THE RELATIONSHIP BETWEEN FINANCIAL INNOVATION AND FINANCIAL FRAUD IN COMMERCIAL BANKS IN KENYA

BY

KOLA MOSES OMONDI

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DECLARATION

This research project study is my original work and has not been presented to any other examination body. No part of this research proposal should be reproduced without my consent or that of the University of Nairobi

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MOSES OMONDI KOLA **REG: D61/79125/2012**

This research project has been submitted with the approval of the University of Nairobi Supervisors

Sign………………………………………….. Date………………………………….

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DEDICATION

This work is dedicated to my beloved wife Audrey, son Kwe and daughter Hera. You are the wind beneath my wings and my very able support system without which I would not have managed to do this work.

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ABBREVIATIONS

ATM – Automated Teller Machines

CBK – Central Bank of Kenya

GDP – Gross Domestic Product

IT – Information Technology

KBA- Kenya Bankers Association

KRA – Kenya Revenue Authority

RTGS – Real Time Gross Settlement

SPSS – Statistical Package for Social Sciences

ABSTRACT

This study sought to determine the relationship between financial innovation and financial fraud in commercial banks in Kenya. The study concluded that commercial banks had adopted process, product and institutional innovation which included use of credit cards, priority banking, unsecured loans, RTGS, mobile banking, internet banking, insurance services, credit reference bureaus and Islamic banking. Adoption of these innovation strategies resulted in more efficient and effective performance of duties hence made commercial banks more competitive. However there was a marked increase in occurrence of fraud in direct relation to the invention of more financial innovations hence there is need to ensure any new inventions are risk free and do not increase the vulnerability of commercial banks to fraudsters who are continuously evolving and becoming more sophisticated. The study suggests further research should be conducted in commercial banks to ascertain the most fraud prone innovation techniques and strategies. This could be extended to other financial institutions and industries within the economy that are rapidly adopting new cutting edge technologies.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

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. Financial innovations enable institutions to raise their competitive strengths, improve their risk management skills and satisfy the needs of their customers and market requirements. Financial innovations can be product, process or institutional in nature. Product innovations include introduction of new deposit accounts, credit cards, debit cards, new credit arrangement and other financial products and are introduced to respond to changes in market demand or to improve efficiency. Process innovations include the introduction of new business processes leading to increased efficiency and market expansion. Institutional innovations include changes in business structure, establishment of new types of financial intermediaries or changes in the legal and supervisory framework. There is need to innovate because as many organizations grow to become more competitive, they quickly adapt to their environment to meet new business demands and for survival. Those organizations that work as if their environment is still stable are not only losing competitive advantage but are also facing huge financial losses (Mosoti & Masheka,2010).

Financial fraud can be defined as an intentional act of deception involving financial transactions for purpose of personal gain .Fraud is a crime as well as a civil law violation. Financial frauds have become more rampant with the inventions of getting processes better and finding more efficient ways of transacting business. Fraudsters are currently setting the pace in the long term

battle with banks and the rate of online fraud is increasing with inventive criminal gangs continuing to develop new fraud types in order to endlessly probe the banks defenses. The incidences of fraud that have bedeviled banks has continued to rise as the fraudsters keep on inventing new ways of keeping ahead of the security measures and agencies hence there is need to explore the effect financial innovations have on the growth of fraud within commercial banks in Kenya.

Kenya is the financial hub of East Africa and its banking and financial sectors are growing in sophistication and this has led to the growth in financial fraud both in the formal and informal sector. Studies on the economic effects of financial innovation on financial fraud are rare since this is a novel field hence this paper recognizes the research gap and sets out to provide literature in the Kenyan context where these innovations are in use. Whereas adoption of financial innovation strategies is important in enabling an organization exploit its opportunities there is need to assess the effect these strategies have on financial fraud within commercial banks in Kenya.

1.1.1. Financial Innovation

Miller (1986) and Merton (1992) highlight the importance of new products and services in the financial arena sometimes characterizing these innovations as "an engine of economic growth".

Innovation is the cornerstone of economic growth and success for both companies that innovate and countries that encourage it. Innovation can also be the competitive lever that gives one company the rights and offensive positioning over another in the fierce environment in which they operate. Financial innovations play the role of generating returns for the innovators as well

as enabling new choices for investment and consumption. They can also help firms raise large amount of capital at a minimal cost.

Laeven and Levin (2010) argue that growth is driven not just by profit maximizing entrepreneurs who spring up to commercialize new technologies but also by financial entrepreneurs who develop new ways to screen and fund the technologists. Economists argue that the overall function of financial innovation is to reduce financial market imperfections. They may help to fill a gap in product or services available to consumers or correct imbalances of information available to the contracting parties. Financial innovation is ubiquitous Tufano (1995,2003) shows that far from being confined to the last few decades financial innovation has been part of the economic landscape for centuries. Goetzmann and Rouwenhorst (2005) document 19 major financial innovations that span the past 4,000 years ranging from innovation of interest to creation of bonds.

Despite the acknowledged economic importance of financial innovation, the sources of such innovation remain poorly understood empirically. Frame and White (2004) are able to identify only 39 empirical studies of financial innovation. Moreover this literature concentrates more on the ‘back end’ of the innovation process focusing on the diffusion of these innovations, the characteristics of the adopters and the consequences of innovation for firm profitability and social welfare. Financial innovation has been powered by financial liberalization as well as significant advances in technology. Financial liberalization has created currency markets and the need for new financial instruments to manage these market risks while advances in computer technology have increased the speed of computation and enabled a host of innovations from

network enabled ATM to internet banking. Financial innovation can be seen as a response to a wider economic and social forces and challenges.

1.1.2 Financial Fraud

Financial fraud erodes the profitability of organizations with adverse effects on the firm solvency. The impact of frauds on entities like commercial banks which are engaged in financial activities is more significant as their operations involve intermediation of funds. The economic cost of frauds can be huge in terms of likely disruption in the working of the markets, financial institutions and the payments system.

