



**ADOPTION OF FINANCIAL INNOVATIONS BY TIER ONE COMMERCIAL BANKS AND FINANCIAL DEEPENING
IN KENYA**

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ABSTRACT

It is envisaged that by 2030 Kenya will realize the three pillars of success that is social, economic and political development. These pillars are not likely to be achieved if the country adopts same way of doing things, thus innovations in all sector is vital. Innovation accelerates growth in all the three pillars and more so economy. Although bank innovations are of convincing importance when checked in terms of financial performance, the effect created by the innovation on financial deepening is still not clear. The general objective of the study was to establish the effect of the adoption of financial innovations by tier one commercial banks and financial deepening in Kenya. Specifically, the study sought to establish mobile, agency, automated teller machine and internet banking on financial deepening in Kenya. The study was based on diffusion theory of innovation and theory of financial deepening. The study adopted correlation research design. In the current study the target population composed of 6 banks in tier one. Census approach was used to select 6 tier one commercial banks from 2010 to 2018. Data was analysed using descriptive statistics, correlation analysis and multiple regression analysis with the aid of STATA 12. The regression coefficients were tested for significance using t-statistics at 5% confidence level. Diagnostic tests that conducted include auto correlation, multicollinearity, heteroscedasticity, fixed and random effects and normality. The study findings found that commercial banks in tier one had an average financial deepening of 16.61. Regression analysis revealed that mobile banking, agency banking, automatic teller banking and internet banking have positive and significant effect on financial deepening of tier one commercial banks in Kenya. There is need to take advantage of agency banking services especially in regions which have low mobile phone penetration and adopt agency banking services owing to proximity to banking agents. Data security should be provided to enhance authorization procedure when using automatic teller machines banking services.

Key words: Financial Innovations, Commercial Banks, Financial Deepening, Kenya

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INTRODUCTION

Financial sector is a major drive that spurs growth in economies. Banks being the major players in the financial sector, act as the engine that control the entire activities of the economic growth through financial deepening. Banks provide access to financial services that steer economic development in a country (Ngugi, Amanja & Maana, 2009). However, as Waithanji (2012) observed there is still inadequate access to the banking services as displayed by large number of savers and small depositors, while on the other side lending is positively skewed toward well-established private and public enterprises in the uptown regions. Furthermore, when financial access is granted, they come at a prohibitive cost (Beck, *et al.*, 2010).

Financial sector has undergone development phases which were aimed at and the Kenyan perspective is grouped into three phases with the earliest period being in 1970s and 1980s when the government had monopoly on provision of banking services (Misati, Njoroge, Kamau & Ouma, 2010). In the second stage, though there were government controls, the sector was liberalized. Monetary policies and structural adjustments were applied to manage financial sector operations. In phase three, banking innovations such as automation of banking services, Islamic and electronic banking approaches were adopted and their implications on financial inclusion and deepening is commendable.

Financial deepening is the state in which individuals gain access to financial services at affordable rate and without non-trade barriers (Kenyoru, 2013). Okafor, Omwumere and Chijindu (2016) understand financial deepening as the situation where there is enough liquidity and financial intermediation is being carried out smoothly. Through financial intermediation, savers with surplus and borrowers with deficit are brought together thus helping conversion of the immediate need. As Ngugi *et al.* (2009) cites financial deepening is also viewed as the increase of assets and access to financial services that offers wider range of services.

Financial deepening as indicated by banks' credit to private sector in respect to country Gross Domestic Product (GDP) has differed in many countries. For instance, in Nigeria credit to private sector recorded a 12.59% in 2013 and the highest values witnessed over 50 years is 38.35% whereas in South Africa, financial deepening as measured by credit to private sector as percentage of GDP has showed 67.38% in 2013 and the highest value to be 72.29% in the last 50 years (Karimo & Ogbonna, 2017). This can be interpreted to mean that in South African residents and companies can easily access financial services than Nigerian citizens and companies. Several researchers assert that financial deepening is a big stimulant to growth.

Internet banking is now becoming a vital tool that can be used to access information and enhances communications. Communication Commission of Kenya (CCK, 2012) observed that about half of the Kenyan population have access to internet almost daily, their serve being mobile phone network (Kathuo, Rotich & Anyango, 2015). The dramatic changes that have been witnessed over the last ten years or so, has been accelerate by factors such as globalization, policy changes and integration of banking services with information technology devices. Presence of reliable and high-speed internet has further seen banks focus to reach their customer in that direction. Through the internet, banks have been able to achieve a lot based on contemporary business setting. From traffic jams to one's comfort, customers are now able to receive live updates about their fund transfer, bill payment and maintain one's account through the internet, just to mention a few. Again, via internet banking customers are able to carry out simple and sophisticated banking transactions such as debit and credit notifications, balance enquiry, cheque status tracking and reminders to bill payment activation (Anyasi & Otubu, 2009).

Financial deepening arising from banking innovations has been seen to have greater potential to increase productivity in the future. A study by Kenyoru (2013) found that when institutions are

properly and innovatively functioning, economic efficiency, expansion of liquidity, mobilization of resources such as saving and transfer of traditional resources for modern growth is made possible.

