

**INFORMATION SYSTEMS INNOVATIONS AND FINANCIAL
FRAUD IN COMMERCIAL BANKS IN KENYA**

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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

Sign..... Date.....

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

Supervisors

Sign..... Date.....

Dr. Kate Litondo

DEDICATION

This project is dedicated to my parents The Late Rev. Onesmus Mativo and Mother Mrs. Elizabeth Mativo for her continued support through my education journey. Thank you for all the sacrifices you have made throughout my life to see me progress in my education and for loving me unconditionally. You have given me a good example and taught me how to work hard for the things that I aspire to achieve.

Special thanks to my husband Kelvin Edebe for literally burning the midnight oil with me. You are my pillar and source of great inspiration. To my child; **Wema Edebe** whose patience, encouragement and push for tenacity has encouraged me to this point.

To my sister Sarah Mativo, I need to express my gratitude and deep appreciation for your friendship, knowledge, and wisdom. You have supported, challenged, enlightened, and entertained me throughout my life. To my other siblings, Joseph, Ann, Neema, James and Faith thanks for consistently helping me keep perspective on what is important in life and showing me how to deal with reality.

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ABSTRACT

This study sought to determine the effect of information systems innovations and financial fraud in commercial banks in Kenya. The objective of the study was to determine the relationship between the information system innovation and financial fraud. The study concluded that commercial banks had adopted various innovations including credit cards, RTGS, mobile banking, internet banking, insurance services, credit reference bureaus and Islamic banking. The population of study was all the 43 commercial banks in Kenya. There was a relatively positive explanatory relationship between information system innovations and financial fraud among commercial banks in Kenya; the coefficients are significantly different from zero. The Correlation Matrix shows that there is a strong positive relationship between information system innovations and financial fraud with an association of positive .764. The relation between the bank characteristics and financial fraud was also positive at .781 while the relation between bank characteristics and information system innovations was also positive at .726. However, there was a marked increase in occurrence of fraud in direct relation to the invention of more financial innovations; hence, there is a 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.

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LIST OF ABBREVIATIONS AND ACRONYMS

ATMs	Automated Teller Machines
IS	Information Systems
IT	Information Technology
KRA	Kenya Revenue Authority
MIS	Management Information Systems
PIN	Personal Identification Number
RTGS	Real Time Gross Settlement
RTGS	Real Time Gross Settlement
SPSS	Statistical Package for Social Sciences
US	United States

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The banking sector in Kenya especially in the recent years has been under massive and significant transformation due to compelling universal trends and forces like liberalization, technology and globalization among others. The key force that stands out is innovation of information systems. Banks in Kenya have continually undertaken information systems innovation to improve their financial performance thus enhancing improved rendering services. Information systems are key determinant of bank's performance thus banks cannot ignore them. Most of the banks cash flow is connected to information systems. Those banks that are still working as if their environment is still stable are not only losing competitive advantage but are also facing huge financial losses (Mosoti & Masheka, 2010).

The study was anchored on fraud triangle theory, fraud scale theory and job dissatisfaction theory. Fraud triangle theory explains trust violators Cressey (1973) established that normally violators originate from the trusted individuals when they are faced with financial difficulties and are fully aware that they can resort to violation to cumber the problems. The theory explains individual pressure, opportunity and rationalization are the key drivers for committing fraud. Fraud scale theory personal integrity. According to Albrecht, Howe and Romney (1984) , personal integrity relates to with persons code of conduct. Personal integrity unlike rationalization is attributable to in a person's decisions and his decision making processes. Job dissatisfaction theory explained that dissatisfaction motivated employees commit fraud. According to Hollinger and Clark (1983), employee typically will be enticed to commit fraud when

they are dissatisfied with conditions of their jobs, that is when they perceive their working conditions were unfair.

Innovations in information systems have also opened new channels that now expose commercial banks in Kenya to cases of financial fraud. Facilitated by these information systems innovations, financial fraud in commercial banks has grown immensely coupled with the increasing widespread use of the internet. Furthermore, bank employees' have sufficient knowledge on the information systems which together with technological advancement can give them the opportunity to commit frauds. All they require is some pressure and rationalization (Cressey, 1973) with which they become part of fraud cartels that are fleecing millions of shillings from the banks. According to a report by Deloitte (2013), Kenyan banks were victims of more than half of the Sh4.1 billion frauds that hit East African banks in 2012 as technology made the crime easier. The incidences of fraud that have troubled banks have 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 relationship between information systems innovation and financial fraud in commercial banks in Kenya.

1.1.1 Information Systems Innovation

Information systems are organized systems for the collection, organization, storage and communication of information. Mariano and Pavesi (2000) establish that application and implementation of information systems to banking services is one of the chief concerns of all banks as it enhances competitiveness and improved profitability. William Baumol (2010) defines information systems as a continuous process to develop, enhance and support expansion for competitive advantage by a firm. Swanson (1994) defines information systems innovation as new ways of improving and maintaining information systems.

William Baumol (2010) sees Information's Systems Innovation as a competitive weapon. Mariano and Pavesi (2000) postulated that deposit machines such as Automated Teller Machines (ATMs) facilities transactions past banking hours. Individuals are able to check balances and make payments through online banking. According to Swanson (1994), innovation of information systems has resulted to a cashless society that is consumers do not make payments with tangible cash. Most people today own mobile devices thus banks have developed mobile banking.

