A FRAUD MANAGEMENT FRAMEWORK FOR MOBILE FINANCIAL SERVICES WITHIN KENYA

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ABSTRACT
Mobile banking offers several benefits to financial sectors, including convenience in terms of time, money and effective customer relationship management. However, illegal actions in the digital age have altered the mode banks operate. It has sparked interest in mobile banking. The expansion of mobile banking fraud especially SIM swapping, hacking identity theft, social engineering, denial of service attack and account take over have created various challenges to financial sectors. The perceived criminal actions are due to continuous growth of mobile banking and computer networks. The identified challenges of rise in mobile financial fraud are due to lack of a proper framework to manage the fraud comprehensively among stakeholders. This study investigated fraud management in the Kenyan financial sector. The study used mixed research methodologies using descriptive and inferential analysis. The developed framework was informed by Fraud Triangle Theory (FTT), Routine Activity Theory (RAT), Fraud Management Lifecycle Theory (FMLT) and Deterrence Theory (DT). The findings confirmed that the fraud triangle and deterrence theories are very instrumental when applied to mobile fraud management. Finally, the result of findings will have significant implications not only to academic researchers but likewise for financial institution policymakers and anti-fraud organizations in both the commercial and governmental sectors.
KEY WORDS: *Fraud management, Banks, Financial services, Framework, Mobile banking, Central Bank of Kenya (CBK), Fraud theories, Fraud principles, Effective, SIM Swap, Customers.*

1.0 INTRODUCTION
Fraud in the terms of mobile money is defined as the purposeful and deliberate action conducted by participants within mobile financial environment with the objective of gaining profit (in cash or e-money), denying other players income, or harming the good name of other participants (Silverstone & Pedneault, 2012). In 1999, a European firm named PayBox, which was financially sponsored by Deutsche Bank, launched mobile banking. The SMS was the first mobile banking service available. It was a new field in the banking industry. Older phones, on the other hand, had limited capability. Wachovia bank started mobile banking in the United States in 2006. Aite Group anticipated in September 2007 that mobile banking customers in the United States of America would reach one point six million by the end of 2007 and thus would swiftly climb to thirty-five million by 2010. According to the survey, mobile banking has a high development potential (Price Waterhouse Coopers, 2011).

Safaricom Ltd which is the Kenya's premier Mobile Network Operator (MNO) pioneered the introduction of Mobile Financial Services (MFS) in 2007 by offering person-to-person money transactions on the M-pesa platform to low-income un - banked consumers. MFS has recently been expanded to include other transactions such as commercial bank/microfinance adoption, person-to-business (bill payment, purchasing), business-to-business, credit and savings services, purchasing and transferring of airtime, and so on. The use of mobile phones to supply financial services changed the dynamics of the banking business, bringing financial services closer to the people through the existing merchant network in local communities (Okonjo, 2013).

Globalization, technological advancement, and other factors have all contributed to an increase in the prevalence of fraud and new attack techniques (Zagaris, 2010). Due to of their technological complexity, these new fraud potentials are exceedingly difficult to detect and prevent, and institutions may expend significant resources seeking to recognize and resist them (Kranacher & Wells, 2010). Financial organizations encounter difficulty in detecting and combating fraud, which is sometimes worsened by the existing political, legal, and institutional frameworks. Even with strong regulatory assistance, a particular country's regulatory system cannot be anticipated to halt or even considerably lower the prevalence of crime within financial industry (Hoffman, 2002). The study concentrates on the prevalence of mobile crime within Kenya's financial sector.

1.1 Research Problem

Mobile banking related fraud is increasingly becoming a challenge to the users and financial service providers. Over the past few years, several incidents of mobile banking crime have been reported where customers lose money on a daily basis through social engineering. This has raised concerns within the financial sector. As mobile banking payments have scaled in many markets and new products have been introduced, there is growing requirement to address mobile banking fraud conclusively (CBK, 2018). Therefore, rise in mobile financial fraud is due to lack of proper framework to manage the fraud comprehensively among stakeholders. This study is therefore aimed at developing comprehensive framework for managing mobile financial fraud. The government, banks, clients, telecommunication companies and consultants have key role to play in this aspect of the industry.

