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Effects of Financial Innovation on Performance of Commercial Banks in Kenya Case Study of Leading Commercial Banks in Kenya

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Abstract

The core of this study was to assess the effects of financial innovation on performance of commercial banks in Kenya with reference to listed banks in Kenya from 2012-2017. The study is guided by three specific objectives; to determine the financial systems on the performance of commercial banks in Kenya; establish the process innovation on the performance of commercial banks in Kenya; and to realize the effects of product innovation on the performance of commercial banks in Kenya. The study is based on three theories; Merton's Market Efficiency Theory of Innovation, Pecking Order Theory, and Agency Theory. This study adapts a quantitative research approach with focus on panel data. The target population were 6 leading commercial banks in Kenya in terms of customer and assets base and are listed commercial banks in NSE .Purposive sampling was used to select the six leading commercial banks and included Kenya Commercial Bank, Cooperative Bank of Kenya, Equity Bank, Family Bank and Barclays Bank and The Standard Bank. Both primary and secondary data were used in this study. Primary data was drawn from the questionnaires that were collected from the respondents. On the other hand, secondary data (a panel data from 2012-2017) used was obtained from the financial statements of the 6 sampled commercial banks. Descriptive analysis was used to analyze primary data that showed extent to which the three type of financial innovation (Financial systems innovations, Process Innovation, Product innovation) influence the performance of commercial banks in Kenya. Partial correlation and linear regression analysis were used for both primary and secondary data. The findings of the study from primary data indicated that financial innovation ($P<0.045$) has a stronger positive consideration influence on the commercial banks performance.The results also shows that: $Y=1.777+.290X1+.148X2+.086X3+\varepsilon$.This indicates that a .290 increase in Financial Systems, a .148 increase in Process Innovation while .086 in Product Innovation will have unit change in the achievement of commercial banks. Product Innovation is the only financial innovation component that does not have a significance influence on the performance of commercial banks. Results from analysis of secondary data indicated that financial innovation factors has no significant effect on the performance factors(Return on Equity(ROE);Return on Asset (ROA);Returns on Capital(ROC);Return on Investment(ROI)) of commercial banks in Kenya. The results also indicated a low correlation between financial innovation and financial performance of commercial banks in Kenya of between $r=0.189342$ and $r=0.182058$ for all the performance indicators (Return on Equity (ROE); Return on Asset (ROA); Returns on Capital (ROC); Return on Investment (ROI)) which indicated that although there was a relation between financial innovation and financial performance of commercial banks in Kenya, the correlation was very low.

Key Words: Financial Innovation; financial systems; process innovation; product innovation financial performance; commercial banks

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1.1 Introduction

1.2 Background of the study

Banks globally in relation to other firms operate as open systems in tumultuous surroundings; their continued viability is based on their capability to seal compatibility with the surrounding (Jenkinson & Penalver, 2012). Noticeably, conventional products in banking are non-physical and comparable making them challenging for banks that desire to be different from the market that they are targeting. Therefore banks need to regularly embrace innovation to be able to offer a set off services and products that are value driven to its clients consequently allowing them to draw added revenue, undertake opportunities that save on cost and help them grow (Raza & Akram, 2011).

US financial institutions recognize that financial innovation presents a firms reaction to financial cost developed by technological alterations, shift in political standings in relation to regulations and laws. Institutions critically consider important the interactional procedure which is followed by the process of reasoning and avoidance within the organization (Llewellyn, 2013). The financial innovation in the both developed and developing would have been driven more by improvements in computer and telecommunication technology.

As financial sector grows in Africa, Bagorogoza and Waal (2014) asserted that leading banks in South have recognized that to remain the leader in the competitive sphere in the region, then got to better the current products or develop the latest innovations. As they seek to reduce risk, commercial banks have adopted innovation, developing services and products that clients are attracted to and those whose risk are reduced consequently making the portfolio of bad loans have less debt.

Since the mid-1990s, various players in the financial sector in Ghana have conducted innovation in finances through utility bills payment, offering services of insurance, brokerage in stock, E-banking, interest rate reduction, having savings accounts, automatic teller machines, mortgages among others hence transforming the institution into a single shop that houses all (Chen, 2013). There are lists of benefits that have been accrued by financial innovations which have also resulted in cost, risk reduction and higher efficiency with the players in the industry.

The more the banking institutions carry out financial innovation the more they are able improve their financial performance. Mandiwa (2014) on mobile banking penetration in Malawi, established that although the improvements being made were significant in relation to the profits being made and profits registered, in Malawi, the commercial institutions were unable to get to and draw broad population groups, specifically the disadvantaged segments within the society

with basic services of banking. The discoveries of the survey outlined that with the increased mobile use, many of the rural population will be able to access financial services.

On the other hand in Uganda, the guidelines of mobile money targeting banks, which were activated on 1st October, 2013 had also experienced great improvement in financial innovation; the objective of financial innovation was to permit providers of financial resources to capitalize on latest technology to enhance access to financial products, and also offer clients protection (BoU, 2014). The pillar on financial innovation has currently provided priority on agent banking and mobile money, even though financial innovation will be evaluated as times goes.

In Kenya, banks that are commercial in nature are currently operating by offering a number of wide financial products compared to the past when restrictions were imposed on them to just take deposits, providing business loans and issuing money out (Karanja, 2011). A lot has changed in relation to banking techniques and practices in the recent past. Several organizations have implemented banking services and products that are very complex, structured for risk taking so as to increase income. Telecommunication advances, revolution in information technology and expansion of financial practices and theories have changed the manner in which business is conducted in the banking industry (Lumpkin, 2014).

Makini (2015) also states that banks that are commercial in nature are making effort in developing new ways of reducing eminent risk such as risk caused by foreign exchange, interest rate, capita and credit and so on. At the same time they are trying to maximize on the wealth of the shareholder resulting in the initiation of the latest processes of production, services, products and forms of organization.