1.1.2 Financial Fraud

Financial fraud is defined as a civil violation involving deliberate act of dishonesty with the objective of personal interests. Davia et al. 2000 posit that for fraud to occur there must be an involvement of one or more individuals with an intention and act secretly to rob another of something of worth for their own enrichment. Individual pressure, opportunity and rationalization are the key drivers for committing fraud. Financial fraud has existed throughout the history of humankind.

Financial fraud has taken different angles as life styles keep on changing with time. When there is huge amounts of floating money individual will strive to find ways to attain it. Internet fraud has become the most practiced fraud by violators this is because it is difficulty to identity individuals online and it is also easy to diverge browsers to dishonest sites thus stealing credit card details. Advantages of information systems innovation must be leveraged to put in place a system wide fraud mitigation mission (Wells, 2005).

1.1.3 Information Systems Innovation and Financial Fraud

It is necessary to recognize the implications of information systems innovation that are not always obvious. Information systems application is significant in facilitating an

effective banking system. The security issue which is the basis information systems related fraud is of special concern in the Banking Industry, as banking is highly based on trust from its customers. The risk of hackers, denial of service attacks, technological failures, breach of privacy of customer information, and opportunities for fraud created by the anonymity of the parties to electronic transactions can be managed by enhancing security of information. Depending upon its nature and scope, a breach in security can seriously damage public confidence in the stability of a financial institution or of a nation's entire banking system (Hishigsuren, 2006).

Furthermore, it is also in the banks' own interest to improve security, as digital fraud can be costly both in financial losses, and in terms of the damage it does to the brand of the bank in. The common concern among users of electronic banking is related to the authentication of users and data connections. Also included is the use of digital signatures, personal identification number codes and encryption. Because fraud methods are evolving, systems must allow users to quickly configure new scenarios and modify existing behavioral patterns. Despite all these, the impact of fraud levels and false positives they generate must always be understood (Wells, 2005).

1.1.4 Commercial Banks

A commercial bank, also known as business banking is a bank that provides checking accounts, savings account, and money market accounts and that accepts time deposits. It raises funds by collecting deposits from businesses and consumers via checkable deposits, savings deposits, and time (or term) deposits. It advances loans to businesses and consumers. It also buys corporate bonds and government bonds. Commercial banks' primary liabilities are deposits, and the primary assets are loans and bonds. 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, as

well as reserve requirements. Information systems innovations in the Kenyan banks include adoption of internet and mobile banking (CBK, 2016). The banking sector in Kenya has experienced tremendous growth in the last five years and has expanded to the east African region. The banking industry in Kenya has also involved information system innovation such as automation, moving from the traditional banking to better meet the growing complex needs of their customer and globalization challenges. There has also been increased competition from local banks as well as international banks, some of which are new players in the country. This has served the Kenyan economy well as the customers and shareholder is the ones who have benefited the most (Banking in Kenya, 2016). As the financial markets continue to evolve, financial institutions are working to grow and maintain profits while adjusting to ever-changing regulations and the downturn's effects on profitability and performance. Successful institutions will need to reassess their operating models and address the effects of regulatory reform, competitive dynamics, evolving markets and increased expectations from stakeholders. (Deloitte, 2012)

1.2 Research Problem

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 (Hishigsuren, 2006). 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. On the other hand, a pre-condition for information systems adoption is

proper risk management including fraud risk. The risk management framework cannot fully address the risk of fraud because it involves collusion between several parties. As technology advances fraudsters have also become technologically competent. The speed at which some bank transactions are effected has rendered it almost impossible to detect fraud CIMA (2008) A number of studies have provided the discipline with insights into the practice of information systems innovation within bank institutions. Studies have been done in relation to information system innovation and financial fraud internationally and locally.

A study conducted by Berentsen (1998) considers the impact that the substitution of smart cards for currency will have on monetary policy, arguing that although electronic substitutes for currency will become widespread, monetary policy will continue to work as before because this currency substitution will leave the demand for central Bank reserves largely intact. Goodhart (2000) discussed how monetary control would work in an economy in which Central Bank currency has been partially or completely replaced by electronic substitutes. Friedman (1999) pointed out that electronic banking presents the possibility that an entire alternative payment system, not under the control of the Central Bank may arise. In an extreme variant of Friedman, King (1999) argues that today computers make it at least possible to bypass the payment system altogether, instead using direct bilateral clearing and settlement; the responses to Friedman. Nyamwembe (2011) conducted a study on factors hindering the adoption of technological innovation by commercial banks in Kenya and took a case study of Kenya commercial bank (KCB).

Wanjiru, (2012) studied the strategic responses to increasing fraud related risks while Wanemba, (2010) tried to establish the challenges of fraud faced by commercial banks in Kenya and to identify the strategies that commercial banks use to combat fraud. Sitienei,

(2012) carried out a study to determine the factors influencing credit card fraud in the banking sector. The above studies have not tested the relationship between information systems innovation and financial fraud in commercial banks in Kenya. This research seeks to bridge the knowledge gap by answering the question; what is the relationship between information systems innovation and financial fraud in commercial banks in Kenya?

1.3 Research Objective

The general objective of the research is to determine the relationship between information systems innovation and financial fraud in commercial banks in Kenya. In achieving this goal, the research will address three specific objectives:

- a) To establish IS innovations commonly used by commercial banks in Kenya.
- b) To establish the extent to which innovations in the commercial banks have enhanced bank fraud.
- c) To determine the challenges faced by commercial banks in Kenya in curbing fraud.
- d) To determine the effect of Information Systems innovations on Financial Fraud among commercial banks in Kenya.