1.2 Objectives of the study

- To establish existing principles underlying mobile fraud management in Kenya.
- To develop a fraud management framework for mobile financial services within Kenya.
- To test and validate the developed framework.

1.3 Research questions

- What are the existing principles for mobile fraud management in Kenya?
- What factors are important in the development of a framework for managing mobile financial fraud?
- How can the developed framework be tested and validated?

1.4 Scope of the study

The research was restricted by industry participation. The scope was set to give a definite subject for comparability and to establish the limits of what should and should not be discussed. The research is limited to comprehensively managing mobile fraud within the financial sector. The financial sectors targeted are the commercial banks in Kenya.

2.0 LITERATURE REVIEW

2.1 Global state of banking industry

The main objective is to deliver an understanding of the current literature on fraud management framework in mobile financial services. Mobile banking has seen extraordinary adoption rates since the earliest SMS offerings. Typically, just balance enquiries and mini-statements. Today, almost all banks have some kind of mobile banking offering, either developed in house or by making use of third-party specialist vendors. In the developed world, the rapid proliferation of smartphones and latterly tablets have increased the demand on the mobile banking, in 2014, Juniper Research reported total global mobile banking users standing at 0.8 billion and predicts 2.0 billion users by 2021. Mobile is already the largest banking channel for the majority of banks by volume of transactions (KPMG, 2019).

2.2 Banking industry in Kenya

The CBK is an autonomous Central Bank that oversees the Kenyan banking industry as well as monetary and fiscal policies for the Kenyan government. Apart from designing and putting monetary policy into action, the CBK fosters liquidity, solvency, stability and correct operation of Kenya's financial and banking infrastructure (CBK, 2018). As of December 31, 2018, the Kenyan banking industry included the following: Central Bank of Kenya (CBK) as the regulatory authority, 43 banking institutions (42 commercial banks and 1 mortgage finance company), 8 representative offices of foreign banks, 13 Microfinance Banks (MFBs), 3 Credit Reference Bureaus (CRBs), 19 Money Remittance Providers (MRPs), 8 non-operating bank holding companies, and 73 foreign exchange (forex) bureaus. Out of the 43

financial institutions, 40 were owned privately, while the Kenyan government held a majority stake in three out of the 40 individually owned banks, 25 were domestically owned (the dominant shareholders were Kenyans) while 15 were internationally owned. The twenty-five (25) locally owned financial institutions included 24 commercial banks and 1 mortgage financing firm. The 15 foreign-owned institutions are all commercial banks, with 12 being local subsidiaries of foreign banks and three being branches of foreign banks. All regulated currency bureaus, microfinance banks, credit reference bureaus, money remittance providers, non-operating bank holding companies, and are privately held (CBK, 2018)

2.3 Factors contributing to mobile fraud
Entails the following: non standardized processes i.e. failure to abide to CBK, poor compliance monitoring, interbank competition leading to reduced compliance check, information sharing hence reduced confidentiality, organization culture i.e. some societies are generally lenient to fraudsters, high cost of transactions hence system abuse, poor remuneration hence staffs handling cash will be tempted to steal, weak pricing policy, maturity of the mobile money services, poor awareness i.e. lack of training and frequent communication, seasonality- fraud is high during festivitie, certainity, celerity, severity, pressure, unemployment and lack of centralized database for fraudsters (Clark & Hollinger, 2007).