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1.1.1 The concept of Financial Innovation

Financial innovation refers to the action of developing and afterwards making popular latest financial techniques including latest markets, institutions and technologies in finance. Financial innovations as referred to as by Ho (2012), as surfacing of financial service and products, latest forms of organization, or latest procedure enabling more growth and financial markets that are complete that minimize risk and cost or offering of services within certain requirement of client financial structures.

Certain gains that are attributed to financial innovation is the reduction of costs, reduction of risks, and also offering better services/tools/products that meet the demands of clients within financial structures. While financial innovations can be categorized in different ways, Malhotra and Singh (2013) pointed out that the most common one are new products being initiated to allow banks to better respond with the demand in the market, also enhance the organization's efficiency, another is the new production processes which has led to increased efficiency and market expansion. The third is new organizational forms that include dynamics in structure of

business or structuring a whole new structure of service that may include web only banking (Pantalone & Welch, 2013).

Turfano (2012) observes that financial innovation is considered as constant product development, services and technological delivery of products or service to their clients. Financial innovation is considered a catalyst that enables financial industry, services and reorganization of financial markets. On the other hand Francesca and Claeys (2012) state that financial innovations stand for the structured procedure of change in instruments, organizations, and functioning guidelines that establish the system of financial structures.

As banks and other financial institutions continue to put in place measures in improving performance many are focusing on the three areas that include categories institutional, product, and process innovations. Pearson (2014) pointed out that organizational innovations relates to the development of the latest forms financial organizations for instance credit specialists and direct banks. On the other hand innovation of products is concern with the latest products for instance mortgages for foreign currencies, securities and derivatives. Innovation in processes involves the latest procedures in conducting financial business, like banking through the phone and web.

In the last 6 years or so, considerable decline has been observed in relation to challenges experienced in entering financial sector, considerable reduction in maintenance costs in relation to micro accounts, initialization of the latest tools focused on underprivileged population groups and more countrywide branches (Njuguna, 2011). The Kenyan central bank has offered leeway for innovative fixes. The platform for managing mobile finances is the initial innovation. Many banks have implemented an ever increasing service of ATM remittance, business to person, person to business, person to person using mobile phones. Also, the banking sector has experienced the innovation of agent banking. Outlets that are not banks are converted to providers of financial services (CBK, 2011).

1.1.2 Performance of Commercial Banks

A number of the gains that are connected with financial innovation is the reduction of costs, reduction of risks and also offers an enhanced tool/service and products that increasingly please financial structure participant's needs financial innovation can be categorized as new products (Michalopoulos & Levine, 2011). In a bid to improve their performance banks have shied away from conventional banking practices, where they were required to issue money in the form of loans, accept deposits and engage in new dealings such as loans, savings and mortgages which previously remained to critically manage the firm.

The state has also initiated latest guidelines to address the banks financial innovations such as it was suggested in the accord in Basel I and ii implemented by central bank (Central Bank, 2011). In order to improve their performances, banks have stretched their wings to provide services to a

larger geographical segment both globally and within the region. Changes in technology connected to processing of data and technology have catalyzed financial innovations bringing changes to services and products of banks and its process of production (Koech, 2013).

Due to competition, commercial banks have been pushed towards embracing innovation in order to increase their performance. Oloo (2014) argues that banks have come to the realization that in order to remain on top of the five competitors, they need to enhance their current products or otherwise develop innovations that are completely new. As a way to keep risk to the minimum, Peng and Kango (2016) notices that innovation has been embraced by banks leading to development of new services and products that are appealing to clients and also that have minimal risk hence lowering the portfolio of bad debt loan.

Some of the measures of performance apart from financial performance in clued non-financial performance measurement that include satisfaction of clients and performance of services or products; flexibility of supply chain, production and innovation levels, time to market as a form of organizational effectiveness; satisfaction of employees as a form of performance for human resources; per share earnings, cycle time for cash to cash, position of market, profits, revenue and other market and financial performance (Anderloni, 2013). For the sake of this study, the focus will be on financial performance.

As financial institution choose to improve their performance through innovation as possible, the motive for financial innovation should as clear as possible. While there are argument if there exists an automatic connection linking financial performance with financial innovation. The favorable innovation hence develops a competitive position which is proprietary that grants the organization a competitive superiority and performance advantage (Lyons *et al*., 2007).

1.1.3 Commercial Banks in Kenya

In Kenya, the banks are either owned by foreigners or locals. Out of the 44 banks currently existing, the ones that are foreign owned are 13 while locally owned are 31. They all perform key roles such as providing a safe place for money deposits, transfer of money, offer customers investment services, assist traders in international business and lending services which will be our main focus in this study. The dominant theme in the lending sector in the year 2017 was the decrease in momentum in the growth of credit and the effects caused by the capping of interest rate (AIB Capital, 2017).

In 2017, growth in credit registered record low. Players in the industry attributed it to the law capping interest rates, the famine of 2016/2017, and the rise in political temperatures occasioned by the coming general election. The decrease in interest income was perhaps the biggest single impact that was caused by the capping of interest rate within the industry. A ksh 175 billion decline which was equivalent to 13% of the interest income was observed by the sector. A 9.7%

decline on interest income was seen by bank in tier 1, 18% decline in tier 2 and 18% in tier 3. The whole sector experienced a decline of 15% of its earnings occasioned by a reduction of interest income.
According to AIB Capital (2017), there were considerable attempts to minimize the cost base that included operations and funds. Despite an 8.3% growth in industry deposit, cost of funds declined by 14% in response to the capping of rates. Term deposit account and savings accounts were to attract a 7% minimal pay as banks were required by the banking act. Transactional accounts that paid no interest were used by banks to deliberately move client's accounts. Attempts by banks to silence expenditure led to a 2.4% growth of cost of operations (without considering provisioning). In a bid to safeguard the impact, an exploration of other avenues of income was considered. According to CBK (2017), the sector registered 11% growth in non-interest income.

