignazio (2007), financial innovation has not only opened up new opportunities for the sector participants, but also increased new market players arising with a range of new and innovative products in the financial market.

Innovation consists of firms developing new products or new production processes to better perform their operations, in which case the new products could be based on the new processes (Tufano, 2002 & Lawrence, 2010). In the financial services industry, innovation is viewed as the act of creating and popularizing new financial instruments, technologies, institutions and markets, which facilitate access to information, trading and means of payment (Solans, 2003). Lerner (2006) puts forward that innovations are not just critical for firms in the

financial services industry, but also affect other companies; for instance, enabling them to raise capital in larger amounts and at a lower cost than they could otherwise and that innovation is an important phenomenon in any sector of a modern economy.

### **Financial Innovations**

According to Tufano (2002), financial innovation is the act of creating and then popularizing new financial instruments as well as new financial technologies, institutions, and markets. According to Lawrence (2010), financial Innovation involves the design, the development, and the implementation of innovative financial instruments and processes, and the formulation of creative solutions to problems in finance. Beaver (2002) believes that innovation is an essential element for economic progress of a country and competitiveness of an industry. Sandvik (2003) argues that innovation is one of the most important competitive weapons and generally seen as a firm's core value capability. Innovation is also considered as an effective way to improve firm's productivity due to the resource constraint issue facing a firm (Lumpkin and Dess, 1996).

According to Ignazio (2007), financial innovations can be grouped as new products (e.g., adjustable rate mortgages; exchange-traded index funds); new services (e.g., on-line securities trading; Internet banking); new "production" processes (e.g., electronic record-keeping for securities; credit scoring); or new organizational forms (e.g., a new type of electronic exchange for trading securities; Internet-only banks). Financial innovation has not only opened up new opportunities for the sector participants, but also increased new market players arising from new products in the financial market (Noyer, 2007).

The developments in the financial sector have not only led to the increase in the number of financial institutions, but also the development in level of sophistication with new payment systems and asset alternatives to holding money. Associated with this rapid expansion in the banking sector is a range of financial innovations: the ATMs and debit cards introduced in the late 1990s; the electronic money introduced in early 2007; Value capping in 2009; the agent banking model introduced in mid-2010; Cheque Truncation System (CTS) in 2012 and more recently T+1 (cheques clearing in one day) in 2013 (CBK report, 2013). Other innovations in banking and financial sector are RTGS, EFT, ACH, MICR, Retail Banking, free advisory services, implementation of standing instructions of customers, payments of utility bills, fund transfers, internet banking, telephone banking, mobile banking, selling insurance products, issue of free cheque books, traveller's cheques and many more value added services (CBK report, 2013).

## Financial Performance

External parties normally evaluate a firm's ability based on its performance (Bonn, 2000). This implies why performance is like a mirror to a firm. The level of goal accomplishment generally defines a firm's performance (Achrol and Etzel, 2003). Firm performance is the outcomes achieved in meeting internal and external goals of a firm (Lin et al., 2008). As a multidimensional construct, performance has several names, including growth, survival, success and competitiveness. The concept of firm growth was introduced in the early 1930s known as the "Law of Proportionate Effect" (sometimes called Gibrat's rule of proportionate growth). The Law of Proportionate Effect is frequently used as a benchmark for many studies to determine business growth. Gibrat's (1931) explains a firm's growth rate does not depend on the size of a firm.

Firm performance is a multidimensional construct that consists of four elements (Alam et al. 2011). Customer-focused performance, including customer satisfaction, and product or service performance; financial and market performance, including revenue, profits, market position, cash-to-cash cycle time, and earnings per share; human resource performance, including employee satisfaction; and organizational effectiveness, including time to market, level of innovation, and production and supply chain flexibility.

Using organizational goals as a basis, different methods are adopted by different firms to measure their performance. This performance indicator can be measured in financial and non-financial terms (Bagorogoza and Waal, 2010; Bakar and Ahmad, 2010). Most firms, however, prefer to adopt financial indicators to measure their performance (Grant et al., 1988). Return on assets (ROA), average annual occupancy rate, net profit after tax and return on investment (ROI) are the commonly used financial or accounting indicators by firms (Tavitiyaman et al., 2012). Some other common measures are profitability, productivity, growth, stakeholder satisfaction, market share and competitive position (Bagorogoza and Waal, 2010).

However, financial elements are not the only indicator for measuring firm performance. It needs to combine with non-financial measurement in order to adapt to the changes of internal and external environments (Krager and Parnell, 1996). Supporting this opinion, Rubio and Aragon (2009) divided business performance into four dimensions, that is internal process, open system, rational goal and human relations, where each dimension is measured by any changes in its own variables.