1.4 Value of the Study

This study will assist policymakers to institute rules and regulations regarding introduction of information systems innovations in commercial banks with a view of curbing or reducing the occurrences of financial fraud. Other commercial organizations can rely on the results to identify how they can enhance their control environment and understand that as information systems advance, there is need to focus on fraud

prevention, detection and control in order to reap the positive benefits of information systems.

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. Researchers and scholars can use the findings from this study as a basis for future research on the fraud and information system challenges. The government can rely on the findings of this study to formulate the relevant laws relating to fraud. It can also set up the legislation relating to adoption and implementation of information systems.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents existing literature on information systems innovations and financial fraud. It discusses theoretical and empirical literatures established by various researchers and scholars.

2.2 Theoretical Review

Three theories have been reviewed to help understand both information systems and fraud. These theories are the theory of the fraud triangle, the fraud scale and the job dissatisfaction.

2.2.1 Fraud Triangle Theory

Developed by Cressey (1973) fraud triangle theory explains trust violators. Cressey (1973) was a 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 stated normally violators originate from the trusted individuals when they are faced with financial difficulties and are fully aware that they can resort to violation to overcome the problems. The theory explains individual pressure, opportunity and rationalization are the key drivers for committing fraud. Cressey (1973) for fraud to occur all the three factors must be present.

Wells (2005) established that taking strict measures in order to eradicate any of the three components of fraud psyche is critical in mitigating and preventing fraud. Rationalization depicts first time violators. Detecting fraud early is very important as it can prevent schemes from worsening to more damaging situations. Cressey (1973) should that individuals may be faced with personal or financial difficulties such as

alcohol, drugs and gambling addiction. Further, he stated that pure greed may also influence individual to be violators.

Opportunity reflects a temporary conditions consenting committing of fraud where the violators have little chances of being penalized or caught. Opportunity fraud is as result of poor organization's internal controls. In concluding his research Cressey, (1973) points out that the fraud triangle theory is limited in its practical use of prevention and detection of trust violators. 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 The Fraud Scale Theory

Advanced Albrecht, Howe and Romney (1984) fraud scale theory explains personal integrity. According to them personal integrity relates to with persons code of conduct. Personal integrity unlike rationalization is attributable to in a person's decisions and his decision making processes. This enables assessment of integrity thus determining the probability of individuals committing fraud. This argument is consistent with other research. Experts agree that fraud and other unethical behaviors often occur due to an individual's lack of personal integrity or other moral reasoning (Dorminey et al., 2010; Rae & Subramaniam, 2008), as moral and ethical norms play essential roles in an individual's decisions and judgment.

2.2.3 Job Dissatisfaction Theory

Research by Hollinger and Clark, (1983) on 12,000 employees revealed that dissatisfaction motivated employees commit fraud. Employee typically will be enticed to

commit fraud when they are dissatisfied with conditions of their jobs, that is when they perceive their working conditions were unfair (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 Information Systems Innovation In The Banking Industry

Information systems innovation include introduction of new deposit accounts, credit cards, debit cards and new credit arrangement. Examples of information system 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 business structure changes, development of new categories of financial intermediaries and legal and supervisory framework changes. Examples of institutional innovation include Credit Reference Bureaus. Credit reference bureau collects, manages and disseminates information to prospective customers. Example of process innovation includes real time gross settlement (RTGS) which a mechanisms that transfers money from one bank to another. 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 (Rogoni, 2012). 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 noncustomers. Online banking has enabled customers to originate payments and monitor their accounts from the comfort of their homes or places of convenience.

2.4 Bank fraud

Concerns of fraud should be how to mitigate them but not just how detect them (Jesper, 2008). Fraud can be detected through internal audits, external audits and anonymous fraud hot lines. Internal and external audits would indicate control weaknesses. Leuchtner, 2011 suggests that bank fraud can be deterred and detected through technology adequacy and sufficient security. Such technology can record internal user activity across the bank and replay it for later investigation. Others include restricting access to customer data to prevent identity theft.

Ndiritu, 2010 researched on the use of technology to reduce international fraud in the Kenyan banking industry and use of chip and pin technology from 2004 to 2009. He examined the use of chip and PIN technology in the banking sector by establishing the nature of card fraud, accessing impacts of technology on fraud and levels of awareness in the banking industry and among the policy makers. The findings of the study were that PIN and chip technology has enhanced the reduction of card fraud in countries that have adopted the technology, however very few commercial banks in Kenya have adopted the technology. The banks sighted the high investment cost as a setback despite the numerous counterfeit cards being used on their payment systems that result to losses from chargeback's received from issuing banks. The study concluded that there is need to Create more awareness on the benefits of technology in minimizing fraud losses in the

industry as the fraudsters are now targeting countries such as Kenya that are still using the magnetic stripe technology.

In addition, the optic fiber cables that have landed in Kenya recently have exposed the country to international hackers who are highly sophisticated in using sensitive information from firms. A complete overhaul of the systems currently in use is encouraged if banks are to avoid potential losses. Appelbaum and Shapiro, (2006) felt that top management plays a major role in fraud control. They concluded that the concept that is stressed by those in top management determines how employees react to conditions that have ethical implications, thus the message of zero tolerance to fraud has to flow downwards from the top.

Hollman, et al., (2003) established that firm ought to have in place manual specifying code of conducts. The policy should be operative throughout the employment duration of an individual. If a firm lacks a policy on code of conducts then it may provide a flat form, for the offender to partake in criminal activities. Policies should be viewed as a social fabric which provides guidelines to hold the organization together.