This portion was grown by a majority of the banks by raising the cost of services charged, including areas of getting new revenue through mobile banking. Additionally, the segment received contributions from investment banking, bank assurance, business leasing, trade finance and merchant banking (Cytonn Investment, 2017). Interest rate on asset financing varies from one commercial bank to another. According to CBK (2014), housing finance and family bank has the lowest loan rates of 22.45% while Guaranty Trust Bank and K-rep banks were the most expensive banks with interest rates of about 25.7%.

1.2 Statement of the Problem

The increase in competition and changing business environment in banking sector is making banks to turn into financial innovation and technological improvement to improve their competitiveness. The conventional products offered by banks are intangible and similar making them challenging to banks that desire to be different as they target the available market. Innovation is therefore a means by which banks must adopt to be able to provide an assortment of services and products that have value to clients that they serve so that they can earn extra revenue.

While there are several studies that have been conducted the achievement of commercial banks has been affected by financial innovation, there are no studies on the effects of financial innovation on performance of commercial banks. Mansury and Love (2013) while measuring the effects of automation on the performance of internal banking in Malaysia pointed development in technologies as being among the vital shifts in the operations of banks that should also exert productive impact on the profitability and performance of banking. Another study by Ahmad et al. (2011) assessed the financial achievement of Finance Companies in Pakistan where the study disclosed that in temporarily, organizations that are innovative can register early gains including cementing relations with essential suppliers. As much as there are studies on financial innovation very few studies have examined the performance of commercial banks in Kenya.

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1.3 Objectives of the Study

1.3.1 Main Objective

The general objective of the study was to undertake an analysis of the effects of financial innovation on performance of commercial banks in Kenya with reference to listed banks in Kenya.

1.3.2 Specific Objectives

The study was guided by the following research objectives;

i. To determine the influence of financial systems on the financial performance of commercial banks in Kenya.
ii. To establish the influence of process innovation on the financial performance of commercial banks in Kenya.
iii. To assess the effects of product innovation on the financial performance of commercial banks in Kenya.

1.4 Literature Review

1.4.1 Merton's Market Efficiency Theory of Innovation

A worthy reasoning is provided by Merton (1990) in relation to financial innovation. His hypothesis is grounded on the idea that financial innovation is influenced by feelings crafted to expand the efficiency of markets and enhance the welfare of the society. According to Merton, there is no perfect market, which means therefore that financial institutions must adopt innovation to enhance the efficiency of markets. Rene (2000) argues that generally, financial economist survey the movement of finances to capitalize on opportunities of investments and innovations productive mechanisms that shape market efficiency, enable sharing of risk and enhance growth.

It has been argued by many that financial innovation and flow of capital resulted to crashes, instability among other mishaps. This is specific to the crash in 1987 and the 1990's derivative calamity even though Merton was not persuaded that the crashes should be blamed on financial innovation. According to Merton (1990), there are 3 things that inspire innovation: development of the latest financial systems that enable sharing of risk, hedging and pooling of risk including new financial systems for shifting resources, the furtherance of efficiency in the economy agency cost reduction and liquidity.

This theory has been used in past studies (Kinuthia, 2010; Mwinzi, 2014) that furthered the establishment of an association between achievement of the banking sector and financial innovation. This theory is thus significant to this study as it discusses the role and importance of financial innovations for banking sector as it creates business efficiency for financial institutions to use financial advancements for instance web banking, mobile banking (m-banking), and use of agency banking.

1.4.2 Pecking Order Theory

Donaldson (1961) divulged that management opt for generating funds internally instead of through external means. Following this outcome, the pecking order theory was proposed by Myers and Majluf (1984). It is the suggestion of the pecking order theory that organizations prefer or opt for internal means financing instead of debt capital. It elucidates that organizations take advantage of internally available funds then turn to debt issuing before finally resorting to capital equity issuing.

A confirmation is provided by Al-Tally (2014) that organizations favor funding new investments using funds that are internally produced initially then resort to debt capital then resorting lastly to equity issuing. Additionally, the theory elucidates that organizations end up borrowing more funds when finances that are generated internally are adequate to realizing the needs of the investment (Shyam-Sunder & Myers, 1999). It was found by Myers (2001) that the organizations' debt ratio manifests the total figure that should be used for sourcing funds externally. An organization with higher opportunities for growth and profits should minimize on the utilization of debt capital.

If the organization does not have any opportunities of investment, profits are maintained so as not to seek external financing in the future. This theory has been used by several studies (Ruri, 2017; Kirui & Gor, 2018) to discuss the influence of capital structure on the performance and growth of financial institutions. The theory on Pecking Order is of paramount importance as is intended for the assessment of financing growth of commercial banks along the life cycle.

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According to Pecking Order assumption, older commercial banks have a superior ability to retain and accumulate earnings, and so the demand to go for external financing to solve their financing needs will be less than in the situation of younger commercial banks. The possibility of old commercial banks reserving profits over time is significant, so the older commercial banks lessen the alternative to borrowing.

1.4.3 Diffusion of Innovation Theory

Adoption according to Rogers (2003) is the resolution to wholly utilize innovation as the best available action while rejection is a resolution to shy away from innovation. Diffusion is stipulated by Rogers as steps that innovation goes through as it is being passed through specific avenues in a given time within a segment in a society. As defined by Rogers, social system, time, channels of communication and innovation are the 4 vital constituents of diffusion of innovation. According to Rogers, these four constituents are the ones that control the dispersion of a new idea: the social system, time, channel of communication and the innovation.