## The Effect of Financial Innovations of Financial Performance

Studies from the early period of research on innovation have typically reported a positive relationship between innovation and measures of firm performance. In a new generation of

models studying the impact of innovative activities on firm performance, the focus has shifted to the complex innovation process and channels through which the innovation inputs are transformed into better performance (Loof, et al., 2006; Kemp, et al., 2003; Bessler, et al., 2008).

The significance of financial innovation is described by Roberts and Amit (2003) as a means leading to a competitive advantage and superior financial performance. As revealed in many studies, financial innovation and firm financial performance have a positive relationship (for examples Zahra and Das, 1993; Capon et al., 1990; Calantone et al., 1995; Han et al., 1998). Innovation would appear in product, process, market, factor and organization (Kao, 1989), but the first three dimensions are more familiar in the innovation literature (Johne and Davies, 2000; Otero-Neira et al., 2009).

Innovation generally does seem to have positive effects in raising financial performance of innovators (Boot & Thakor, 2007). Crepon et al. (1998) used a four-equation model, to link the innovation decision of firms to their performance through the impact of innovation input on innovation output and the innovation output on productivity and better performance. Their findings confirm the positive relationship between innovation activities and productivity at the firm level and provide further evidence on the relationship between size and innovation activities.

### **Commercial Banks in Kenya**

The banking sector in Kenya is comprised of 43 commercial banks, two mortgage finance companies, 130 foreign exchange bureaus and fifteen micro finance institutions (CBK, 2012). The companies Act, the Central Bank of Kenya Act Cap 491, the banking Act Cap 488 and the micro finance Act 2006 are the main regulators and governors of the banking industry in Kenya. The Acts are used along with prudential guidelines that are issued by the central bank of Kenya. In 1995 the exchange controls were lifted after liberization of the banking in Kenya.

Today banking is known as innovative banking. Financial innovation associated with technological change has totally changed the banking philosophy and that is further tuned by the competition in the banking industry in Kenya. Challenging business environment within the banking system has created more innovation in the fields of product, process and market. Information technology has given rise to new innovations in the product designing and their delivery in the banking and finance industries. Customer services and customer satisfaction are their prime work. Current banking sector has come up with a lot of initiatives that oriented to providing a better customer services with the help of new technologies. Banking through internet has emerged as a strategic resource for achieving higher efficiency, control of operations and

reduction of cost by replacing paper based and labour intensive methods with automated processes thus leading to higher productivity and profitability.

Innovations in the Kenyan banking sector include: increased use of paper money instead of cash. Cheques are the main paper based mode of payment accounting for 48% of non-cash payments. Use of Magnetic Ink Character Recognition (MICR) ensures clearing of cheques speedily and efficiently. The Central Bank of Kenya launched a Real Time Gross Settlement (RTGS) system known as the Kenya Electronic Payments and Settlement System (KEPSS) in July 2005 in an effort to modernize the country's payment system in line with global trends. E credit services e.g M-SHWARI has revolutionized the banking sector.

## **THEORETICAL REVIEW**

A theory is a systematic explanation of the relationship among phenomena and provides a generalized explanation to an occurrence (Dawson, 2009). In the literature of financial innovation, there is a wide range of theories that have been developed by various scholars. These theories include; Circumvention Innovation Theory, Schumpeter Theory of Innovation, Constraint-Induced Financial Innovation Theory, Regulation Innovation Theory, Transaction Cost Innovation Theory and lastly Location Innovation Theory. These theories are explained below;

### **Circumvention Innovation Theory**

Kane (1981) pioneered circumvention innovation theory. He postulated that many forms of government regulations and controls, which have the same property of implicit taxation, embarrass the profitable activity engaged by the company and the opportunity of earning profit, so the market innovation and regulation innovation should be regarded as the continuous fighting process between independent economic force and political force. Because financial industry is special, it has the stricter regulations. Financial institutions deal with the status such as the reduction of profit and the failure of management induced by government regulations in order to reduce the potential loss to the minimum. Therefore, financial innovation is mostly induced by the purpose of earning profit and circumventing government regulations.

Kane's (1981) theory is different from the reality. The regulation innovation he assumed is always towards the direction of reinforcing regulation, however, the regulation innovation in reality is always towards the direction of liberal markets innovation, the result of the game is release of financial regulation and markets become more liberal. This theory not only considered the origin of innovation in the market but also explained the process of regulation innovation and their dynamic relation.