2.4 Principles of fraud management
The fraud management principles entails: deterrence meaning stopping fraud before it is attempted i.e. password/biometric verification, maker checker concept, software and hardware security; prevention which are the actions to stop fraud from occurring i.e. employee and customer education, fraud assessment, hotlines mechanisms and real-time monitoring; detection which is the activity that reveals or uncovers the presence or attempt at fraud i.e. statistical monitoring programs , analyzing identified red flags, audits, whistle blowing and tip-offs, suspicious transaction reporting; mitigation which hinder fraudster from completing /continuing to perpetrate fraud i.e. blocking an account; analysis meaning to examine the effects of the fraud i.e. examine causes and the volume of losses; policy which is the deployment of policies to minimize the occurrence of frauds i.e. Information security policies; investigation which involves having sufficient information and enough evidence to end fraudulent incidents , recover stolen assets and produce evidence and finally prosecution which entails to discipline and castigate the fraudsters with the aims of preventing further theft (Wilhelm, 2004).

2.5 Theoretical foundation of the study
A number of fraud theories have been developed to clarify the nature of frauds being experienced. The four principal theories of criminology and management were adopted as theoretical framework supporting this research. The theories are Fraud Triangle Theory (FTT), Routine Activity Theory (RAT), Fraud Management Lifecycle Theory (FMLT) and Deterrence Theory (DT) (Williams, 2015)

2.6 Enhanced fraud management framework
The framework begins with factors contributing to mobile financial fraud. The factors are derived from literature, theory and data findings. Factors contributing to mobile fraud create an environment likely to compromise the banking systems, although this is not possible due to existence of robust fraud management principles, perceived decision quality, and perceived quality reports to CBK that operate jointly to help in comprehensive fraud management. Factors contributing to mobile fraud are the independent variables; the banking systems, fraud management principles, perceived decision quality and perceived quality reports to CBK are the intervening variables. Finally, the end result is effective fraud management which represents the dependent variable. The enhanced fraud management framework is shown in **figure 2.0** below
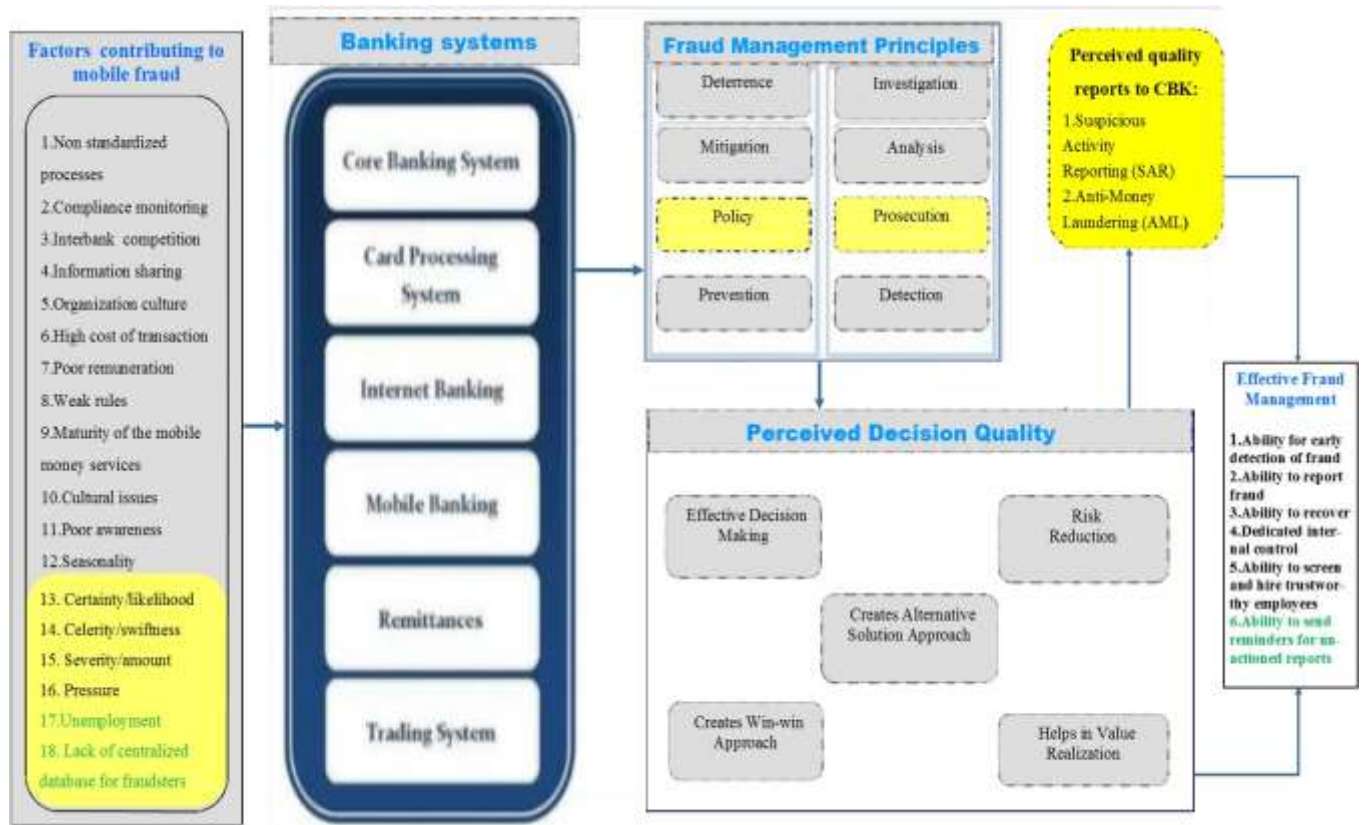
Figure 2.0 - Enhanced fraud management framework (Author, 2022)