Asset misappropriation is the most common type of fraud in organizations. This is because a wide range of irregularities can be classified under this type of crime and opportunity to commit this crime is readily available to individuals at all levels. Accounting fraud is the next most commonly reported type of fraud. This involves accounting manipulations, fraudulent borrowings, fraudulent application for credit and unauthorized transactions. The reported high incidences of accounting fraud are characteristics of inadequacy of governance structures in organizations. Bribery is offering something usually money in order to gain an unfair advantage while corruption is abuse of trust to equally gain an undue advantage. Corruption is more difficult to detect as it involves two or more people entering into an agreement. It creates a major distortion of trade as well as undermining the democratic development of emerging markets. Procurement fraud is most prevalent during vendor selection process.

Other processes that are under attack in the procurement process are vendor contracting, bid process, payment process and quality review. This means the procurement fraud is perpetrated earlier on in the procurement cycle making detection of such crimes difficult. Governance structures are important to ensure sufficient oversight of the procurement process. Cybercrime involves use of a computer, internet or computer technology to commit an illegal activity or crime.

Financial frauds can have a potentially debilitating effect on confidence in the banking system and may damage the integrity and stability of the economy. It can bring down banks, undermine central bank's supervisory roles and even create a social unrest, discontent and political upheavals. The vulnerability of banks to fraud has been heightened by technological advancements. Technological advancements and continual evolution of the global business environment provide enhanced tools and additional challenges for perpetration and concealment as well as the prevention, detection and investigation of fraud. Advantages of technology, communication and accessibility of data must be leveraged to put in place a system wide fraud mitigation mission.

1.1.3 Financial Innovations and Financial Fraud

Financial service firms and their regulators will need to adapt traditional risk management and other processes to minimize the potential unintended consequences associated with innovation. It will be paramount to recognize the implications of innovations that are not always obvious. The recent crisis in the global financial system has shaken many economists faith in the positive effects of financial innovation. There is debate whether the financial innovations that led to the

crisis were a deliberate fraud by financial industry players or the whole phenomenon was simply an unfortunate catastrophe. An example of such an instance where fraud may have played a substantial role is deceiving investors who ultimately purchased mortgage based securities.
As financial firms expand their markets and deliver innovative services, risk rises as quickly as opportunity. Criminals are quick to exploit any and all vulnerabilities created by new processes under protected channels and changing customer behavior.

With new fraud types emerging constantly, banks must take a more sophisticated approach to online fraud detection and be in a state of constant readiness. Careful data monitoring and management is critical from the outset and banks must enhance their data quality and collate and link different data types coming into the organization. Johnson and Kwok (2009), Litan (2010) Mishra (2010) point out that financial innovations are neither all bad nor all good but contain a mixture of both elements. Hence the occurrence of financial innovations can lead to well crafted scams designed to conceal fraudulent transactions. Critics of financial innovation state that recently developed financial products like subprime mortgage loans, credit default swaps and structured investment vehicles have become emblematic of our present financial crisis.
Because fraud methods are evolving, systems must allow users to quickly configure new scenarios and modify existing behavioral patterns. However the impact of fraud levels and false positives they generate must always be understood.

1.1.4 Commercial Banks in Kenya

Kenya has 44 licensed commercial banks and out of these 31 are locally owned while 12 are foreign owned. Barclays Bank, Standard Chartered, Citibank & Habib Bank are among the foreign owned banks in Kenya. The government of Kenya has a large stake in three of Kenya's

commercial banks. The remaining local commercial banks are largely family owned. Commercial banks in Kenya accept deposits from individuals and make a profit by using the deposits to offer loans to businesses at high interest rates. These banks are regulated by the Central Bank Act and the Companies Act which stipulates the activities they should be engaged in, the rules on publishing of financial statements, minimum capital requirements as well as reserve requirements. Innovations in the Kenyan banks include adoption of internet and mobile banking.

Over the past decade there has been a sharp rise in incidences of fraud within the Kenyan banking sector. The main cause has been attributed to staff complicity and collusion with third parties. However the technological advancements in the industry poses a risk as system vulnerability is taken advantage by fraudsters who collaborate with dishonest employees to commit fraud. Common types of fraud existing in the banking industry include frauds through staff complicity and collusion, frauds through electronic funds transfer, IT fraud, identity fraud, forgery, cheque fraud, card fraud, clearing frauds (KRA funds), procurement fraud and false claims by staff and diversion of commissions.

1.2 Problem Statement

Financial innovations have numerous advantages including reducing agency costs, facilitating risk sharing, improving efficiency which all result into accelerated economic growth. According to (Akhtar,1984) financial innovations lower the transaction cost of transferring funds from lower yielding money balances to higher yielding alternatives thus market participants attempt to minimize risk and maximize return. Countries where financial institutions spend more on

financial innovation are better able to translate growth opportunities into GDP per capita growth. The increasing rate of globalization combined with the expansion of technology and other factors has also increased the rate of fraud and new fraud activities (Zagaris,2010).Firms are constantly evolving and innovating to match the changes in their environment thereby staying relevant. However these financial innovations have a dark side too that has led to the occurrence of numerous financial frauds. The global financial crisis was deemed to have been caused by financial innovations leading to an unprecedented credit expansion that helped feed the boom and subsequent bust in housing prices or by engineering securities perceived to be safe but exposed to neglected risks. Commercial banks and investment banks have also designed structured products that have exploited investor’s misunderstandings. There is thus the need to gauge the relationship between financial innovation and bank’s risk taking volatility and fragility.

Akelola (2012) asserts that fraud is considered to be a major problem within the Kenyan banking industry although the size of frauds conducted was relatively small and unsophisticated. Fraud detection and prevention methods used in the industry were standard and no different from global standards. This study argued that the fraud triangle is not as effective in explaining the collusive and predatory nature of the Kenyan bank fraudster. Internal and external factors involved in fraud in Kenya are also identified including weak industry co-operation, inadequately trained police and prosecutors and ineffective justice systems.