### ***Schumpeter Theory of Innovation***

Schumpeter (1934) argued that entrepreneurs, who could be independent inventors or R&D engineers in large corporations, created the opportunity for new profits with their innovations. In turn, groups of imitators attracted by super-profits would start a wave of investment that would erode the profit margin for the innovation. However, before the economy could equilibrate a new innovation or set of innovations, conceptualized by Schumpeter (1934) as Kondratiev cycles, would emerge to begin the business cycle over again.

Schumpeter (1934) emphasized the role of entrepreneurship and the seeking out of opportunities for novel value generating activities which would expand and transform the circular flow of income, but it did so with reference to a distinction between invention or discovery on the one hand and innovation, commercialization and entrepreneurship on the other. This separation of invention and innovation marked out the typical nineteenth century institutional model of innovation, in which independent inventors typically fed discoveries as potential inputs to entrepreneurial firms. The author further saw innovations as perpetual gales of creative destruction that were essential forces driving growth rates in a capitalist system. Schumpeter's thinking evolved over his lifetime to the extent that some scholars have differentiated his early thinking where innovation was largely dependent on exceptional individuals/entrepreneurs willing to take on exceptional hazards as an act of will.

### ***Constraint-Induced Financial Innovation Theory***

American economist Silber (1983) advanced constraint-induced financial innovation theory. This theory pointed out that the purpose of profit maximization of financial institution is the key reason of financial innovation. There are some restrictions (including external handicaps such as policy and internal handicaps such as organizational management and leadership style) in the process of pursuing profit maximization in an organization.

According to Silber (1983), these restrictions and limitations not only guarantee the stability of management, they reduce the efficiency of financial institution, and so financial institutions strive toward casting them off. Constraint-induced innovation theory discussed the financial innovation from microeconomics, so it is originated and representative. But it emphasized "innovation in adversity" excessively. So it can't express the phenomenon of financial innovation increasing in the trend of liberal finance commendably.

### ***Regulation Innovation Theory***

Scylla et al (1982) is credited with pioneering Regulation Innovation Theory. This theory explains financial innovation from the perspective of economy development history. The theory

proposes that financial innovation connects with social regulation closely, and it is a regulation transformation which has mutual influence and has mutual causality with economic regulation.

Scylla et al (1982) thought that it is very difficult to have space of financial innovation in the planned economy with strict control and in the pure free-market economy, so any change brought about by regulation reform in financial system can be regarded as financial innovation. Innovative activities can only appear in the market economy controlled by government. When government's intervention and the management have hindered the finance activities, there will be many kinds of financial innovation which intend to circumvent or get rid of government controls. The game between the market and government finally form the spiral development process, namely, "control-innovate, controls again-innovates again".

This theory expanded the scope of financial innovation; government activity is also regarded as the origin of financial innovation. But it regards regulation innovation as one part of financial innovation. Especially, it regards rules and regulations which are used to control as financial innovation. The financial control is the obstructive force of financial innovation, so rules and regulations which are regarded as the symbol of financial control should be the direction of financial reform and innovation (Scylla et al, 1982).

### ***Transaction Cost Innovation Theory***

Hicks & Niehans (1983) advanced the transaction cost innovation theory in the research on innovation. They thought that the dominant factor of financial innovation is the reduction of transaction cost, and in fact, financial innovation is the response of the advance in technology which caused the transaction cost to reduce. The reduction of transaction cost can stimulate financial innovation and improvement in financial services.

This theory studied the financial innovation from the perspective of microscopic economic structure change. It thought that the motive of financial innovation is to reduce the transaction cost. And the theory explained from another perspective that the radical motive of financial innovation is the financial institutes' purpose of earning benefits. This theory discussed the motive and the process of financial innovation from different sides.

### ***Location Innovation Theory***

Desai & Low (1987) with the location theory thought that financial innovation is the method which can make the integrity of financial market come true. According to the Location Innovation Theory, they advanced the financial innovation microscopic economic model. Desai & Low (1987) utilized this theory to confirm and measure the gap in the scope of acquirable product in financial market, which indicates the potential opportunity of the new products' innovation and



promotion. Chen (1995) built the financial intermediacy model in which new security secured by old security is created. In the period of decomposing the old securities and opening new market, innovators play an influential economical role. For example, investors can obtain the consumption at lower cost; investors can realize a better share of risks.