The process heavily depends on the personnel. To sustain itself, the innovation must be adopted widely. While being adopted, there is a point where that particular innovation reaches a point

known as critical mass. At that point, the information uses the available network to pass through. The innovation will be adopted depending on the role played by opinion leaders and the kind of network. The opinion leaders apply their dominance on the conduct of their audience through their individual networks. Further, gate keepers or agents of change also known as intermediaries have a responsibility in the diffusion process. This is a hypothesis advanced by Rogers as it sought to elucidate on why, how and the degree at which new technology or idea spreads. Diffusion is argued by Rogers to be the process that innovation goes through within a given time to participants of a society. The banking system has employed very many methods of providing services to its clients over the past year. This includes mobile banking, real time gross settlements (RTGS) and easy methods of saving and borrowing which has been adopted in all participating banks to create a uniform platform of easy banking

1.5 Effects of Financial Innovation on Performance of Commercial Banks in Kenya

1.5.1 Financial systems innovations

Innovations in financial systems comprise of real time gross settlements which is an electronic form of settlement payment in Kenya that allows for processing financial settlement through funds transfer systems that continuously settles itemized gross on a daily basis within a business. This is a web based system that enables payment transfer time critical funds in real time. According to CBK (2011), its purpose is to increase efficiency by minimizing structural risk in conventional systems of funds payment in clearing houses.

The relationship between financial systems innovations and financial performance cannot be overemphasized. Tahir *et al*. (2018) conducted a survey on whether financial systems innovations improve financial achievement. The study analyzed process innovation used in Pakistan financial system. The study sought to quantify the effects innovation techniques of funds transfer utilized in Pakistani financial system and its effects on the ratio of efficacy.

In the 2007 to 2016 period, the Pakistani state bank issued secondary data that was used. By analyzing the root test for units the outcome of the investigation divulged a considerable positive influence of web transaction in relation to ratio of efficacy although the outcome for mobile banking, point of sale and automated teller machines never should any significance statistically. While the findings of the study did not divulge any effect between ratio of efficacy and innovative products, there was considerable influence on the transaction value.

A study by Mohamud and Mungai (2019) sought to examine how commercial banks were being affected by innovation in relation financial achievement. The study took place in Kenya, Garissa County. It was hinged on technology acceptance model and the model of task technology fit through descriptive methods targeted 215 respondents drawn from the department of information technology, research and development and human resources. A sample of 170 was drawn through the formula provided by Yamane, then selection done by simple random technique

hence selecting a sample representative of all commercial banks within the county of Garissa in Kenya. The acquired data was evaluated through descriptive and inferential techniques using SPSS software. The outcome of the study divulged that banking through agencies significantly and positively influenced the financial achievement of commercial banks. Banking through mobile phones was established also to have considerably and positively influenced commercial banks financial achievement.

Another study by Moki et al. (2019) evaluated the Financial Innovation Strategy and financial achievement of Sacco's taking deposits within the county of Nairobi. The investigation was hinged on the theory of financial intermediation, open systems and the Life cycle of saving theory and adopted both descriptive research design and causal research design. The study population comprised of the 40 registered Sacco's taking deposits within the county of Nairobi while it used descriptive inferential analysis of data collected. The study established that financial innovation was significant in increasing financial performance of SACCO's. The study also concluded that firms that have not effectively implemented financial innovation may fail or collapse or otherwise can be absorbed by other well managed SACCO's**.**

On the other hand in Kenya, Muthoka *et al.* (2018) evaluated how market capitalization is affected by financial innovation. The study focused on branchless commercial banks. Eleven commercial banks listed in the Kenyan NSE were selected through census technique. In 8 banks, officials from the department of operations and finance were identified producing primary data on financial innovation. Innovation on branchless banking was established to statistically have a considerable impact on market capitalization of these types of banks. Anchored on the outcome of the investigation, it was concluded that commercial banks listed in NSE in Kenya was being impacted by financial innovation in relation to market capitalization.

1.5.2 Process Innovation

Process innovation encapsulates the initialization of new business procedures resulting in enhanced expansions of markets, efficiency, quality of services and increased accessibility to the banking services (Zacchaeus & Muturi, 2017). Internet banking divulges that, efficiency of the process, time taken and cost are vital elements that impact the adoption of internet banking. Unger (2013) while evaluating the advantages of the service of internet banking in Europe, the study through a desk review of data collected from six European Countries established that while there may be some economies of scale in technological innovation, aspects of saving time and cost are viewed a key advantages that clients consider when picking services of internet banking in relation to large funds.

According to Muthinja and Chipeta (2018), the banking sector in Kenya has observed that there is new evidence relating adjustment speeds, organizational performance and financial innovation. The study through Koyck distributed lag model used changing estimation panels and

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computerized generalized technique of moments to measure financial performance. The study established that it is estimated to take 3 years drivers of financial innovation to adjust mobile banking within the organization. Also it takes 5 years for drivers of financial innovation to adjust Automated teller machines.

The findings of the study also established that financial performance of banks is estimated to take 1.179 years to realign to 4 financial innovations. Additionally, 0.368 years which is under 1 year is required to attain 50% of the sum total of the dynamic performance of an organization given one unit maintained change within financial innovation. Also, a 4.926 mean lag was observed being the longest for ATM's while a 2.849 mean lag being the shortest for mobile banking.

Another PWC (2016) study evaluated the relationship between technological change and banking system performance in Africa. The study through a desk review based on 5 countries in Africa established that while there may be improved efficiency in terms of performance, expediting the speed of changing technology was force most creative while most destructive in the ecosystem of financial services. The study argued that financial innovation has little or no productivity benefits given little relations linking complexities of banking structures and positive growth provided lack of detected evidence that growth in the economy was occasioned by financial innovation.

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Tsuma *et al.* (2015) carried out a study on how Kenyan Sacco's were having their financial performance attributed to processes of the organization. The investigation was anchored on the theory of transactional cost innovation, it used descriptive design in establishing relations in variables while only utilized primary data. It was carried out at a savings and credit cooperative society company in Kakamega with 53 employees forming the population but only 44 being sampled. Questionnaires with closed ended questions were deplored while collected data analyzed using SPSS v17 software being used to evaluate data inferentially and descriptively. The outcome divulged that innovative procedures positively related to financial achievement.

Monica (2018) conducted an investigation on the effect of financial innovations on operational efficiency of commercial banks with reference to Equity bank. A descriptive research design was adopted for the study and targeted 42 Equity bank branches operating within Nairobi. The study through census collected primary data through the use of a structured questionnaire while inferential and descriptive evaluation was done using SPSS v23. The findings of the study indicated that there was a statistically considerable link relating financial process innovations and operational efficiency of commercial banks.