According to Wambugu (2008) the banking sector in Kenya has in the recent years come under increasing threat of operational risks, which affects their performance. These operational risks

mainly arise from the ever increasing incidents of fraud which in one way or the other involve banking staff. For instance between 2009 and 2010 July banking institutions lost Ksh.2.4 billion through a criminal syndicate using the latest technology. Commercial banks moving to online platforms coupled with increasingly tech-savvy generation, continuing economic uncertainty and lack of controls create fertile conditions for fraud to occur

According to Bologna and Lindquist (1995) fraud is no simple vice. They looked at the expanded scope that fraud and other white collar crimes have taken on in the business landscape and attributed in part to the pervasiveness of computerized accounting systems, the world wide web and large scale frauds like Enron and WorldCom which requires financial accountants to provide a new level of assertion to the veracity of a company's financial records. Over the past few years fraud has grown both in size and complexity. The costs of fraud are increasing worldwide

Wolfe and Hermanson (2004) say that in order for fraud to be possible other than having motivation, opportunity and rationalization, the offender requires the capability of committing the crime where capability may involve technical knowledge to execute or get away with the crime.

Financial innovations are specifically driven by technological change and consumer demand (Nasri, 2007) Whereas these innovations enhance customer service delivery and faster payments they equally open digital channels that are more vulnerable to fraud with the speed and openness of the approaches hence as they continuously emerge this has a direct effect on the occurrences of financial frauds in commercial banks.

1.3 Objective of the Study

This research work is designed to achieve the objective of determining the relationship of financial innovation on financial fraud in commercial banks in Kenya.

1.4 Value of the Study

With the rapid development of financial innovations, commercial banks are becoming more reliant on conducting banking transactions electronically which exposes them to the risk of financial fraud.

This study will enable practitioners and owners of commercial banks be aware of the new emerging cutting edge technologies together with the risks of financial fraud they carry along with them with a view of helping them make strategic decisions. The study will be equally significant because it will provide answers to factors causing the occurrences of financial fraud in commercial banks in Kenya.

This study will assist policymakers to institute rules and regulations regarding introduction of financial innovations in commercial banks with a view of curbing or reducing the occurrences of financial fraud. This is an exploratory study that will help in determining the relationship between financial innovation and financial fraud as it adds to the knowledge of academia in this area. It is the researcher's intention that when the research is complete it will contribute immensely to the existing literature on the relationship between financial innovation and financial fraud in commercial banks in Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of related literature and various concepts on the subject under study presented by various researchers, scholars, analysts, theorists and authors. The researcher has drawn material from several sources which are closely related to the theme and objectives of the study.

2.2 Theoretical Literature Review

2.2.1 Fraud Triangle Theory

This was offered by Cressey (1973) the criminologist who carried out a research on 200 embezzlers (trust violators) who had been incarcerated and held in various prisons in the US Midwest. Cressey's final research statement was as follows "Trusted persons become trust violators when they conceive of themselves as having a financial problem which is non-shareable are aware this problem can be secretly resolved by violation of the position of financial trust and are able to apply to their own conduct in that situation verbalizations which enable them to adjust their conceptions of themselves as users of the entrusted funds or property" (Cressey 1973 p30). This hypothesis has popularly become known as the Fraud Triangle Theory. The legs of the triangle respectively represent the individual pressure, opportunity and rationalization for committing fraud. Importantly all the three factors must be present for fraud to occur. Tackling any of the angles of the fraudster's psyche in order to remove at least one of these elements can significantly thwart fraud or mitigate losses. Rationalization is a trait of first time and early

thieves. It may not apply to predatory individuals who have a highly conscious criminal intent to steal from a company in an organized-crime situation. While this is the starting point for many individuals, the internal need often fades when small lies or thefts are repeated resulting into a frequent occurrence or causing more loss. The con becomes routine over time and eventually the person loses the need for internal justification. As a result early detection of fraud is critical in preventing schemes from deteriorating into a more damaging series of occurrences.

Motivation or pressure is the second angle in examining what is driving the individual to commit the act. The perception of a need or a pressure is the key factor and it does not matter whether or not the motivation makes sense to others or is based on reality. Individuals may be facing financial or other personal problems such as gambling, drugs or alcohol addiction. Pure greed can also factor into the equation but may be flavored with a sense of injustice. Opportunity is an environment or temporary circumstance that allows the fraud to be committed typically with little perceived chance of getting caught or penalized. Windows of opportunity exist for wrong doers when companies have poor internal controls, weak processes and procedures, unauthorized or unchecked access to assets by employees or lack of management review and oversight. Failure of audit controls may allow false claims to slip through and companies may not aggressively prosecute all fraud claims. All these factors can create an opportunity not only for a one-time fraud but also for a first instance to spiral into a larger scheme.

In concluding his research Cressey (1973) points out that the fraud triangle theory is limited in its practical use for prevention and detection of trust violation like fraud or for treatment of apprehended offenders. Wells (2005) has also echoed the same sentiment that the fraud theory

triangle has had little application when it comes to fraud prevention. A critique of this model is that it describes antecedents that may be present in a large number of cases that do not result in a fraud. Thus the fraud triangle cannot be said to be predictive rather is a descriptive model that is best used in post analysis (Day,2010)

2.2.2 Theory of Differential Association

The theory of Differential Association was developed by Edwin Sutherland in 1930s.It proposes that through interaction with others, individuals learn the values, attitudes, techniques and motives for criminal behavior. Sutherland is often referred to as the father of white collar crime being the pioneer researcher in the area of white collar crime (Wells,2005). He first researched on crime committed by upper class business executives either against the shareholders or the public and he coined the term white collar crime in 1939. Contemporary studies of Sutherland's differential association theory argue that people learn about crime predominantly or exclusively through exposure to attitudes and motives that legitimize such behaviors (McCarthy,1996).