His model indicated that even when introducing the surplus securities which are not distributed yet, the innovators can also play these roles. In other words, although these innovations have not changed the scope of acquirable financial tools, it makes investor's trade at lower expected cost. The main focus is on security designing in incomplete financial markets. These theories will be applied to point in the way of explaining the impact of financial innovation on financial performance.

### **Financial Innovations and Financial Performance**

Financial performance is a measure of how well a firm can use assets from its primary mode of business and generate revenues (Bessler et al., 2008). This term is also used as a general measure of a firm's overall financial health over a given period of time, and can be used to compare similar firms across the same industry or to compare industries or sectors in aggregation. There are many different ways to measure financial performance, but all measures should be taken in aggregation. Line items such as revenue from operations, operating income or cash flow from operations can be used, as well as total unit sales (Business Dictionary, 2011).

The most commonly employed measures of the performance are productivity, sales, export revenues and profits although sometimes financial measures such as the returns on the assets are also employed (Loof, et al., 2002; Bessler, et al., 2008). Most studies have reported a positive relationship between innovation and firm performance. Loof (2000) tests the existence of a positive relationship between the innovation output measured by sales of new products per employee and five different measures of firm performance (employment growth, value added per employee, sales per employee, operating profit per employee and return on assets). A positive relationship was confirmed for all five indicators. However, not all studies have confirmed the existence of this relationship. Klomp and Van Leeuwen (2001), for example, have found a positive relationship between innovation output and sales growth but no evidences of a relationship between the innovation output and employment growth.

Kemp et al. (2003) have found a positive relationship between the innovation output (measured by the share of sales from new products in total turnover) and the growth of turnover and employment and no significant with profit. Bloom and Van Reenen (2002) find that the impact of innovation output on the firm performance appears to be contemporaneous when

performance is measured by market value but it occurs with a lag when performance is measured by productivity. Bessler and Bittelmeyer (2008) report that innovations bestow on firms only temporary advantage in the short run and their effect appears to be diminishing in the long run. This finding is consistent with Schumpeterian thesis of creative destruction. Innovations provide competitive advantage for a limited period of time after which knowledge is diffused across the market. As new products enter the market the competitive advantage of the firm diminishes and it will suffer loss and eventually will be forced to exit the market unless it develops even better product.

Malhotra and Singh (2009) in their study on the impact of internet banking on bank performance and risk found out that on average internet banks are larger, more profitable and are more operationally efficient. They also found that internet banks have higher asset quality and are better managed to lower the expenses for building and equipment and that internet banks in India rely substantially on deposits. They further found out that smaller banks that adopt internet banking have been negatively impacted on profitability.

Mabrouk and Mamoghli (2010) in their study on Dynamics of Financial Innovation and Performance of Banking Firms: Context of an Emerging Banking Industry, analyzed the effect of the adoption of two types of financial innovations namely; product innovation (telephone banking and SMS banking etc) and process innovation (Magnetic strip card (debit, ATM and credit card), Automatic cash dispenser; (Automatic teller machine; Electronic payment terminal etc) on the performance of banks. Their analysis included two adoption behaviours, first mover in adoption of the financial innovation and imitator of the first movers. They found out that first mover initiative in product innovation improves profitability while process initiative has a positive effect on profitability and efficiency. Banks that imitate are less profitable and less efficient than first movers

### **Empirical Review**

The significance of financial innovation is widely recognized. Many leading scholars, including Miller (1986) and Merton (1992), have highlighted the importance of new products and services in the financial arena. Empirically, Tufano (2002) showed that of all public offerings in 2000, 18% (on a dollar-weighted basis) consisted of securities that had not been in existence in 1994. These innovations are not just critical for firms in the financial services industry, but also impact other companies: for instance, enabling them to raise capital in larger amounts and at a lower cost than they could otherwise.

Nader (2011) analyzed the profit efficiency of the Saudi Arabia Commercial banks during the period 1998- 2007. The results of his study indicated that availability of phone banking,

number of ATMs and number of branches had a positive effect on profit efficiency of Saudi banks. On the contrary he found that the number of point of sale terminals (POSs), availability of PC banking and availability of mobile banking did not improve profit efficiency.

Innovation in the financial sector is key to financial inclusion according to a review on Kenyan mobile financial services (Njuguna, 2011). In Kenya, mobile banking services have been the landmark of financial innovation. The Department of International Development (DFID) gave Vodafone a grant of £1 million. This funded Safaricom (the network affiliated with Vodafone in Kenya) to create a competitive financial service, that ultimately brought 12 million people into formalized financial markets.