3   RESEARCH DESIGN AND METHODOLOGY

It provides further information on the research design method used in determining the area under study. In addition, it highlights on the population under review, sampling technique, data collection method, and research procedure and data analysis method. This research adopted mixed methods approach. The mixed methods approach to research examines a research problem from both a qualitative and a quantitative perspective, integrating findings from both approaches in order to arrive at a highly robust approach (Clark & Hollinger, 2007).

3.1 Research design

This is blue print of the study that provides the outline and direction of a research. This study used a descriptive research design. A descriptive research design involves the investigation of a topic with the aim and purpose of describing the problem or identifying problems. A descriptive research design was justified for use in this study as it sought to identify and describe how the independent factors influenced the dependent variable (Kothari C, 2019).

3.2 Target population

The Kenyan banking industry is made-up of 43 banks with an average of 15 IT and forensic staffs per bank hence making a total of 645 staffs (CBK, 2018). Therefore, the population for this study was mainly IT and forensic staffs of the commercial banks in Kenya which are mainly based at their head offices in Nairobi. The choice of the commercial banks was based on their highest number of branches and customers all over the country (CBK, 2018). They also hold 95% of the total capital that are available in Kenya. Though, Omotayo and Kulatunga observed that, in most cases, interviewing the entire population is very difficult, due to inadequate time, limited accessibility, lack of enough funds and other inconveniences. Thus, in this situation, for economic reasons, it was very easy to interview a subgroup of the population, which means a "sample" (Omotayo & Kulatunga, 2015).

3.3 Sample size and sampling strategy

Non-probability sampling is employed in research when it is the only feasible and viable option to adopt in the aspect of restrictions in selecting probability sampling; therefore, the choice of non-probability sampling requires solid assumptions on the nature and proportion of the sample for its validity (Barratt, Ferris, & Lenton, 2015). The sample size for the study was calculated based on Yamane's formula because it is accurate and suitable for random sampling (Yamane, 1967). By using Yamane's formula of calculating sample size with an error of 0.05 and with a confidence coefficient of 95% (Yamane, 1967), the calculation from a population of 43 commercial banks (43*15 = 645 IT and Forensic staffs) came up with 247as sample size. The sample size was obtained from 17 commercial banks which are in tier one and two, given anonymous titles: Bank A, Bank B, Bank C, Bank D, Bank E, Bank F, Bank G, Bank H, Bank I, Bank J, Bank K, Bank L, Bank M, Bank N, Bank O, Bank P and Bank Q. The rationale of obtaining the sample from 17 banks was that, the selected banks are in tier one and two (they command 80% of total banking income), have the highest number of branches and have their head office in the capital city of Nairobi, while the other banks had few branches, making up 20% of the total banking income. The selected banks were appropriate because of their heavy transactions due to many branches and high involvement in mobile banking commerce.