1.5.3 Product innovation

Product innovation has been another area that the banking sector has improved in order to increase their competitiveness, increase customer base and overall financial performance in Europe (Peng & Kao, 2016). Product innovation in the financial sector encompasses the initialization of hire purchase, leasing, insurance, deposit, new credit among other financial products to the clients triggered by dynamics in the market. An investigation was carried out by Mabrouk and Mamoghli (2015) on banks performance and dynamics of financial innovation: factors of new banking sector. The study through a mixed method that include both quantitative and qualitative data established that innovation products are initialized to better react to dynamics in a market or to enhance the efficiency of the banking institution.

As the need for business competitiveness grows globally in the banking sector, product innovation continues to be the focus of many financial institutions that are used to improve performance. Zhao et al. (2019) investigated a study on how to improve approaches involved in the innovation of financial services in strengthening the banking sector in China. This was done during the Fintech revolution in relation to the upper hand China had in relation to competition. It was anchored on the theory of service innovation. The study used a new multiple mixed technique in the process of making decisions to evaluate the approaches of innovating services for purposes of enhancing the stability of the banking sector in China within the Fintech revolution. The findings indicated the priorities of improvement having ranked them from the highest all through to the lowest with the highest being emerging partners of business, emerging concepts of services, innovation in the firm, innovation through technology, emerging interactions with customers and emerging models of revenue.

Beck *et al.* (2016) carried out a study on the correlation linking growth in the economy, fragility and growth of bank and financial innovation. The results indicated that while various mechanisms of financial innovation such as specific products of innovation and wide concepts are related to a faster growth of the bank, other include increased fragility of the bank and degenerated bank achievement when undergoing a crisis. The findings of the study also established that, the impacts are weightier in nations that have big market securities and established regulatory guidelines.

A study by Zacchaeus and Muturi (2017) on the impact of financial innovation on financial sector development in East African countries of Uganda, Tanzania and Kenya established that financial innovations have significant influence on financial sector development, hence boosting market efficiency. The study while evaluating the secondary data from the banking sector in the three countries indicated that financial innovation indicators can work for or against developmental effect via the transmission mechanism, hence impacting financial development. Finally, the study established that rapid innovations as past incident has changed the assortment

of financial services accessible to clients and increased the efficiency of the financial system and is becoming an important factor in the development of the banking sector.

In Kenya, Amed and Wamugo (2018) investigated how commercial banks performance is being affected by financial innovation. The study was anchored on the constraint induced innovation theory, the theory of cost innovation and resource based theory having adopted descriptive design. It concluded that products of financial innovation such as ATM banking, internet banking, mobile banking and agency banking are positively and considerably impacting commercial banks performance through the many avenues including increased efficiency and productivity, costs of infrastructure, reduced banking cost and increased profits.

A study by Kiptum (2016) evaluated the effect of investment in financial innovations in relation to commercial banks financial achievement within Kenya. The study through descriptive study used where data from the panel was utilized as primary data while financial records that were published in the department formed the secondary data. Through census, the study in Kenya targeted commercial banks totaling 41. Relationships were established through analysis of correlation and regression. The study established that commercial banks financial performance, market innovation expenditure, product innovation and institutional innovation expenditure and return on assets are substantial predictors of return on asset by extension the profitability levels of the regulated commercial Banks in Kenya.

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1.6 Methodology

The study employed quantitative research approach that included both primary and secondary data. The secondary data comprised of panel data that that included financial reports gathered for a period 5 years (2012-2017) for each of the selected commercial banks in Kenya. The study purposively focused on the six leading commercial banks that included Kenya Commercial Bank, Cooperative Bank of Kenya, Equity Bank, Family Bank and Barclays Bank and The Standard Bank. Additionally, primary data was collected through structured questionnaire from 3 respondents selected from each of the six banks sampled banks. Descriptive statistics were used to analyze primary data to show the extent to respondents agreed on various factors under investigation. Partial correlation and linear regression analysis were also used to determine whether financial innovation (financial systems innovations, process innovation, and product innovation) has an influence on the performance (ROE and ROA) of selected commercial banks in Kenya.

1.7 Study Findings

The results indicated that 94.4% of the study participants while only, 5.6% did not respond to the study. This indicated that the response was high as a result of frequent following up by the researcher.

1.7.1 Descriptive Analysis

Table 4.1 The influence of financial systems innovation on the financial performance of commercial banks

The influence of financial systems innovation on the financial performance of commercial banks.	SD&D %	Neutral %	SA&A %	Mean	STDV
Mobile money transactions have increased the profitability of the commercial bank.	5.9	23.5	76.0	3.94	.899
ATM withdrawals continue to be the banks main source of income,	23.5	17.6	58.8	3.47	1.375
More and more customers are considering Internet Banking as their main source of income from bank transfers	35.3	0.0	64.7	4.65	.493
The commercial bank has improved on its performance since embanking on financial systems innovation.	11.8	5.9	82.4	3.29	.920
The commercial banks need to ensure that all the systems are effectively working.	11.8	5.9	82.4	4.00	1.118

The study established that 76.0% of the respondents felt that mobile money transactions have increased the profitability of the commercial bank, 23.5% were neutral on the matter while 5.9% felt that mobile money transactions have increased the profitability of the commercial bank. The study indicated a mean of 3.94 and a variation in responses of a standard deviation of .899.

The study also was meant to establish whether ATM withdrawals continue to be the banks main source of income, where 58.8% of the respondents agreed, 17.6% were neutral while 23.5% felt that ATM withdrawals continue to be the banks main source of income. The study in this part also indicated a mean of 3.47 and a Standard Deviation of 1.375, which shows that there was a great variation in terms of responses on whether ATM withdrawals continue to be the banks main source of income.