Kagan et al (2005) in their study on whether internet banking affects the performance of community banks found that banks that provide extensive online banking services tend to perform better. They further found out that online 45 banking helps community banks improve their earning ability as measured by return on equity and improved asset quality by reducing the proportion of overdue and underperforming assets.

Shirley and Sushanta (2006) studied the impact of information technology on the banking industry and analyzed both theoretically and empirically how information technology related spending can affect bank profits via competition in financial services that are offered by the banks. Using a panel of 68 US banks for a period of over 20 years to estimate the impact of IT on profitability of banks, they found out that though IT might lead to cost saving, higher IT spending can create network effects lowering bank profits. They further contend that the relationship between IT expenditures and bank's financial performance is conditional to the extent of network effect. They say that if network effect is too low, IT expenditures are likely to; reduce payroll expenses, increase market share, and increase revenue and profit.

Mwangi (2007) carried out a study on factors influencing innovation of companies listed of the Nairobi Securities Exchange. The findings concluded that the laws protecting investors was the major factor influencing financial innovation. He also observed that. The absence of automated trading system as a technical factor was found to have influence on innovation. In addition, he postulated that financial competition and integration had an influence on financial innovation with increased financial competition amongst financial institution influencing innovation the most.

Githikwa (2009) carried out a study on the relationship between financial innovation and profitability of commercial banks in Kenya. The findings concluded that banks conceptualize financial innovation as a means to create impact in the profit performance. In addition, the study revealed that implementation of financial innovation requires more banks to have a great deal of resources and reduce costs of operations, reduce cost per transaction and equally enable

banks to satisfy the customer needs. Implementing product, process and institutional innovation makes the commercial banks to become more flexible in their operations and it leads to acquisition of qualified personnel in the bank, quality products and allows bank expansion.

Waweru (2012) carried out a study on the effects of financial innovation on risk management of commercial banks in Kenya. The study concluded that financial innovations have exposed commercial banks in Kenya to various risks e.g. credit risks, liquidity risk, interest rate risk, country risk, compliance risk and reputational risks. All of these risks should therefore inform overall risk management of institutions through realistic risk index factors at any period. The researcher recommended a more robust risk mitigation practices and policies to ensure that all elements of risks are captured in the risk index factors of commercial banks.

Mwangi (2013) carried out a research on Innovations and financial performance in the financial industry in Kenya. The findings revealed that bank innovations had statistically significant influence on income, return on assets, profitability and customer deposits of commercial banks in Kenya and tests for significance also showed that the influence was statistically significant. The findings also revealed that mobile phones had a higher moderating effect than internet services on the bank innovations when influencing financial performance of commercial banks in Kenya. Based on the findings of the study, the researcher concluded that bank innovations influence financial performance of commercial banks in Kenya positively.

## **METHODOLOGY**

### **Research Design**

According to Denvir & Millet (2003), a research design provides glue that holds a project together. A design is used to structure research, to show how all the major parts of the project, which include sample or groups, measures, treatments or programs, and methods of assignment that work together to try to address the central research question. This study adopted a descriptive design that is aimed at establishing the effect of financial innovations on financial performance. This is because the study sought to establish a relationship between two variables. Kothari (2004) describe a descriptive design as a design that seeks to portray accurately the characteristics of a particular individual, situation or a group. A descriptive survey was undertaken in this study.

### **Population and Sampling**

According to Mugenda and Mugenda (2003), a population is a well-defined as a set of people, services, elements and events, group of things or households that are being investigated. The population comprised of all 43 commercial banks in Kenya as at 31<sup>st</sup> December, 2013 which

have been in operation from 2008 to 2013 (Appendix 1). This period was considered long enough to provide sufficient variables to assist in establishing the effect of financial innovations on financial performance. This period was chosen in order to capture the most recent data and to give results that are conclusive and reflect the current trend. No sampling was done due to the small population size and the study employed a census where all the 44 banks were used in the study.

### **Data Collection**

Dawson (2009) states that secondary research data involves the data collected using information from studies that other researchers have made of a subject. This study was facilitated by the use of data for financial innovations and financial performance covering a period of 5 years (2009 to 2013). Data for financial innovation included the value of EFTs, Cheques and RTGS which were obtained from CBK's annual statistics presented under payments systems statistics. Data for financial performance included ROE which was obtained from CBK's annual bank supervision reports as well as bank's annual financial statements.

### **Data Analysis**

According to Marshall and Rossman (1999), data analysis is a process of bringing order, structure and interpretation of mass collected data. Data collected was systematically organized in a proper manner to facilitate analysis. Data analysis involved preparation of the collected data, coding, editing and cleaning of data in readiness for processing using SPSS package version 20. SPSS was preferred because it is systematic and covers a wide range of the most common statistical and graphical data analysis.