Fraud management lifecycle comprise of eight stages; Deterrence, prevention, detection, analyses losses, determine the factors of the loss situation, create, evaluate, communicate, and assist in the deployment of policies, obtaining enough evidence and information to stop fraudulent activity and culmination of all the successes and failures in the Fraud Management Lifecycle. A whistle blower line provides an avenue for early detection of fraud. It also acts as an avenue for a concerned employee to anonymously voice his or her concerns. The policy can simultaneously create an incentive program for associates who uncover misconduct (Kelly, 2008).

2.5 Challenges of Curbing Fraud

Financial fraud in recent times has become a wide spread predicament to the efficient performance of commercial banks. Cases of financial frauds have increased due to numerous reasons such as reluctance by the banks to confront the fraud problem, slow response time by the relevant authorities, poor surveillance systems at the banking halls, lack of independence of the auditing department (Kelly, 2008). There exists no law on credit card fraud thus enticing offenders to convey out deceitful activities with ease as they are aware that they will get light punishments from the courts.

Hollman, et al., (2003) established that banks have been slow in reporting fraudulent activities while in the other hand courts have failed in convicting financial fraudsters. Courts penalties and fees rates are very low on fraudsters. Technology banker (2012) found that out of the 102 fraud cases brought forward between April and June 2010 only 8 cases were finalized with two of them been withdrawn. This thus is an indication that Kenya to a great extent has a huge problem with fraud prosecution thus may be the reason why banks are reluctant in reporting fraudulent activities. In Kenya political authorities have been known to impede with the independence of enforcement institutions such as the police and the courts, greatly hindering operative prosecution of fraud cases.

2.6 Empirical Review

A research study by Akelola (2012) investigated factors motivating fraudsters. The study reviewed top managers involved in mitigating fraud. The study used a sample of top managers, audit and fraud managers. The study focused on 30 banks. From the 30 banks the study picked 60 respondents. The study established that fraud was the greatest

predicaments with the banking sector in Kenya. The study found that detection and prevention measures adopted by the banks were similar with those used internationally.

Wolfe and Hermanson (2004) added a fourth component on the fraud triangle theory which is cognitive abilities. The inclusion of cognitive abilities has helped to rectify some shortcomings of fraud triangle model. Some researchers did not Critics of the fraud diamond while others used cognitive abilities. They established that the right person with the abilities to execute details of fraud could commit the fraud. They suggested four propositions for executing a fraud; capacity to understand and manipulate systems, authoritative position within the organization, confidence that he/she will not be detected and capability to deal with the stress created within the good person.

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. The study established three factors that contribute to fraud that is situational pressure, perceived opportunity and level of personal integrity. The study found that whereby by personal integrity is low and subsequently situational pressure and perceived opportunities typically occupational fraud tends to occur at a higher rate.

Wanjiru, (2011) investigated effects of strategic responses in mitigating fraud related risks at Equity bank limited. The study found that fraud is a sensitive issue and that customers have immense panic of fraud and it impacts negatively on banks profitability where income lost through fraud would have been reinvested. The study also concluded that the worst fraud risk is identity theft where identification documents are easy to reproduce, fraudsters make parallel passports, IDs and driving licenses then use them to takeover accounts. The study further concluded that cheque fraud is a common type of

fraud mainly because customers with cheque books are not careful in ensuring that their books are kept in safe custody. The Bank's information system infrastructure is designed to support the monitoring process by producing daily reports and alerts to be auctioned. The study also revealed that a whistle blowing facility is existent in the Bank.

Batavia, (1999) investigated performance of commercial banks in Kenya. The study found that risk management significantly influences the profitability of the commercial banks. Rogony, (2012) carried out a study with the objective of assessing correlation of real time gross settlement system and interbank settlement efficiency of banks in Kenya. The study concluded that the adoption of real-time gross settlement system has improved the efficiency of interbank settlement in the Kenyan banking industry. The real-time gross settlement system has led to increased volumes of processed payments, while decreasing the volumes of cheques through the Automated Clearing House. The study findings serve as stimuli to policy makers to understand the industry better and to acknowledge that embracing technology, particularly in the banking sector will bring benefit both in the micro and macro economy.

Rogers (2007) investigated role of information systems in the delivery of financial services. Mavungo, (2012) evaluated the effects information system strategies on the bank's performance. He concluded that effective exploitation of technology is essential for the bank to increase their efficiency and effectiveness levels and reform agenda and all the firms should be incorporating and taking advantage of the technology to increase their growth through the adoption of the technologies. Rogony, (2012) carried out a study with the objective of assessing correlation of real time gross settlement system and

interbank settlement efficiency of banks in Kenya. The study concluded that the adoption of real-time gross settlement system has improved the efficiency of interbank settlement in the Kenyan banking industry. The real-time gross settlement system has led to increased volumes of processed payments, while decreasing the volumes of cheques through the Automated Clearing House. The study findings serve as stimuli to policy makers to understand the industry better and to acknowledge that embracing technology, particularly in the banking sector will bring benefit both in the micro and macro economy.

2.7 Summary of Literature and Research 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 information systems innovations. Many studies have looked at information systems innovations separately from financial fraud but not specifically linking the two areas. As much as there are many developments in information systems innovation, there have been few and nonspecific 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.