Gaylord and Gallaher (1988) observe that Sutherland in departure from economic explanations, biological and pathological perspectives attributes crime to the social context of the individual. Organizations with dishonest employees will eventually infect the honest employees and generally honest employees will eventually have an influence on those who are dishonest.(Sutherland,1949; Wells 2005) Akers (1996) criticized Sutherland's differential association theory based on the inaccurate assumption that Sutherland was suggesting that by simply interacting with criminals would tend to criminal behavior but this was not what Sutherland proposed. Supporters of Sutherland's theory like Cressey (Sutherland and

Cressey,1978) argue that some of these criticisms are misinterpretations on the part of the critics (Akers,1996). Other authors argue that the theory cannot be measured empirically (Matsueda, 1988 ; Akers 1996) due to inability or difficulty in measuring and defining Sutherlands concept of definitions favorable and unfavorable to criminal behavior.

2.2.3 Job dissatisfaction theory

Research by Holinger & Clark (1983) on 12,000 employees revealed that dissatisfaction motivated employees commit fraud. When employees perceived their jobs or working conditions were unfair, they were more likely to justify and commit fraud (Wells,2005). However this theory is difficult to prove due to relative lack of information regarding employee theft in general. It is difficult to identify in general due to lack of reliable and widespread information about employee theft (Muistaine & Tewksbury 2002). This model suffers from the same issues regarding motivation and rationalization as the Fraud Triangle theory.

2.3 Determinants of Fraud

Product innovations include introduction of new deposit accounts, credit cards, debit cards, new credit arrangement and other financial products and are introduced to respond to changes in market demand or to improve efficiency. Examples of product innovations are Safaricom and Airtel mobile phone money transfer services Mpesa and Airtel money respectively. Equity bank rolling out a money transfer system Equitel. Safaricom partnering with Commercial Bank of Africa to offer MShwari. Safaricom partnering with Equity bank to offer M-Kesho. Banking services tailored to meet specific status groups such as Premier, Executive or priority.

Institutional or organizational innovations include changes in business structure, establishment of new types of financial intermediaries or changes in the legal and supervisory framework. They affect the financial sector as a whole. Examples include Credit Reference Bureaus which collect, manage and disseminate customer information to lenders within a provided regulatory framework. Embracing of Islamic banking that is guided by Islamic Sharia Law and bancassurance which involves commercial banks offering insurance services

Process innovations include the introduction of new business processes leading to increased efficiency and market expansion. Examples of this include Real Time Gross Settlement (RTGS) which is a funds transfer mechanism where transfer of money takes place from one bank to another in real time. This means transactions are processed as they are received without batching them first before processing thus resulting in quick settlement of large payments.

Service innovation largely relates to enhanced account access and new payment methods to meet consumer demands more easily and conveniently. Usage of Automated Teller Machines (ATMs) has enhanced significantly retail bank account access by providing customers with access to their money at whatever time they may need it. Barclays Bank has enhanced the capabilities of its ATMs to allow for real time cashless deposits into its accounts by both customers and non customers. Online banking has enabled customers to originate payments and monitor their accounts from the comfort of their homes or places of convenience

2.4 Empirical Literature Review

A research study by Akelola (2012) uses theoretical framework based on the Fraud Triangle to analyze the incidence of fraud and motivation of fraudsters. It uses a sample of audit, fraud, security and other managers involved in fraud fighting from thirty banks across the industry to conduct a mixed qualitative and quantitative study based on a survey of sixty respondents and seventeen semi-structured interviews. The research found that fraud is considered to be a major problem within the Kenyan banking industry although size of frauds committed was relatively small and unsophisticated. Fraud detection and prevention methods used in the industry were standard and no different from those used globally. The fraud triangle worked effectively to predict the patterns of fraud described by respondents. Unlike previous research and theories that have mainly focused on the individual or environmental factors, this research suggests an integrated, theoretical and conceptual approach to fraud.

Wolfe and Hermanson (2004) built on the fraud triangle theory and theorized that another fourth element capability of the offender should be added to the fraud triangle to form a fraud diamond. The inclusion of cognitive abilities has helped to rectify some limitations of the fraud triangle like a group of researchers using cognitive heuristics while others did not Critics of the fraud diamond argued that even thought the fraud diamond added a fourth variability; capability to the fraud triangle and filled the gap in other theories, the model alone is an inadequate tool for investigating, preventing and detecting fraud. They believed many frauds would not occur without the right person with the right capabilities implementing the details of the fraud. They suggested four observation traits for committing fraud; authoritative position within the organization, capacity to understand and manipulate systems, confidence that he/she will not be

detected and capability to deal with the stress created within the good person when they commit a bad act.

Albrecht et al,(1983) developed a fraud theory known as the Fraud scale in the 1980s that shared some of the fraud elements used by Cressey (1973) in explaining criminal behavior. His theory suggests that three factors contribute to fraud, a situational pressure, a perceived opportunity to conceal the fraud and the level of employee's personal integrity. He concluded that when situational pressures and perceived opportunities are high and personal integrity is low, occupational fraud is more likely to occur than when the opposite is true.(Albrecht, Howe and Romney,1983)

2.5 Chapter Summary

Although occurrence of product, process, organizational and service innovations in a firm is highly beneficial to its operational efficiency they will also directly determine the vulnerability of a firm's processes and procedures to fraud thus there is need to highlight them and study this effect.

This literature review attempts to review other scholars' works in the relationship between financial innovation and financial fraud in commercial banks in Kenya. (Akelola, 2012) uses theoretical framework based on the fraud triangle to address fraud in the banking industry in Kenya but is largely silent on the role financial innovations may play in all this. Wolfe and Hermanson (2004) improve on the fraud triangle theory by addition cognitive ability as a pre-requisite for fraud to occur. This can implicitly fit in with financial innovations though this is not

explicitly expressed. Albrecht (1983) used a fraud scale to explain criminal behavior and like the fraud theory largely ignores the role financial innovations have to play. In summary improvements in financial innovations have a direct impact on the incidences of frauds in commercial banks as fraudsters evolve better ways of committing crimes and this results into increased costs of conducting businesses.