### ***Analytical Model***

Regression model was used to establish the relationship between the variables. Multiple regression models were used in this study as it allows simultaneous investigation of the effect of two or more variables (Zikmund, 2003). The model established the relationship between financial innovations and financial performance. In regression terminology, the variable that is predicted is called dependent variable while the variable used to predict the value of dependent variable is called independent variable. In this study, dependent variable was ROE while independent variables were value of EFTs, Cheques and RTGS. For the variables in this study, an average was computed for each year and then simple average for all 5 years was computed. The equation representing the algebraic expression of multiple regression model of the form below was applied;

Financial Performance =  $f$  (Financial Innovation)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

Where  $Y$  = Financial Performance (Measured by ROE) which is the dependent variable

$\beta_0$  = Constant which defines long term interest rate without inclusion of independent variables:

$X_{1-3}$  = Independent variables are,

$X_1$  = Value of RTGS transfers

$X_2$  = Value of EFTs Cleared

$X_3$  = Value of Cheques cleared

$e$  = Error Term

$\beta_1$  -K Regression coefficients- define the amount by which  $Y$  is changed for every unit change in independent variable.

### ***Test of Significance***

The significance of each independent variable was tested at a confidence level of 95%. Significance of innovation variables as predictors of financial performance was tested using the chi-square test. A correlation analysis was also performed to find how the variables relate to each other in the model.

## **ANALYSIS & FINDINGS**

### **Model Estimation**

Table 1 gives the regression model summary results. It presents the  $R$  value which is the measure of association between the dependent and the independent variables, the  $R$  Square which is the coefficient of determination measuring the extent at which the independent variables influence the dependent variable as well as the Adjusted  $R$  Square which measures the reliability of the regression results.

Table 1. Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.939 <sup>a</sup>	.928	.923	.00196

a. Predictors: (Constant), Cheque value cleared, RTGs transfer, EFTs Value cleared

According to the table results, there is a strong and positive association between the dependent variable (performance) and the independent variables (value of cheques cleared, value of EFTs cleared and the value of RTGS transfers). This is as given by the  $R$  value of 0.939 revealing the strength of the association. The coefficient of determination ( $R$  Square) in the table is 0.928.

This value explains that, holding other factors (not mentioned in the study) constant, the value of the cheques cleared, value of the EFTs cleared and the value of the RTGS transfer contributes to 92.8% of the variance in the financial performance of the commercial banks while the other factors accounting for 7.2% of the variability (1-0.928).

The variation due to the studied variables (92.8%) is very high and therefore can be relied on to explain the changes in the financial performance of the commercial banks in Kenya. The results obtained are also reliable as given by the Adjusted R Square value of 0.923 which explains that the study results are 92.3% reliable and therefore the regression model developed can be relied on to explain the trends in the financial performance of the commercial banks.

### Analysis of Variance

The results presented in table 2 gives the ANOVA results which shows the reliability of the model developed in explaining the relationship between the study variables. The significance of the model was tested at 5% level with a 2-tailed test.

Table 2. ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.268	3	.08934	3.436	.015 <sup>a</sup>
	Residual	.026	1	.026		
	Total	.138	4			

a. Predictors: (Constant), Cheque value cleared, RTGs transfer, EFTs Value cleared

b. Dependent Variable: ROE

From the table, the F statistic is 3.436 with a distribution  $F(3,1)$ , and the probability of observing a value greater than or equal to 3.436 is less than 0.001 as given by the significance value of 0.015 which is less than the critical value at 5% level in a 2-tailed test. This therefore reveals that the regression model developed is statistically significant and the variation in the results is insignificant that cannot result to a much difference in case of a change in the study units (population) and therefore the model can be relied upon to explain the effect of financial innovation on performance of commercial banks.

### Regression Coefficients

In order to answer the proposed model for the relationship between financial performance of commercial banks and the independent variables, the regression coefficients were calculated and presented in table 3 below. These with their significance values (also given in the table) measures the influence of each independent variable to the financial performance of the banks

(dependent variable) and the effect that would occur to the financial performance in an attempt to changing (increasing/decreasing) these variables.