2.8 Conceptual Framework

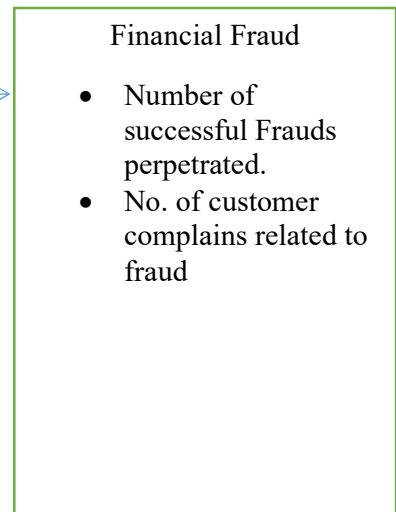
Independent Variable

(IS Innovation)

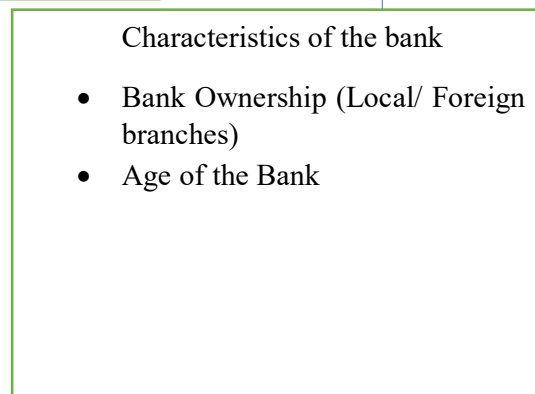


Dependent Variable

(Financial Fraud)



(Moderating)



CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

Chapter three highlights the research methodology. The chapter discusses the research design, population, sample, data collection and data analysis techniques.

3.2 Research Design

The research is an empirical study carried out as a survey on all the forty four banks registered and operating in Kenya as at 31st August 2016 (Appendix II). The study purposes to use descriptive and explanatory research design. The explanatory design was used investigating correlation between information systems innovation and financial fraud in commercial banks in Kenya.

3.3 Population and Sample

Population for the study comprised of all the licensed commercial banks in Kenya. These commercial banks are 44 in number as per by end of 2015(CBK Report, 2015). The accessible population will be all the commercial banks as at 31st August 2016 and will have operated for an uninterrupted period of not less than 5 years.

3.4 Data Collection

The study used both secondary and primary sources of data. Primary data was obtained through the use of semi structured questionnaires while secondary data was obtained from the banks' journal reports, publications and websites.

3.5 Data Analysis

The study carried out the measures of central tendency as descriptive statistics to describe the data. The study adopted a multiple linear regression model. Financial Fraud was the dependent variable and information systems innovation and characteristics of the bank were the independent variables.

Relationship equation was presented in the linear equation below.

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

Where,

Y = Financial Fraud

β_0 = Constant

X_1 = Information Systems innovation

X_2 = Characteristics of the bank

β_1, β_2 = Regression Coefficient

e = Error term

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

Chapter four highlights data analysis interpretations and discussion information system innovation and financial fraud.

4.2 Reliability Test

The study used Cronbach statistics to test for reliability. In Cronbach, any alpha of more than 0.7 shows that data was reliable. The findings are presented in table 4.1 below.

Table 4.1 Reliability Test Cronbach's Alpha

Cronbach's Alpha	N of items
0.909	44

The study found a Cronbach alpha of 0.798 which is more than 0.7 thus indicating that data was reliable.

4.3 Response Rate

The study targeted 44 respondents from different commercial banks in Kenya. Out of the 44 questionnaires administered by the researcher, 40 filled questionnaires were collected translating to 90.9 % response rate which was satisfactory.

4.4 Descriptive Statistics

4.4.1 The demographic information

Table 4.2: Sex

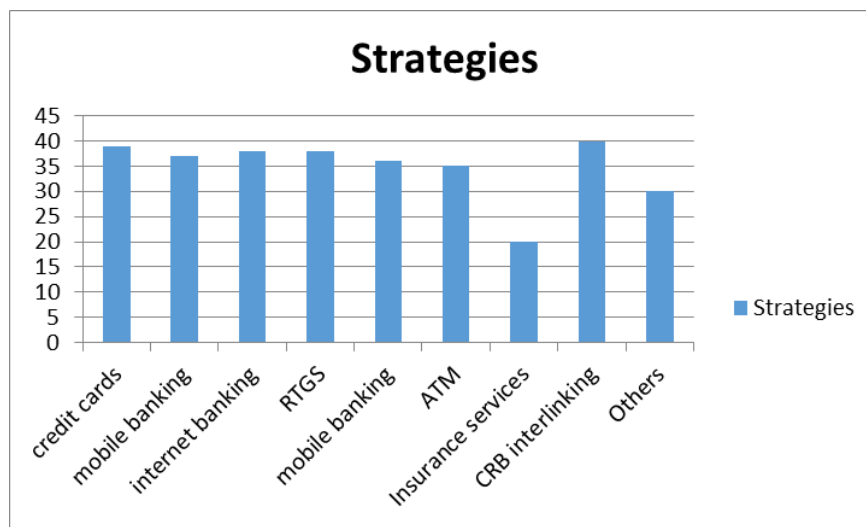
FACTOR	FREQUENCY	PERCENTAGE
--------	-----------	------------

Male	18	45
Female	22	55
TOTAL	40	100

Table 4.1 above shows the highest number of respondents were female with 22(55%) while 18(45%) were male respondents. The study implied that the ratio of male and female are almost the same.

4.4.2 Strategies Adopted

Figure 4.1: Strategies Adopted



From the figure 4.1 above there is an indication that all the banks have adopted quite a number of strategies to deal with fraud and this includes introducing new fixtures for the credit cards and debit cards. Most of the banks are also using mobile banking and internet banking.