When the study sought to establish whether more and more banks are considering Internet Banking as their main source of income from bank transfers, the results indicated that 64.7% felt that more and more banks are considering Internet Banking as their main source of income from bank transfers while 35.3% of the respondents felt that less and less banks are considering Internet Banking as their main source of income from bank transfers. The study in this part indicated a mean of 3.94 and a difference in responses of a standard deviation of .493. The response indicated the lowest variation in terms of response. This means that the respondents felt almost the same way that either more and more clients are contemplating web banking as their main source of income from bank or less and less clients are considering web banking as their main source of income from bank.

The study results also indicated that 82.4% of the respondents felt that the commercial bank has improved on its performance since embanking on financial systems innovation, 5.9% of the respondents were neutral while 11.8% were of the opinion that the commercial bank has not

enhanced on its achievement since embanking on financial systems innovation. The study in this part indicated a mean of 3.94 and a difference in responses of a standard deviation of 1.124.While many of the respondents had felt that the commercial bank has improved on its performance since embanking on financial systems innovation, there was a great variation in terms of responses.

Lastly, the outcome of this investigation also indicated that 82.4% of the participants felt that the commercial banks need to ensure that all the systems are effectively working, 5.9 were neutral while 5.9% of the respondents felt that the commercial banks did not need to ensure that all the systems are effectively working. The study in this part indicated a mean of 4.00 and a difference in responses of a standard deviation of 1.131. This indicated that there was a high variation in terms of responses.

Table 4.2 The influence of process innovation on the performance of commercial banks in Kenya

The influence of process innovation on the financial performance of commercial banks.	SA&A %	Neutral %	SD&D %	Mean	STDV
The process taken is shorter therefore affecting the overall performance of the commercial banks.	0.0	17.6	82.3	4.35	.786
The time taken for withdrawals from ATMs has affected the overall performance of the banks.	5.9	17.6	76.5	4.06	.899
The time taken for mobile money transaction from ATMs has reduced the overall cost of operations from banks.	17.7	11.8	70.6	3.82	1.237
The overall cost of transaction from mobile money operations has reduced the overall operations commercial banks.	11.8	11.8	76.5	3.88	1.269
The overall cost of transaction from ATM and electronic transfers has reduced the overall operations commercial banks.	5.9	11.8	82.4	3.53	1.281

In this part, the outcome of this investigation indicated that that 82.3% of the participants felt that the process taken is shorter therefore affecting the overall performance of the commercial banks, 17.6% felt that the process taken is shorter therefore affecting the overall performance of the commercial banks. The study in this part indicated a mean of 4.35 and a difference in responses of a standard deviation of .786.The study divulged that there existed a high response variation on the overall cost of transaction from mobile money operations has reduced the overall operations commercial banks. The outcome of the investigation also divulged that 70.6% were of the opinion that the time taken for withdrawals from ATMs has affected the overall performance of the banks, 17.6% were neutral while only 5.9% of the respondents felt that the time taken for withdrawals from ATMs has not affected the overall performance of the banks. The study in this part indicated a mean of 4.06 and a difference in responses of a standard deviation of .899.Although this response registered the higher mean of 4.06 ,there was a low variation in terms or response.

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The results also indicated that the time taken for mobile money transaction has reduced the overall cost of operations from banks where 70.6% were in agreement, 11.8% were neutral while 17.7% of the respondents felt that mobile money transaction has not reduced the overall cost of operations from banks. The study in this part indicated a mean of 3.82 and a difference in responses of a standard deviation of 1.237.This indicated a high difference in terms of responses.

When the study sought to establish whether the overall cost of transaction from mobile money operations has reduced the overall operations commercial banks, the findings of the study established that 76.5% were in consensus yet 11.8% of the respondents were either neutral or felt that the overall cost of transaction from mobile money operations has not reduced the overall operations commercial banks. The study in this part indicated a mean of 3.88 and a difference in responses of a standard deviation of 1.269.There was a high variation in terms of responses.

Finally the study established that 82.4% of the participants felt that the overall cost of transaction from ATM and electronic transfers has reduced the overall operations commercial banks, 11.8 % were neutral while overall cost of transaction from ATM and electronic transfers has not reduced the overall operations commercial banks. The study in this part indicated a mean of 3.53 and a difference in responses of a standard deviation of 1.281.The responses indicated that the respondents felt different on whether the overall cost of transaction from ATM and electronic transfers has reduced the overall operations commercial banks.

Table 4.3 The influence of product innovation on the financial performance of commercial banks.

The influence of product innovation on the financial performance of commercial banks.	**SA&A %**	**Neutral %**	**SD&D %**	**Mean**	**STDV**
The more product innovation is carried out by the commercial banks the more they are able to increase their performance.	23.6	5.9	70.6	3.65	1.367
The number of products that have been developed over the last five years have increased commercial banks performances	17.7	23.5	58.8	3.47	1.231
Commercial banks can improve their performance if they continue innovating new products.	0.0	29.4	70.6	3.82	.636
The commercial banks must identify products that can help in the reduction of cost and improve efficiency in operations.	23.6	5.9	70.6	3.59	1.460

The study had sought to establish whether the more product innovation is carried out by the commercial banks the more they are able to increase their performance. The findings of the study indicated that that 70.6% of the respondents felt that the more product innovation is carried out by the commercial banks the more they are able to increase their performance, 5.9% were neutral while 23.6% the more product innovation is carried out by the commercial banks the more they were not able to increase their performance. The study in this part indicated a mean of 3.65and a difference in responses of a standard deviation of 1.367.The study indicated that there

was a great variation in terms of response on whether more product innovation is carried out by the commercial banks the more they were not able to increase their performance.

The findings of the study indicated that that 58.8% of the respondents felt that the number of products that have been developed over the last five years have increased commercial banks performances, 23.5% were neutral while 17.7% the number of products that have been developed over the last five years have not increased commercial banks performances. The study in this part indicated a mean of 3.47 and a difference in responses of a standard deviation of 1.231. The study indicated that there was a great variation in terms of response on whether the numbers of products that have been developed over the last five years have not increased commercial banks performances.