Table 3. Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.227	.011		1.096	.005
	RTGS transfers	2.945	.024	.466	1.901	.020
	Value of EFTs cleared	1.321	.006	2.511	1.490	.014
	Value of Cheques cleared	7.632	.019	1.970	1.099	.003

a. Dependent Variable: ROE

The regression test results presented in the table indicate that, all the coefficients are positive and are also significant as given by their p-values (sig. values) which are all less than 0.025 testing at 5% level with a 2-tailed test. Thus, with these values being less than the critical value at 5% level, the coefficients are statistically significant and explain significant influence of the independent variables to the financial performance of the banks.

These coefficients therefore are used to answer the following regression model which relates the predictor variables (independent variables) and the dependent variables;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

Where Y = Financial Performance (Measured by ROE) which is the dependent variable

$\beta_0$  = Constant which defines long term Financial performance value without inclusion of independent variables

X1 = Value of RTGS transfers

X2 = Value of EFTs Cleared

X3 = Value of Cheques cleared

e = Error Term

Based on these coefficients, the regression model therefore becomes;

$$Y = 0.227 + 2.945 X_1 + 1.321 X_2 + 7.632 X_3$$

Thus, the model indicates that, holding the predictor variables constant, the financial performance of commercial banks would be 0.227. This explains that, without the influence of the value of cheques cleared, the value of the EFTs cleared and the value of RTGS transfers, the ROE value of the commercial banks would be 0.227. Also, the model shows that, a unit



increase in the RTGS transfer would result to 2.945 times increase in the banks' financial performance. Thus the two variables are positively related with a magnitude of 2.945 explaining the extent of influence to the dependent variable.

From the model developed also, it is clear that a unit change (increase/ decrease) in the value of EFTs cleared will lead to a 1.321 times direct changes in the banks' financial performance. This indicates that, the value of EFTs cleared and the financial performance off the commercial banks are positively related where increasing the value of EFTs cleared will give a corresponding increase of 1.321 times to the financial performance and vice versa.

Further, the model indicates that, the coefficient of the value of cheques cleared and the financial performance of the commercial banks is 7.632. This reveals that, given a unit increase in the value of the cheques cleared, the financial performance of the commercial banks will be affected by 7.632 times increase consequently. Thus, the two variables are positively related and a unit change in the value of cheques cleared will result to 7.632 times changes in the same direction to the financial performance of the commercial banks.

### Test of Significance

The significance of the relationship between the dependent and the independent variables in this study was tested at 5% confidence level using a chi-square test. The critical significance value at this level was set at 0.025 in a 2-tailed test. Thus, with a significant value below this value (0.025), the results reveal the significance of the relationship. The chi-square test results for the significance of the relationship between financial performance and the independent variables are as presented in table 4 below;

Table 4. Chi-Square Test for the Relationship between the Variables

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.000 <sup>a</sup>	16	.020
Likelihood Ratio	16.094	16	.004
Linear-by-Linear Association	3.147	1	.016
N of Valid Cases	5		

Based on the table results, the significance test results indicate a Pearson chi-square value of 20 with 16 degrees of freedom at 5% confidence level. The significance value is 0.02 which is less than the critical value (0.025) in a 2-tailed test. Thus, based on these results there is a statistically significant relationship between the financial performance of the commercial banks and the financial innovativeness of the commercial banks.

## DISCUSSION

The study was conducted with the aim of evaluating the effects of financial innovations on financial performance of commercial banks. The financial performance as the dependent variable was measured by ROE for the banking sector in the period 2009 to 2013. The financial innovativeness aspect is measured by three factors (value of cheques cleared, value of EFTs cleared and the value of RTGS transfers) which are the independent variables of the study. The major analysis to answer this object was regression analysis. Correlation analysis was conducted to evaluate the association of the variables. Multiple regression analysis was also conducted to evaluate the linear relationship between the dependent and the independent variables. The significance of the association and relationships was tested at 5% confidence level with a 2-tailed test. Chi-square test was the main test statistics conducted to test the significance of the relationships.

Testing the association between the financial innovations and the financial performance of commercial banks, the Pearson correlation test was conducted for each independent variable and the dependent variable separately. For the value of cheques cleared and the financial performance, the Pearson correlation value was found to be positive and strong as indicated by the obtained value of 0.803. The association was also found to be statistically significant since the significant value supporting this association was 0.012 which is less than the critical value of 0.025 at 5% level with a 2-tailed test.

The study findings indicated that, the financial performance of the banks and the value of EFTs cleared have positive and strong correlation which is also significant tested at 5% level. This is as indicated by the Pearson coefficient value of 0.863 which is a strong and positive correlation coefficient. Thus, the findings indicate that there is a strong positive association between financial performance and the value of EFTs cleared.