2.6 Knowlegde Gap

Fraud in the banking industry in Kenya is not formally tracked by the Central Bank of Kenya thus there is no information regarding how fraud is accelerated by financial innovations. Many studies have looked at financial innovations separately from financial fraud but not specifically linking the two areas. As much as there are many developments in financial innovation, there have been few and non specific studies that have looked at the impact of this on financial fraud in commercial banks in Kenya thus this study aims at filling in the knowledge gap that arises from such empirical studies.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methods and procedures that will be followed in conducting research with the aim of evaluating the relationship between financial innovation and financial fraud in commercial banks in Kenya. Outlined in this section is research design, population and sample, data collection, research models and data analysis.

3.2 Research Design

The research is an empirical study carried out as a survey on all the 44 banks registered and operating in Kenya as at 31st December 2014. The study purposes to use descriptive and explanatory research design. The main focus of the study will be quantitative in nature though some qualitative approach will be used in order to gain an insightful interpretation of the results of the quantitative study. The explanatory approach will be used to investigate existing relationship between financial innovation and financial fraud in commercial banks in Kenya.

3.3 Population and Sample

The target population of the study will be all the commercial banks in Kenya. These commercial banks were 44 in number by end of 2014 (CBK Report, 2014). The accessible population will be all the commercial banks as at 31st December 2014 and had operated for an uninterrupted period of not less than 5 years. The study will be conducted using census survey owing to the number of commercial banks in Kenya.

3.4 Data Collection

The study will use primary sources for data collection. While secondary data on financial innovation may be found from the company's financial results and publications, primary data will be gathered through the use of questionnaires. Use of questionnaires was chosen since questionnaires had advantages over other types of data collection such as low costs. It will also yield high quality data thus enabling an in depth analysis. The questionnaire had both open and close-ended questions.

3.5 Research Model and Data Analysis

3.5.1 Empirical Model

The study will use multiple regression technique for analyzing data. Regression analysis is used when a researcher is interested in finding out whether an independent variable predicts a given dependent variable. Multiple regression attempts to determine whether a group of variables together predict a given dependent variable. The multiple regression model equation is as follows

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \alpha$$

Where,

Y = Financial Fraud in Commercial Banks in Kenya (dependent variable)

β_0= The regression coefficient

X_1= Represents the independent variable that measures technological innovation

X_2 = Represents the independent variable that measures product innovation

X_3 =Represents the independent variable that measures service innovation

X_4 = Represents the independent variable that measures process innovation

α = Error term

Financial fraud in commercial banks (dependent variable) depends on the following financial innovation determinants: product, service, process and technology.(independent variables)
Data will be collected on these variables and frequency of occurrence used to measure the impact on the dependent variable.

3.5.2 Data Analysis

The data collected will be edited for accuracy, uniformity, consistency and completeness. It will be arranged to enable coding and tabulation before final analysis. Qualitative data will be analyzed by categorizing and grouping thematic contents through content analysis to address research questions. Quantitative analysis will be analyzed through descriptive statistics such as measures of central tendency to generate relevant percentages, frequency counts, mode, median and mean where applicable. The study will also use multiple linear regression to analyze the data.

Correlation analysis will be used to describe the degree to which one variable is related to the other. The relationship, if any is usually assumed to be linear. In this study coefficient of correlation (r) and coefficient of determination (r2) will be estimated to determine the nature and magnitude of the relationship. Correlation coefficient will be used to measure the degree of relationship between financial innovation and financial fraud in commercial banks in Kenya. The data will be entered into statistical package for social sciences (SPSS) version 22 for analysis along with variables and values to get the correlation coefficients. The magnitude of the sample coefficient of correlation indicates a weak or strong linear relationship.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

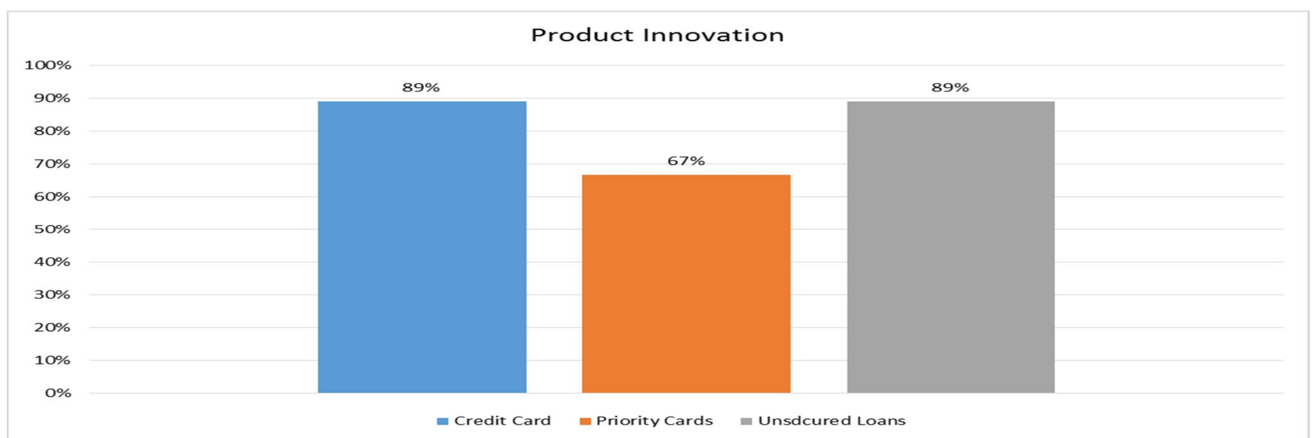
This chapter discusses results and analysis of the survey that was conducted as set out in the research methodology. The survey questionnaire is attached in appendix III. The questionnaire was designed in line with the objectives of the study.

4.1.1 Response Rate

This chapter presents an analysis of the data that was collected from 36 respondents from the 44 commercial banks in Kenya who filled and returned the questionnaire given out to them. This represents 82% response rate which is actually a good representation of the targeted population.