4.4.3 Innovation in the banking Sector

Table 4.3 Innovations in the banking sector

Innovations	N	Mean	Std Dev
credit cards	40	39	6.5997
mobile banking	40	30	0.2357
internet banking	40	32	1.6499

RTGS	40	32	1.6499
mobile banking	40	34	3.0641
ATM	40	29	0.4714
Insurance services	40	10	13.9064
CRB interlinking	40	26	2.5927
Others	40	35	3.7712

From the above Table 4.3 there is an indication that most of the banks have adopted various strategies to cab fraud and they do include credit cards, mobile banking, RTGS, mobile banking, ATM, insurance services, CRB interlinking and others. Credit cards were the widely used by the banks followed by mobile banking. The least used was the insurance services

4.4.3 Characteristics of the bank

Table 4.4 Characteristics of the bank

Challenge			
	N	Mean	Std Dev
Structural and Institutional Issues	40	3.8	0.212
Prosecution Challenges	40	3.9	0.254
High rate of acquittals	40	3.7	0.514
The legal system	40	3.6	0.624
Cost Vs Benefit	40	3.9	0.258
Weak legal enforcement and poor industry co-operation	40	4.1	0.851
Rate of Technological advancements	40	4.2	0.251
Poor Infrastructure	40	4.5	1.245
Lack of standardized online identity verification and authentication tools	40	3.5	1.258
Customer ignorance on identification procedures	40	4.2	0.147
Fraudster use of imaging techniques, cameras and other gadgets	40	4.6	0.258
Phone verification and notification products	40	4.3	0.256

The results indicate that respondents' generally commercial banks do face challenges when it comes to innovations especially poor infrastructure (Mean=4.5, STD dev. =1.245). The fraudster use of imaging techniques, cameras and other gadgets had a mean of 4.6 and STD dev. of 0.258. Poor verification and notification products had a mean score of 4.3 and STD dev. of 0.256.

4.4.3 Aspects of Occurrence

Table 4.5 Aspects of Occurrence

Aspects	N	Mean	Std Dev
Bank Ownership (Local/ Foreign branches)	40	4.2	0.3842
Expenditure on ICT investments(Ebanking)	40	4.2	1.5841
No. of debits cards issued to customers	40	4.5	0.0015
No. Of ATM's Installed	40	4.8	0.0256
Others(Specify)	40	4.9	0.0024

Table 4.4 summarizes the aspects of occurrence of fraud in commercial banks in Kenya. The bank ownership had a mean score of 4.2 and STD dev. of 0.3842, expenditure on ICT investments had a mean score of 4.2 and STD dev of 1.5841, number of debit cards issued to customers had a mean score of 4.5 and STD dev. of 0.0015. The number of ATMs installed had a mean score of 4.8 and STD dev. of 0.256, while other factors had a mean score of 4.9 and STD dev. of 0.0024.

4.4.2 Descriptive Analysis

Table 4.6: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Fraud	40	0	10	2.375	2.382
Innovations	40	2	7	4.625	1.628
Characteristics	40	1.98	4.8	3.613	0.769
Valid N (listwise)					

The mean for financial fraud was 2.375, information system innovations was 4.625 and the banks characteristics was 3.613. The minimum for all the variables was 0 and the maximum was 10. The standard deviation was 2.382 for financial fraud, 1.628 information system information and banks characteristics were 0.769. The bank characteristics had the lowest standard deviation while financial fraud had the highest standard deviation at 2.382.

4.4 Correlation Analysis

Table 4.8 below explains the correlation matrix.

Table 4.7: Correlations Matrix

		Correlations		
		FF	ISI	BC
FF	Pearson Correlation	1	.764**	.781**
	Sig. (2-tailed)		.000	.000
	N	40	40	40
ISI	Pearson Correlation	.764**	1	.726**
	Sig. (2-tailed)	.000		.000
	N	40	40	40
BC	Pearson Correlation	.781**	.726**	1
	Sig. (2-tailed)	.000	.000	
	N	40	40	40

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

Where the dependent variable was fraud (FF) and the independent variables were information system innovations (ISI) and bank characteristics (BC). The findings from research as shown in table 4.4 above demonstrate a positive relationship between the financial statement fraud and information system innovation at 0.764. There is also apposite relationship between financial statement fraud and bank characteristics. The relationships are both significant at a significant level less than 5%. . The Correlation Matrix shows information system innovation had a strong positive relationship with financial fraud with a magnitude of 0.764. The relation between the bank characteristics and financial fraud was also positive at .781 while the relation between bank characteristics and information system innovations was also positive at .726.

4.5 Regression Analysis

4.5.1 Model Summary

Table 4.8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.832 ^a	.692	.676	1.35665

a. Predictors: (Constant), BC, ISI

The model summary (Table 4.4) shows a very strong association amongst the variables as indicated by the coefficient of determination of $R=0.832$. The value of R Square was 0.692 indicating that 69.2 % of the changes in financial fraud are explained by the independent variables for the study i.e. information system innovations and bank characteristics.

Table 4.9: Regression results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.796	1.057		-5.483	.000
	ISI	.611	.194	.417	3.149	.003
	BC	1.480	.410	.478	3.607	.001

a. Dependent Variable: FF

Regression coefficient value of information system innovation was .611 with a p-value of more than .05. The regression coefficient value of bank characteristics 1.667 with a

significance level of 0.153 and the values were insignificant. $Y = -5.796 + 0.611X_1 + 1.480X_2 + \varepsilon$

4.5.2 Analysis of Variance

The study conducted an Analysis of Variance, in order to test the influence of information system innovations on financial fraud of commercial banks in Kenya. The findings were as shown below:

Table 4.10: Analysis of Variance

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	153.276	2	76.638	41.640	.000 ^a
	Residual	68.099	37	1.841		
	Total	221.375	39			

a. Predictors: (Constant), BC, ISI

b. Dependent Variable: FF

Table 4.10 showed P values of 0.000. This implied that there was no probability that the variables studied gave false predictions therefore the model was ideal in making conclusions. Also the F- calculated value of 41.640 was less the F critical of 153.27, thus implying that the overall model was insignificant. That is there was insignificant association between financial fraud and the independent variables.