The study also found out that, the banks' financial performance and the value of RTGS transfers have a strong and positive correlation as given by the Pearson correlation coefficient of 0.887. The association was also found to be statistically significant at 5% level. This therefore shows that there is a strong and positive correlation between financial performance of commercial banks in Kenya and the value of RTGS transfers.

These findings were contrary to the findings of the study conducted by Shirley and Sushanta (2006) who studied the impact of information technology on the banking industry. Their research illustrated that; though IT might lead to cost saving, higher IT spending can create network effects lowering bank profits.

The study findings illustrated that, holding other factors constant, the value of the cheques cleared, value of the EFTs cleared and the value of the RTGS transfer (independent

variables) determines 92.8% of the financial performance of the commercial banks. Only 7.2% of the financial performance has not been accounted for by the studied factors (independent variables). Also, without the influence of the value of cheques cleared, the value of the EFTs cleared and the value of RTGS transfers, the financial performance of the commercial banks would be 0.227. Further, findings indicated that, commercial bank's financial performance and RTGS transfers are positively related with a magnitude of 2.945 explaining the extent of influence to the dependent variable.

The findings also revealed that, the value of EFTs cleared and the financial performance of the commercial banks are positively related where increasing the value of EFTs cleared will give a corresponding increase of 1.321 times to the financial performance and vice versa.

Further, the study found out that, given a unit increase in the value of the cheques cleared, the financial performance of the commercial banks will be affected by 7.632 times increase consequently. Thus, the value of cheques cleared and the financial performance of the commercial banks are positively related.

## CONCLUSION

The study accounts for the study of innovativeness, identifying the relationship among financial innovation and financial performance of commercial banks in the banking sector of Kenya. The researcher therefore based on the findings presented in the above section makes conclusions regarding the effects of financial innovations and financial performance of commercial banks. These are as presented below;

In general, the financial innovations in the Kenya's banking sector influence financial performance of commercial banks positively. This has a significant effect on the profitability of the commercial banks which also influence their competitive advantage. This is in agreement with the argument of several studies including: Walker (2004); Damanpour (1991); Atuahene-Gima (1996) and Subramanian & Nilakanta (1996). These in their findings indicate that innovations have positive impact on performance indicators. Their findings also support significance of the transformational effects of innovations on bank performance and operational efficiency.

Results from the data collected discovered that financial innovativeness of commercial banks had a positive and significant effect on financial performance of the banks. From these findings, it is evident that innovativeness dimension of commercial banks significantly affect financial performance of the banking sector in Kenya.

The findings confirm that an increase in the innovation level results to increased financial performance. Specifically, the study findings give the relevance of the innovation developed in

order to meet the customers' needs as well as of those developed in order to differentiate from the competitors in improving the financial performance. These findings agree with the findings of the study conducted by Mwangi (2013) on Innovations and financial performance which illustrated that, bank innovations had statistically significant influence on income, return on assets, and profitability and customer deposits of commercial banks. This was the case from the findings as the financial innovativeness of the banks have been evaluated to be significantly related to the financial performance of the commercial banks which determines the banks' profitability and asset value.

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## APPENDIX

### List of licensed Commercial Banks in Kenya

1. ABC Bank (Kenya)
2. Bank of Africa
3. Bank of Baroda
4. Bank of India
5. Barclays Bank Kenya
6. CfC Stanbic Holdings
7. Chase Bank Kenya
8. Citibank
9. Commercial Bank of Africa
10. Consolidated Bank of Kenya
11. Cooperative Bank of Kenya
12. Credit Bank
13. Development Bank of Kenya
14. Diamond Trust Bank
15. Dubai Bank Kenya
16. Ecobank Kenya
17. Equatorial Commercial Bank
18. Equity Bank
19. Family Bank
20. Fidelity Commercial Bank Limited
21. First Community Bank
22. Giro Commercial Bank
23. Guaranty Trust Bank Kenya
24. Guardian Bank
25. Gulf African Bank
26. Habib Bank

27. Habib Bank AG Zurich
28. Housing Finance Company of Kenya
29. I&M Bank
30. Imperial Bank Kenya
31. Jamii Bora Bank
32. Kenya Commercial Bank
33. K-Rep Bank
34. Middle East Bank Kenya
35. National Bank of Kenya
36. NIC Bank[11]
37. Oriental Commercial Bank
38. Paramount Universal Bank
39. Prime Bank (Kenya)
40. Standard Chartered Kenya
41. Trans National Bank Kenya
42. United Bank for Africa
43. Victoria Commercial Bank