3.4 Data analysis method

Once the data was received, the researcher used the data by checking for missing data or unfilled sections of the questionnaire. Only sections properly filled were used. After cleaning and editing of data, coding was done. The data collected was then analyzed by conducting reliability analysis, correlation analysis and regression analysis. Final data analyzed was presented using tables.

4   RESEARCH FINDINGS AND ANALYSIS

Reliability analysis

Dependability of the survey was checked through Cronbach alpha which is a factual instrument used to decide interior consistency of variables (factors contributing to mobile fraud, fraud management principles, reports to CBK, banking system, perceived decision quality and effective fraud management). The Cronbach's alpha value for six variables/items are all greater 0.5, which indicates strong/good level of internal consistency. Table 1.0 below shows the Cronbach's alpha value for each six variables/constructs.

Table 1.0 – Reliability of variable

Variables	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Value
Factors contributing to mobile fraud	20.37	8.725	-.141	.121	.799
Fraud management principles	19.89	8.598	-.135	.054	.841
Perceived quality report to CBK	20.27	5.289	.831	.764	.583
Banking systems	21.01	4.924	.815	.750	.572
Perceived Decision Quality	20.22	4.369	.824	.830	.554
Effective fraud management	20.04	5.647	.693	.718	.627

Correlation analysis

Correlation analysis basically depicts the strength of relationship among the variables. Correlation value (r value) moves from -1 to +1. If the value is greater than 0.5 it means positive strong correlation exist among the variables. Table 2.0 below shows the correlations of variables.

Table 2.0 - Correlations of variables

Variables		Factors contributing to mobile fraud	Fraud management principle	Report to CBK	Banking systems	Perceived Decision Quality	Effective fraud management
Factors contributing to mobile fraud	Pearson Correlation	1	.078	-.104	-.086	-.128*	-.283**
	Sig. (2-tailed)		.230	.109	.189	.048	.000
	N	237	237	237	237	237	237
Fraud management principles	Pearson Correlation	.078	1	-.092	-.092	-.153*	-.198**
	Sig. (2-tailed)	.230		.160	.160	.019	.002
	N	237	237	237	237	237	237
Perceived quality report to CBK	Pearson Correlation	-.104	-.092	1	.809**	.849**	.765**
	Sig. (2-tailed)	.109	.160		.000	.000	.000
	N	237	237	237	237	237	237
Banking systems	Pearson Correlation	-.086	-.092	.809**	1	.848**	.726**
	Sig. (2-tailed)	.189	.160	.000		.000	.000
	N	237	237	237	237	237	237
Perceived Decision Quality	Pearson Correlation	-.128*	-.153*	.849**	.848**	1	.811**
	Sig. (2-tailed)	.048	.019	.000	.000		.000
	N	237	237	237	237	237	237
Effective fraud management	Pearson Correlation	-.283**	-.198**	.765**	.726**	.811**	1
	Sig. (2-tailed)	.000	.002	.000	.000	.000	
	N	237	237	237	237	237	237

The r value between factors contributing to mobile fraud and effective fraud management is 0.283 which is significant at 0.000 level < p-value (0.05). It means positive and strong correlation exists among factors contributing to mobile fraud and effective fraud management.