4.6 Discussion of Research findings

The P value of 0.000 indicates the significance of the model and we therefore reject the null hypothesis indicating that information system innovations affect financial fraud.

The study established that there was a positive association between information system innovations and financial fraud; the coefficients are significantly different from zero. The Correlation Matrix showed a strong positive relationship between information system innovations and financial fraud with a magnitude of 0.764. The relation between the bank characteristics and financial fraud was also positive at .781 while the relation between bank characteristics and information system innovations was also positive at .726.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

Chapter five highlights a summary, conclusion and recommendations of the findings from the analysis.

5.2 Summary of Findings

The aim of the study was to determine the association between financial innovation and financial fraud. P value of 0.000 indicates the significance of the model and we therefore reject the null hypothesis indicating that information system innovations affect financial fraud.

The study established that there was a positive association between information system innovations and financial fraud; the coefficients are significantly different from zero. The Correlation Matrix showed a strong positive relationship between information system innovations and financial fraud with a magnitude of 0.764. The relation between the bank characteristics and financial fraud was also positive at .781 while the relation between bank characteristics and information system innovations was also positive at .726.

5.3 Conclusions

The study 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 while improved

technology have mitigated financial 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. Adverse information was also circulated around the same time on internet asserting to classify banks that had failed to meet specific brinks 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 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.

REFERENCES

- Agboola, A. A. (2001). Impact of Electronic Banking on Customer Services in Lagos, Nigeria. *Ife Journal of Economics and Finance*, 5(1 and 2)
- Albrecht, W., Howe, K. & Romney, M. (1984). *Deterring fraud: The internal auditor's perspective*. The Institute of Internal Auditors Research Foundation. Altamonte Springs, FL
- Appelbaum, S. & Shapiro, B. (2006). Diagnosis and Remedies for Deviant Workplace Behaviors. *Journal of American Academy of Business, Cambridge*; 14-15
- Central Bank of Kenya <http://www.centralbank.go.ke/> Accessed 2nd September, 2016.
- Cressey, R.D. (1973). *Other people's money: A study in the social psychology of embezzlement*. Montclair, NJ Peterson smith.
- Day, R. (2010). *Applying the Fraud Triangle Model to the Global Credit Crisis*. Retrieved from Nordicum- Mediterranean (Icelandic E-Journal of Nordic and Mediterranean Studies) 5(1). Available at: <http://nome.unak.is/nm/5-1/12-reflection-on-the-economic-crisis-/236-applying-the-fraud-triangle-model-to-the-global-credit-crisis> [Accessed on July 1, 2011]
- Hishigsuren, G. (2006). *Information and Communication Technology and Microfinance: Options for Mongolia*. ADB Institute Discussion Paper 42. Retrieved from <http://www.adbi.org/files/2006.02.dp42.ict.microfinance.mongolia.pdf>
- Jesper F. (2008) *.occupational fraud –auditors' perceptions of red flags and internal control* Linkoping's University, Linkoping, Sweden
- Leuchtner, T. (2011). Four internal frauds and how to spot them. *ABA Banking Journal*, Retrieved from <http://www.ababj.com/>
- Mustaine, E. E., & Tewksbury, R. (2002). Workplace theft: An analysis of student employee offenders and job attributes. *American Journal of Criminal Justice*, 27 (1), 111-127.
- Ssewanyana, J.K. (2008). *The role of Free and Open Source Software in the microfinance sector in Uganda*. Conference Proceedings IST-Africa. Retrieved from <http://www.ISTAfrica.org/conference>.
- Swanson, E. B., (1994), Information Systems Innovation Among Organizations. *Management Science*, Vol. 40, No. 9, pp. 1069-1088.
- Turaga, J. (2004). Opportunities and challenges in India “Kuch Apru Sock aur Kuch Jugaad”: Crafting the MFI/IT Paradigm. *The Indian Experience*. Retrieved from <http://www.I4donline.net/issue/jan04/opportunities-full.html>
- Wells, J.T. (2005). *Principles of fraud examination*. London: John Wiley and Sons.

- Wilhelm W. K. (2004). The Fraud Management Lifecycle Theory: A Holistic Approach to Fraud Management. *Journal of Economic Crime Management*, 2(2), 8-10
- Stephen H., (2006). Management Information Systems for the Information Age. Third Edition. McGraw-Hill Ryerson.
- Fang, Z. (2005). Exploring the synergy between entrepreneurship and innovation. *International Journal of Entrepreneurial Behaviour & Research*, 11,(1), 2005
- Manual De Oslo. (2008). proposed guidelines for collecting and interpreting data on technological innovation. *Journal of Finance and Management in Public Services*. Volume 14. Number 1.