4.2 Product Innovation

Figure 4.1 Types of product innovation strategies adopted by the institution



Source : Survey Data, 2015

The study sought out to find out the types of product innovation strategies adopted by commercial banks. According to the findings, 89% of the respondents indicated that product innovation strategies adopted by institutions was credit cards, 67% of the respondents indicated that product innovation strategies adopted by the institutions was priority banking and 89% of the respondents indicated that product innovation strategies adopted by the institutions was unsecured loans.

4.3 Process innovation

Table 4.1 : Types of process innovation strategies adopted by the institutions

Strategies	**Frequency**	**Percentage**
RTGS	**36**	**100%**
Mobile Banking	**36**	**100%**
Internet Banking	**36**	**100%**
Total Numbers of Banks	**36**	

Source : Survey Data, 2015

The study sought out to find out the types of process innovation strategies adopted by commercial banks. According to the findings 100% of the respondents indicated that the institutions used RTGS, 100% of the respondents indicated that the institutions used mobile banking and 100% of the respondents indicated that the institutions used internet banking process innovation.

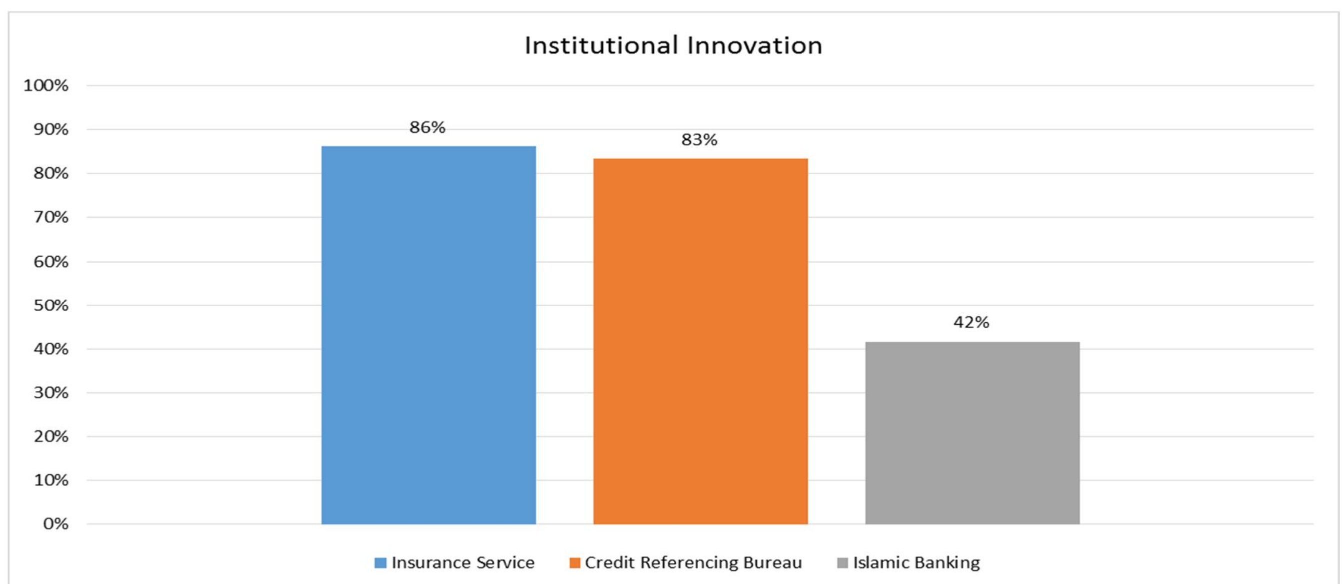
4.4 Organization innovation

Table 4.2: Types of institutional innovation strategies adopted by institutions

Strategies	Frequency	Percentage
Insurance services	**31**	**86%**
Credit Referencing Bureau	**30**	**83%**
Islamic Banking	**15**	**42%**
Total	**36**	

Source : Survey Data, 2015

Figure 4.2 Types of institutional innovation strategies adopted by the institution



Source : Survey Data, 2015

The study sought out to find out the types of institutional innovation strategies adopted by commercial banks. According to the findings 86% of the respondents indicated that the institutions used insurance services, 83% of the respondents indicated that the institutions used

credit referencing bureau and 42% of the respondents indicated that the institutions had Islamic banking institutional innovation.

4.5 Usage of Financial Innovation and the impact on occurrence of Fraud

Table 4.3: Extent bank makes use of financial innovations that has resulted in occurrence of fraud

Financial Innovation	Very great extent	Great extent	Moderate extent	Little extent	No Extent
Mobile Banking	58	19	11	8	3
RTGS	56	25	8	-	11
Internet banking	50	33	6	8	3
ATM deposits	19	8	19	22	31
Average	**46**	**22**	**11**	**10**	**12**

Source : Survey Data, 2015

The study sought out to find out the extent that the banks had made use of financial innovation and the impact this had on occurrence of fraud in commercial banks. According to the findings 58% of the respondents indicated mobile banking contributed to the occurrence of fraud to a very great extent, 11% of the respondents indicated that RTGS had no contribution to the occurrence of fraud used and 6% of the respondents indicated that internet banking contributed moderately to the occurrence of fraud while 22% of the respondents indicated ATM deposits contributed to a little extent to the occurrence of fraud.

4.6 Correlation and the Coefficient of Determination

The table below presents the correlation (R) and the coefficient of determination between financial fraud in commercial banks in Kenya and the independent variables (technological, product, service and process innovations) From the findings the study found out that there was a

positive relationship between the dependent variable and the independent variables.(technological, product, service, process)

Of all the four independent variables, process innovation had the highest relationship with occurrence of frauds of 0.619 followed by service innovation with 0.422. Both product and technological innovation had a correlation value of 0.255 marking the weakest relationship with occurrence of financial frauds in commercial banks in Kenya

Table 4.4 : Correlation and the Coefficient of Determination

Correlations					
		Extent technological innovation has determined financial fraud	Extent production innovation has determined financial fraud	Extent service innovation has determined financial fraud	Extent financial innovation has resulted into increase of frauds in banks
Extent technological innovation has determined financial fraud	Pearson Correlation	1	.255	.140	.505**
	Sig. (2-tailed)		.134	.422	.002
	N	36	36	35	36
Extent production innovation has determined financial fraud	Pearson Correlation	.255	1	.117	.387*
	Sig. (2-tailed)	.134		.502	.020
	N	36	36	35	36
Extent service innovation has determined financial fraud	Pearson Correlation	.140	.117	1	.272
	Sig. (2-tailed)	.422	.502		.114
	N	35	35	35	35
Extent financial innovation has resulted into increase of frauds in banks	Pearson Correlation	.505**	.387*	.272	1
	Sig. (2-tailed)	.002	.020	.114	
	N	36	36	35	36
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

Source : Survey Data,2015

4.7 Coefficient of Determination (R2)

Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable (financial fraud in commercial banks) that is explained by all the four independent variables (technological, product, service, process).