The study results indicated that that 70.6% of the respondents felt that commercial banks can improve their performance if they continue innovating new products, while 29.4% were neutral on whether the commercial banks can improve their performance if they continue innovating new products. None of the respondents felt that commercial banks cannot improve their performance if they continue innovating new products. The study in this part indicated a mean of 3.82 and a difference in responses of a standard deviation of .636. There was a great variation in terms of response on whether the commercial banks cannot improve their performance if they continue innovating new products.

When the study sought to establish whether indicated that that 70.6% of the respondents felt that the commercial banks must identify products that can help in the reduction of cost and improve efficiency in operations, while 5.9% were neutral on whether the commercial banks must identify products that can help in the reduction of cost and improve efficiency in operations. On the other hand 23.6% of the respondents felt that the commercial banks must identify products that can help in the reduction of cost and improve efficiency in operations. The study in this part indicated a mean of 3.59 and a difference in responses of a standard deviation of 1.460.This indicated there was a great variation in terms of response on whether the commercial banks must identify products that can help in the reduction of cost and improve efficiency in operations.

Table 4.4 Extent to which the financial innovation have influenced the financial performance of commercial banks.

Extent to which the financial innovation have influenced the financial performance of commercial banks.	SA&A %	Neutral %	SD&D %	Mean	STDV
Financial innovation affects the performance of commercial banks.	23.6	29.4	47.0	3.35	1.169
The more the commercial banks innovate products the more the commercial banks will perform better	17.1	35.9	47.0	3.47	1.179
Prepaid Cards services have improve the	23.6	23.6	52.8	3.35	1.272

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performance of commercial banks.					
Since the adoption of Automated Clearinghouse (ACH) the performance of commercial banks	23.6	11.8	64.7	3.59	1.372
Simple products that facilitate easy accounts opening have improved the performance of commercial banks.	11.8	35.3	52.8	3.59	.939
The numbers of products that have been innovated over time have improved the performance of commercial banks.	17.1	35.3	47.6	3.24	1.091

The study had sought to establish whether financial innovation affects the commercial banks performance. The outcome of the study divulged that 47.0% of the respondents felt that commercial banks performance was being affected by financial innovation, 29.4% were neutral while 23.6% the financial innovation affects commercial banks performance. The study in this part indicated a mean of 3.47 and a difference in responses of a standard deviation of 1.169.The study also indicated that there was variation in the responses on whether financial innovation affects the commercial banks performance.

The investigation had also sought to establish whether the more products are innovated by commercial banks the more commercial banks will perform better. The outcome of the investigation indicated that 47.0% of the participants felt that the more the commercial banks innovate products the more the commercial banks will perform better, 35.9% were neutral while 17.1% the more the products are innovated by commercial banks the more commercial banks will perform better. The study in this part indicated a mean of 3.47 and a difference in responses of a standard deviation of 1.179.The study indicated that there was a variation in the way they felt on whether the more the commercial banks innovate products the more the commercial banks will perform better.

The outcome of the survey also indicated that 52.8% of the respondents felt that the prepaid cards services have improve the performance of commercial banks, 23.6% were neutral while 23.6% of the respondents felt that the prepaid cards services have improve the achievement of commercial banks. The study in this part indicated a mean of 3.35 and a difference in responses of a standard deviation of 1.272. This indicated the respondents felt differently on whether the prepaid cards services have improve the achievement of commercial banks.

When the investigation sought to determine whether since the adoption of Automated Clearinghouse (ACH) the achievement of commercial banks, the study established that 64.7% of the respondents felt that since the adoption of Automated Clearinghouse (ACH) the performance of commercial banks, 11.8% were neutral while 23.6% of the respondents did not feel that since the adoption of Automated Clearinghouse (ACH) the achievement of commercial banks. The study in this part indicated a mean of 3.59 and a difference in responses of a standard deviation

of 1.372. This also divulged that there existed a high variation in terms of the responses on whether since the adoption of Automated Clearinghouse (ACH) the achievement of commercial banks.

The study had also sought to establish whether simple products that facilitate easy accounts opening have enhanced achievement of commercial banks, the investigation divulged that 52.8% of the respondents felt that simple products that facilitate easy accounts opening have enhanced achievement of commercial banks, 35.3% were neutral while 11.8% of the respondents did not feel that simple products that facilitate easy accounts opening have enhance achievements of commercial banks. The study in this part indicated a mean of 3.59 and a difference in responses of a standard deviation of .939. This divulged the existence of a moderate variation in terms of responses on whether simple products that facilitate easy accounts opening have improved the commercial banks achievement.

Lastly, when the investigation determined whether the numbers of products that have been innovated over time have enhanced achievement of commercial banks, the investigation divulged that 47.6% of the respondents felt that the numbers of products that have been innovated over time have improved the performance of commercial banks, 35.3% were neutral while 17.1% of the respondents did not feel that the numbers of products that have been innovated over time have improved the commercial banks achievement. The study in this part indicated a mean of 3.24 and a difference in responses of a standard deviation of. 1.091. This indicated that there was a high variation in terms of response on whether the numbers of products that have been innovated over time have improved the performance of commercial banks

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1.7.2 Inferential Analysis from Primary Data

The other model adopted to examine the relations linking financial innovation and performance of commercial banks. Regression Coefficient can be explained as the slope of the regression line, where each coefficient estimates that X was being increased by a unit every time the mean changed. This happened when all the predictors remained unchanged. According to Bandyopadhyay and Forster (2011), there was considerably significant linking the response and the predictors when the chosen significance level was more than the p-value which was 0.05.

4.5.1 Regression Analysis

Analysis from Primary Data

Table 4.5 Effect of financial innovation and performance of commercial banks: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	229.122	2	57.281	60.366	.045[b]
	Residual	307.441	14	.949		
	Total	536.563	16			

a. Dependent Variable: Performance
b. Predictors: (Constant), Product, FS, PI

From the regression analysis test the relations linking commercial banks achievement with financial innovation, shows a regression result of financial innovation as valid F, (2, 16) =60.366, $P<0.045$). This indicates that the financial innovation could be utilized as a predictor to explicate the variance in the performance of commercial banks. The model is thus suited in examining the relations between Independents Variable: financial innovation and Dependent Variable: performance of commercial banks.