APPENDIX I: 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. Please indicate gender Male[] Female []

PART B: INFORMATION SYSTEMS INNOVATION AND FINANCIAL FRAUD

1. What information systems innovation strategies have been adapted by your institution?

Credit Cards [] RTGS [] Insurance Services []
 Priority banking [] Mobile banking [] CRB Interlinking[]
 Internet banking [] ATM [] Specify other _____

2. Would you agree that the adoption of information systems innovation has resulted into increase of financial fraud in commercial banks?
 [] Strongly agree [] Agree [] Disagree [] strongly disagree

3. To what extent does the following describe the banks characteristics?

Characteristics	1	2	3	4	5
Structural and Institutional Issues					
Prosecution Challenges					
High rate of acquittals					
The legal system					
Cost Vs Benefit					

Weak legal enforcement and poor industry co-operation					
Rate of Technological advancements					
Poor Infrastructure					
Lack of standardized online identity verification and authentication tools					
Customer ignorance on identification procedures					
Fraudster use of imaging techniques, cameras and other gadgets					
Phone verification and notification products					

4. To what extent have the following determinants of information systems innovations resulted in occurrences of financial fraud in commercial banks in the following aspects?

	1	2	3	4	5
Bank Ownership (Local/ Foreign branches)					
Expenditure on ICT investments(Ebanking)					
No. of debits cards issued to customers					
No. Of ATM's Installed					
Others(Specify)					

7. How many fraud cases were reported in the last one month.

- i) Number of successful Frauds perpetrated
- ii) No. of customer complains related to fraud.....

APPENDIX II: List of Commercial Banks in Kenya as at 31st December 2016

1. Bank of Africa Kenya Ltd.
2. Bank of Baroda (K) Ltd.
3. Bank of India
4. Barclays Bank of Kenya Ltd.
5. CFC Stanbic Bank Ltd.
6. Chase Bank (K) Ltd.
7. Commercial Bank of Africa Ltd.
8. Consolidated Bank of Kenya Ltd.
9. Co-operative Bank of Kenya Ltd.
10. Credit Bank Ltd
11. Citibank N.A.
12. Development Bank of Kenya Ltd.
13. Diamond Trust Bank Kenya Ltd.
14. Dubai Bank Kenya Ltd.
15. Ecobank Kenya Ltd
16. Equatorial Commercial Bank Ltd.
17. Equity Bank Ltd
18. Family Bank Limited
19. Fidelity Commercial Bank Ltd
20. Fina Bank Ltd
21. First community Bank Limited
22. Giro Commercial Bank Ltd.
23. Guardian Bank Ltd

24. Gulf African Bank Limited
25. Habib Bank A.G Zurich
26. Habib Bank Ltd.
27. Imperial Bank Ltd
28. I & M Bank Ltd
29. Jamii Bora Bank Limited.
30. Kenya Commercial Bank Ltd
31. K-Rep Bank Ltd
32. Middle East Bank (K) Ltd
33. National Bank of Kenya Ltd
34. NIC Bank Ltd
35. Oriental Commercial Bank Ltd
36. Paramount Universal Bank Ltd
37. Prime Bank Ltd
38. Standard Chartered Bank Kenya Ltd
39. Trans-National Bank Ltd
40. UBA Kenya Bank Limited
41. Victoria Commercial Bank Ltd
42. Housing Finance Ltd

Source: (Central Bank of Kenya, 2016)

APPENDIX III: QUESTIONNAIRE.

	Fraud	complaints	Innovations	Characteristics
1. Bank of Africa Kenya Ltd.	2	5	6	4.2
2. Bank of Baroda (K) Ltd.	0	4	4	3.1
3. Bank of India	0	2	3	2.5
4. Barclays Bank of Kenya Ltd.	5	10	7	4.4
5. CFC Stanbic Bank Ltd.	1	5	4	3.5
6. Chase Bank (K) Ltd.	5	10	7	4.2
7. Commercial Bank of Africa	6	12	7	4.3
8. Consolidated Bank	0	1	3	1.98
9. Co-operative Bank of Kenya	10	12	7	4.6
10. Credit Bank Ltd	5	6	5	4.1
11. Citibank N.A.	0	1	4	3.5
12. Development Bank of Kenya	0	1	4	2.9
13. Diamond Trust Bank Kenya	0	2	4	2.1
14. Dubai Bank Kenya Ltd.	0	2	4	2.3
15. Ecobank Kenya Ltd	1	3	5	3
16. Equatorial Commercial Bank	1	5	5	2.9
17. Equity Bank Ltd	2	5	6	3.5
18. Family Bank Limited	2	3	6	3.9
19. Fidelity Commercial Bank Ltd	2	5	6	4.1
20. Fina Bank Ltd	2	5	4	4.1
21. First community Bank	1	4	4	3.9
22. Giro Commercial Bank Ltd.	2	3	5	4.2
23. Guardian Bank Ltd	2	6	5	4.1
24. Gulf African Bank Limited	2	6	5	4.3
25. Habib Bank A.G Zurich	4	8	6	4.5
26. Habib Bank Ltd.	0	2	2	3.1
27. Imperial Bank Ltd	3	3	4	4.1
28. I & M Bank Ltd	2	4	3	3.7
29. Jamii Bora Bank Limited.	2	5	3	3.8
30. Kenya Commercial Bank Ltd	6	9	7	4.8
31. K-Rep Bank Ltd	5	5	6	4.6
32. Middle East Bank (K) Ltd	0	1	2	2.5
33. National Bank of Kenya Ltd	6	8	6	4.2
34. NIC Bank Ltd	5	7	6	4.44
35. Oriental Commercial Bank	0	5	2	2.4
36. Paramount Universal Bank	0	2	2	3
37. Prime Bank Ltd	0	3	2	2.8
38. Standard Chartered	5	10	6	4
39. Victoria Commercial Bank	2	1	2	3.2
40. Housing Finance Ltd	4	10	6	3.7