The correlation and coefficient of determination of the dependent variables when all independent variables are combined can also be measured and tested as in the following table 4.5. From the findings 31.6% of the bank's financial fraud is attributed to combination of the four independent variables (technological, product, service, process) investigated in this study. A further 68.4% of financial fraud occurring in commercial banks is attributed to other factors not investigated in this survey.

Table 4.5 : Coefficient of Determination (R2)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.562[a]	0.316	0.224	0.744

a. Predictors: (Constant), Extent service innovation has determined financial fraud, Extent production innovation has determined financial fraud, Extent technological innovation has determined financial fraud, Extent process innovation has determined financial fraud

Source : Survey Data,2015

4.8 Multiple Regression Analysis

The researcher conducted a multiple regression analysis so as to determine the relationship between financial fraud in commercial banks and the four attributes investigated in this survey. The regression equation ($Y= \beta_0 + \beta_1 X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \alpha$) was

$Y= 0.698 + 0.358 X_1 + 0.228X_2 + 0.147X_3 +0.206X_4 + 0$

Whereby

Y = Financial Fraud in Commercial Banks in Kenya (dependent variable)

β_0= The regression coefficient

X_1= Represents the independent variable that measures technological innovation

X_2 = Represents the independent variable that measures product innovation

X_3 =Represents the independent variable that measures service innovation

X_4 = Represents the independent variable that measures process innovation

α = Error term

According to the regression equation established, taking all factors (technological, product, service and process) with constant at zero, financial fraud in commercial banks as a result of these independent factors will be 0.698. The data findings analyzed also shows taking all other independent variables at zero, a unit increase in technological innovation will lead to a 0.358 increase in financial fraud in commercial banks. A unit increase in product innovation will lead to a 0.228 increase in financial fraud in commercial banks, a unit increase in service innovation will lead to a 0.147 increase in financial fraud in commercial banks while a unit increase in process innovation will lead to a 0.206 increase in financial fraud in commercial banks.

This therefore implies that all four variables have a positive relationship with technological innovation contributing more to financial fraud in commercial banks while service innovation contributes the least to the occurrence of financial frauds in commercial banks in Kenya.

At 5% level of significance and 95% level of confidence, technological innovation had a 0.01 level of significance, product innovation had a 0.103 level of significance, process innovation had a 0.186 level of significance while service innovation showed a 0.222 level of significance hence the most significant factor in influencing financial fraud in commercial banks in Kenya is service innovation.

Table 4.6 : Multiple Regression Analysis

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	0.698	0.495		1.41	0.169
	Extent technological innovation has determined financial fraud	0.358	0.13	0.527	2.755	0.01
	Extent production innovation has determined financial fraud	0.228	0.136	0.269	1.683	0.103
	Extent process innovation has determined financial fraud	-0.206	0.152	-0.283	-1.353	0.186
	Extent service innovation has determined financial fraud	0.147	0.118	0.207	1.247	0.222

a. Dependent Variable: Adoption of Financial Innovation has led to financial fraud

Source : Survey Data, 2015

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the summary of the findings from chapter four and it also gives the conclusions and recommendations of the study based on the objectives of the study. The objective of the study was to determine the relationship between financial innovation and occurrence of financial fraud in commercial banks in Kenya.

5.2 Summary of Findings

The study aimed at determining the relationship between financial innovation and financial fraud in commercial banks in Kenya. 88.9% of the respondents indicated that product innovation strategies adopted by commercial banks was credit cards. 66.7% of respondents indicated that commercial banks used priority banking product innovation.88.9% of the respondents indicated that commercial banks disbursed unsecured loans. 86.1% of the respondents indicated that commercial banks were offering insurance services as well.100% of respondents indicated that commercial banks were making use of RTGS, mobile and internet banking.83.3% of respondents indicated that banks were using credit referencing bureau innovation while only 41.7% of respondents indicated that commercial banks had instituted Islamic banking.58.3 of respondents indicated that mobile banking contributed to a very great extent to occurrence of financial fraud in commercial banks. 50% of respondents indicated that internet banking contributed to occurrence of fraud in commercial banks to a very great extent.55.6% of the respondents

indicated that RTGS contributed to occurrence of financial fraud in commercial banks to a great extent.

5.3 Conclusions

The study was able to achieve the set objectives of determining the relationship between financial innovation and financial fraud in commercial banks in Kenya. It highlighted the fact that there was an increase in occurrence of fraud as a result of new innovations but there were instances where the innovations managed to reduce fraud as well. This explains that the banking industry is aware of fraud and its implications for the industry. Advancement in technology and sophistication of criminals have caused an increase in the occurrence of fraud in commercial banks but on the other hand improved control and technological measures have mitigated the increase in fraud. The occurrence of product, process, organizational and service innovations in a firm is highly beneficial to its operational efficiency but this may also directly determine the vulnerability of a firm's processes and procedures to fraud.

5.4 Recommendations

This study recommends that there should be formal tracking of fraud by the regulators of commercial banks (CBK) and other interested stakeholders like KBA to ensure fraud occurrences are well documented to ensure they do not recur in future. The regulators can also institute regulations and policies to govern introduction of new innovations to ensure banks realize profitability and limit their exposure to fraud risk. Commercial banks should ensure that new products introduction and improved innovation processes conform to the industry regulations.