Fraud management principles correlation value is 0.198 which is significant at 0.002 level < p-value 0.05 which shows positive and strong correlation between fraud management principles and effective fraud management. Perceived quality reports to CBK correlation value is 0.765 which is significant at 0.000 level < p-value 0.05 which shows positive and strong correlation between reports to CBK and effective fraud management. Banking system correlation value is 0.726 which is significant at 0.000 level < p-value 0.05 which shows positive and strong correlation between banking system and effective fraud management. Perceived decision quality correlation value is 0.811 which is significant at 0.000 level < p-value 0.05 which depicts positive and strong correlation between banking system and effective fraud management.

REGRESSION ANALYSIS

Multiple regression analysis was also used to depict the impact of predictors (independent) variables upon criterion (dependent) variables. The multiple correlation coefficient - R, has a value of 0.848 indicating strong level of prediction. Table 3.0 below shows multiple coefficient of regression.

Table 3.0 - Coefficient of regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.004	.325		9.243	.000
	Factors contributing to mobile fraud	-.296	.058	-.181	-5.117	.000
	Fraud management principles	-.078	.035	-.078	-2.202	.029
	Perceived quality report to CBK	.267	.070	.265	3.795	.000
	Banking systems	.068	.062	.077	1.110	.268
	Perceived Decision Quality	.369	.060	.485	6.189	.000
a. Dependent Variable: Effective fraud management						

Factors contributing to mobile fraud has significant relationship with effective fraud management as beta shows β= - 0.296, t = -5.117 with p = 0.000 which is <0.05. Therefore, factors contributing to mobile fraud has significant and direct relationship with effective fraud management. It shows that if one-unit change occurs in factors contributing to fraud, it will change dependent variable negatively by 29.6%. Fraud management principles has significant relationship with effective fraud management as beta shows β= - 0.078, t = -2.202 with p = 0.029 which is <0.05. Therefore, fraud management principles have significant and direct relationship with effective fraud management. It shows that if one-unit change occurs in fraud management principles, it will change dependent variable negatively by 7.8%. Perceived quality reports to CBK has significant relationship with effective fraud management as beta shows β= 0.267, t = 3.795 with p = 0.000 which is <0.05. Therefore, perceived quality reports to CBK has significant and direct relationship with effective fraud management. It shows that if one-unit change occurs in reports to CBK, it will change dependent variable negatively by 26.7%. Banking system has significant relationship with effective fraud management as beta shows β= 0.068, t = 1.110 with p = 0.268 which is >0.05. Therefore, banking system does not have significant and direct relationship with effective fraud management. It shows that if one-unit change occurs in banking system, it will change dependent variable positively by 6.80%. Perceived decision quality has significant relationship with effective fraud management as beta shows β= 0.369, t = 6.189 with p = 0.000 which is <0.05. Therefore, perceived decision quality has significant and direct relationship with effective fraud management. It shows that if one-unit change occurs in perceived decision quality, it will change dependent variable positively by 36.9%.

5   CONCLUSION AND RECOMMENDATIONS

The fraud management framework for mobile financial services within Kenya is considered a success because it leads to effective fraud management i.e. ability to detect and report fraud, ability to do recovery when fraud occurs, ability to perform dedicated fraud control and ability to send reminders for unactioned reports. During the study, researcher also noted that there exist other fraud management frameworks i.e. GAO framework, framework for fraud in Kenya's banking industry and fraud detection framework. The existing frameworks have gaps like inability to manage fraud comprehensively i.e. lack of policy and prosecution principles, inability to manage fraud swiftly and effectively.and inability to send reports directly to Central Bank of Kenya (CBK) respectively. All the mentioned gaps have been fully addressed by the developed fraud management framework for mobile financial within Kenya hence the framework is considred a sucess. There was an evidence of many financial sectors willing to adopt the developed fraud management framework because it has centralized database which assist in sharing information of the fraudsters,

although there is a need to do further research on how to achieve watertight privacy and confidentiality of fraudsters information shared on database since it will make the performance of the framework even much better.

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