A value of P that is less than 0.045 is and 0.05 critical value allows the null hypothesis rejection and acceptance of a different hypothesis alternative which indicates that financial innovation has a stronger positive consideration influence on the commercial banks performance.

Table 4.6 Effect of financial innovation and performance of commercial banks: Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	1.777	.210		8.470	.000
	Financial Systems	.290	.047	.346	6.221	.024
	Process Innovation	.148	.051	.182	2.918	.033
	Product Innovation	.086	.051	.113	1.687	.093

From the multi-regression analyzing, the outcome of the investigation shows that: $Y=1.777+.290X1+.148X2+.086X3+\varepsilon$.This indicates that a .290 increase in Financial Systems, a .148 increase in Process Innovation while 086 in Product Innovation will have unit change in the achievement of commercial banks. Product Innovation is the only financial innovation component that does not have a significance influence on the performance of commercial banks. Where; Constant 1.777 that indicates that if financial systems, process innovation and product innovation are all rated at zero, performance of commercial banks would stay at 1.777.

Analysis from Secondary Data

The findings below indicated the results from the 5 year serial data collected from the five commercial banks covered by the study on the study findings on relations linking financial innovations (financial systems, process innovation and product innovation) and the financial achievement of commercial banks within Kenya.

Table : 7 Effects of financial innovation on performance of commercial banks

Measurement of performance	***P< Values* at 95% Confidence levels**	**Conclusion**
Return on Equity(ROE)	*P>0.797*	Financial innovation have no significant influence on the financial performance (ROE) in commercial banks in Kenya
Return on Asset (ROA)	*P>0.810*	Financial innovation have no significant influence on the financial performance (ROA) in commercial banks in Kenya
Returns on Capital(ROC)	*P>.553*	Financial innovation have no significant influence on the financial performance (ROC) in commercial banks in Kenya
Return on Investment(ROI)	*P>.414*	Financial innovation have no significant influence on the financial performance (ROI) in commercial banks in Kenya

The findings of the analysis from secondary data indicated that financial innovation factors has no significant effect on the performance factors(Return on Equity(ROE);Return on Asset (ROA);Returns on Capital(ROC);Return on Investment(ROI)) of commercial banks in Kenya.

4.5.2 Correlation Analysis

The findings of the study also indicated a low correlation between financial innovation and financial performance of commercial banks in Kenya of between r =0.189342 and r =0.182058 for all the performance indicators (Return on Equity (ROE); Return on Asset (ROA); Returns on Capital (ROC); Return on Investment (ROI)) which indicated that although there was a relation between financial innovation and financial performance of commercial banks in Kenya, the correlation was very low. Although the findings indicated that there was a low relationship between the variables, the relationship was not significant based on the analysis from the secondary data. This indicated that there are many other factors that would influence performance in commercial banks in Kenya that such as the banks reputation, customer care, other financial related services, the government policies, capping rates, corporate governance, and rates charged on loan, loan performance among other factors that were not covered by the study. This means that while financial innovation would have an improvement on the overall performance in terms of process, products and cost of transactions, the banks need to consider other factors. This would also explain why despite intensive investment in innovation some banks continue to experience financial loses.

1.8 Conclusion and Triangulation Analysis

The findings from the primary data collected from the secondary data shows there exists a significance relation linking commercial banks performance to financial innovation, indicates a

regression output of the financial innovation with a significance value of $P<0.045$). The findings from the primary data also indicated that financial innovation factors ((financial systems, process innovation and product innovation) in isolation of variables that are constant, explicating the dynamics exhibited by performance of commercial banks by 42.0%. The fifty eight percent that remained can be elucidated by other elements left out in this study's model of regression.

The findings of the study also indicated that while the findings from the primary data indicated that there was a significance relation linking financial innovation to financial achievement, the findings of the study from secondary data collected over five years on the relations between commercial banks performance and financial innovation in Kenya is inconsistent with these findings. The findings of the study also indicated that only 22.4% of the total performance variance of commercial banks can be directly related to the financial innovation. Additionally, while financial innovation would be influence performance of commercial banks in Kenya, this influence was not significant.

1.9 Recommendation

Policy implication: There is need for increased mobile money transactions through creation of more APPs and the user friendly softwares that can provide easy interface between the commercial banks and the clients in order to increase profitability of the commercial bank. Given that ATM withdrawals continue to be the banks main source of income, there is need of establishing ATM invent in the remote areas that the given commercial banks do not have branches. Lastly there is need for the commercial to consider other areas in order to increase their performance through modern financial systems innovation.

Process Innovation: There is need to ensure that systems are properly working and they do not hand given that they can really reduce the time to complete transaction thereby affecting the overall performance of performance of the commercial banks. Withdrawals from ATMs are great revenue for commercial banks in Kenya and therefore there is need of ensuring that they are properly working and that security is enhanced in order to encourage their usage. There is also need of ensuring that the online platforms and mobile APPs function properly as they can increase the number of mobile money transaction which can then have an effect on the overall performance of the commercial banks in Africa. While there are variations in the cost of transactions for ATM, electronic transfers and mobile money operations, there is need for the banks whose charges are still high to reduce the overall cost in order to encourage usage which will then reflect on the overall financial performance.

Product Innovation: With the increased competition from non-financial institution such as companies that lend money through online APPs there is need for increased innovation in terms of products to ensure that the commercial banks are able to compete with this emerging companies. Thy need to ensure that there is a continued innovation in terms of the number of product that are attractive to the youth and the millennial.

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1.10 Suggestions for Further Studies

There is need for a study on the effects of non-financial innovation factors (banks reputation, customer care, other financial related services, the government policies, capping rates, corporate governance, rates charged on loan, loan performance among other factors that were not covered by the study) that influence financial performance of banks.

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