Study recommends more in depth analysis into innovation theories and draw parallels with the impact this may have on occurrences of fraud to develop more knowledge in this area.

5.5 Limitations of the Study

It was quite tricky getting respondents to answer questionnaires in the wake of both Dubai Bank and Imperial bank going into receivership. Most employees decried a confidentiality policy that bound them from answering queries on the banks' behalf while others cited red tape and bureaucracy concerning who could speak on behalf of the bank. This led to delays in obtaining data for analysis in time. Adverse information was also circulated around the same time on social media purporting to identify banks that had failed to meet certain thresholds of the minimum capital adequacy that caused a lot of panic in the banking sector hence casting suspicion on the aims of the research.

5.6 Suggestions for Further Research

The study focused on the relationship between financial innovation and financial fraud in commercial banks in Kenya therefore further research should be conducted in commercial banks to ascertain the most fraud prone innovation techniques and strategies. This could be extended to other financial institutions and industries within the economy that are rapidly adopting new cutting edge technologies. This could include micro-finance institutions and telecommunication companies that are running pseudo banking activities such as safaricom with mpesa and mshwari airtel with airtel money and equitel with its newly launched money transfer system in collaboration with Equity bank.

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APPENDICES

Appendix 1: Commercial Banks in Kenya

1.ABC Bank (Kenya)

2. Bank of Arica

3. Bank of Baroda

4. Bank of India

5. Barclays Bank

6. Chase Bank (Kenya)

7. Citibank

8.Commercial Bank of Africa

9. Consolidated Bank of Kenya

10. Co-operative Bank of Kenya

11. Credit Bank

12. Development Bank of Kenya

13. Diamond Trust Bank

14. Dubai Bank Kenya

15. Ecobank

16. Equatorial Commercial Bank

17. Equity Bank

18. Family Bank

19. Fidelity Commercial Bank Ltd

20. Fina Bank (GT Bank)

21. First Community Bank

22. Giro Commercial Bank Ltd

23. Guardian Bank

24. Gulf African Bank

25. Habib Bank

26. Habib Bank AG Zurich

27. Investments & Mortgages Bank

28. Imperial Bank Kenya

29. Jamii Bora Bank

30. Kenya Commercial Bank

31. K-Rep Bank

32. Middle East Bank Kenya

33. National Bank of Kenya

34. NIC Bank

35. Oriental Commercial Bank

36. Paramount Universal Bank

37. Prime Bank (Kenya}

38. CFC Stanbic Bank

39.Standard Chartered Bank Ltd

40. Trans National Bank Kenya

41. United Bank for Africa
42. Victoria Commercial Bank
43. Southern Credit Bank
44. Daima Bank

Appendix II : Introductory Letter

Dear Sir/Madam

REF: REQUEST FOR INTERVIEW APPOINTMENT ON THE RELATIONSHIP BETWEEN FINANCIAL INNOVATION AND FINANCIAL FRAUD IN COMMERCIAL BANKS IN KENYA

I am a student at University of Nairobi pursuing a Master's degree in Business Administration (MBA). As a requirement in fulfillment of this degree, I wish to carry out a study on the relationship between financial innovation and financial fraud in commercial banks.

Being a chief financial officer or equivalent in your company, I have considered you knowledgeable in providing the most relevant data on the topic and an honor of an interview with you would be highly appreciated. I therefore ask for an appointment with you so that I conduct an interview.

The information obtained through this study shall be treated as confidential and will be purely for the purpose of academic research. A final copy of the project will be availed to you at your request. Your co-operation will be highly appreciated. Thank you in anticipation.

Yours Faithfully

Moses Kola

University of Nairobi

P.O Box 30197

Nairobi

Tel. 0722986602

Email: mkola9@gmail.com

Appendix III : Questionnaire

Kindly answer the following questions by filling the spaces provided

PART A: GENERAL INFORMATION

1. Name of Institution : ____
2. When did your institution commence operations in Kenya?________________
3. Has your institution operated uninterrupted between 2010 and 2015?________

PART B: FINANCIAL INNOVATION AND FINANCIAL FRAUD

1) What financial innovation strategies have been adapted by your institution?

Product Innovation	Process Innovation	Institutional Innovation
a).Credit Cards [ ]	RTGS [ ]	Insurance Services [ ]
b).Priority banking [ ]	Mobile banking [ ]	Credit referencing bureau [ ]
c). Unsecured Loans [ ]	Internet banking [ ]	Islamic banking [ ]

2.) To what extent does this bank make use of the following financial innovations in its operations? Use a scale of 1 to 5 where 1 is to a great extent and 5 is to no extent

Financial Innovation	**1**	**2**	**3**	**4**	**5**
Mobile banking					
Internet banking					
ATM deposits					
RTGS					
Others (Specify)					

3.) Would you agree that the adoption of financial innovation has resulted into increase of financial fraud in commercial banks?

[ ] Strongly agree [ ] Agree [ ] Disagree [ ] Strongly disagree

4.) How would you rate the importance of financial innovation in occurrence of financial fraud in commercial banks?

[ ] Very high [ ] High [ ] Moderate [ ] Low

5.) To what extent has financial innovation resulted into the increase of frauds in commercial banks?

[ ] Very great extent [ ] Great extent [ ] Moderate extent [ ] Little extent

6.) Do you agree that while commercial banks are adopting financial innovations to improve their performance, they are also increasing their vulnerability to fraud.

[ ] Strongly agree [ ] Agree [ ] Disagree [ ] Strongly disagree

7.) To what extent has the following determinants of financial innovations resulted in occurrences of financial fraud in commercial banks in the following aspects?

Aspects	**1**	**2**	**3**	**4**	**5**
Technological innovation					
Product innovation					
Process innovation					
Service innovation					
Others (Specify)					

8.) In your opinion do you think commercial banks need to embrace all financial innovations without a definite risk assessment criteria for the occurrence of fraud?

…………………………………………………………………………………………………
…………………………………………………………………………………………………

Thank you