Bakang (2015) avers those nations endowed with developed financial systems have experienced faster economic growth. Developing nations like Kenya, financial deepening is recognized as the major tool that fosters economic development. One of the pillars for the Vision 2030 is economy. With this, the government of Kenya aims to create financial stability, promote more credit and increase financial services and products. Financial deepening ought to be an ongoing process with continuous effort meant to enhance economic growth. Hence the need for continuous studies to countercheck whether the country is still on the right course of spurring the economy. In the light of this backdrop the study endeavours to establish the effect of tier 1 commercial banks innovations on financial deepening in Kenya.

Research Objectives

The general objective of the study was to establish the adoption of financial innovations by tier one commercial banks and financial deepening in Kenya. The specific objectives were: -

- To determine the effect of tier one mobile banking adoption on financial deepening in Kenya.
- To establish the impact of tier one agency banking adoption on financial deepening in Kenya.
- To assess the outcome of tier one ATM banking adoption on financial deepening in Kenya
- To determine the results of tier one internet banking adoption on financial deepening in Kenya

The study tested the following hypothesis: -

- H0₁: There is no significant effect of tier one mobile banking adoption on financial deepening in Kenya.

- H0₂: There is no significant impact of tier one agency banking adoption on financial deepening in Kenya.
- H0₃: There is no significant outcome of tier one ATM banking adoption on financial deepening in Kenya.
- H0₄: There is no significant result of tier one internet banking adoption on financial deepening in Kenya.

LITERATURE REVIEW

As proposed by Mckinnon (1973) and Shaw (1973) theory of financial deepening thrives well where there is financial liberalization in the financial sector which is observed when there is financial development that eventually led to economic growth. Theory of financial deepening tends to explain the reason behind atomized financial systems, which is experienced when financial system, exists largely without financial repression (Nnanna & Dogo, 1998). Financial deepening comes from adoption of necessary and real financial policy such as real rate of returns to real stock of finance (Kisaka *et al.*, 2015). In opposition, shallow financial systems are seen to be caused by changes in the relative process of finance. Therefore, presence of active financial intermediation ensures growth and financial deepening in many sectors. Specifically, when the process of financial intermediation is carried out innovatively, that is, where there are new products and services being generated day in day out. This further ensures that monetary systems are increasing to yield more opportunities that are profitable to enter into business (Shaw, 1973). As per the said theory, financial deepening through productive investment encourages growth. As Friedman (1998) found out, this connection between growth and financial deepening points to the positive impact created on financial liberalization.

Several literatures have pointed to the benefits that are enjoyed by countries whose financial development is massive (Levine (1997a; Demirguc, Kunt & Levine, 2008; 2009). Kisaka *et al.*, (2015) also avers that in a vibrant, dynamic, and well-

functioning financial sector there are numerous improvement economy wise. McKinnon (1973) and Goldsmith (1969) hypothesized that economy development would be achieved to a greater extent in areas where banks are free of repressive controls as exercised in interest rate caps and quantities predominant during at olden time. Since those old days, financial systems have recognized the role of banks in conducting four basic functions important to the economic growth, namely accumulation of savings, allotting resources through lending to most profitable zones, facilitating transactions and risk management, and exercising corporate control (Kisaka *et al.*, 2015). Thus, if the highlighted functions are carried out in conducive environment, more and more development will be realized that would accelerate growth rate to higher heights.

Mobile phones have offered conveniences services to an extent that institutions aiming to grow and expand rapidly would find them inevitable (Kisaka *et al.*, 2015). Descriptive research design was adopted. This weakness was attributed to fear for the full transfer of the services to digital platform due to security that would expose banking system to outside shocks that would have transferal. However, over time this has improved hence many banks adopted mobile banking that included almost their services. Lewis (2012) study too pointed that for the competition reason, banking industry is forced to adopted technology so as to reach the high level of unbanked individuals who are geographically far. Technology in the mobile phones is seen create a separation between the most successful and less successful banks (Lewis, 2012). A weakness with Kisaka *et al.*, (2015) study was that there was shift in focus from the commercial banks in Kenya to the banking services as rendered by the telecommunication companies.

Kathuo *et al.*, (2015) conducted an exploration on impact of the mobile banking on performance of 42 commercial banks registered in Kenya. Through the use of questionnaires issued to 180 management staffs selected from 42 commercial banks, data was collected which showed that many banks have

moved into mobile platform which has enabled them reach out many customers. Further, measure of mobile banking including fund transfer accounts, bill payment, bank statements and cheque book ordering were the common banking products regularly used showing that banks role of financial performance is carried on well. The study heavily relied on the primary data which to some extent did not give the countries outlook as compared to the reported performance. This study will counter this problem by use of content analysis from the published reports based on similar factors.

Munoru (2016) studied the impact created by having agency banking on commercial banks financial inclusion. Taking a sample of 13 banks, agency banking was measured by amount of cash deposits through this channel, payment of retirements and social benefits to customers, number of bill payment and number engaged in this channel. On the other hand, financial inclusion was assessed by the percentage of adult with bank accounts. The results indicated that there is strong relationship between agency banking and financial inclusion hence should be an idea that should be recommended for all commercial banks. Several other innovations have taken place which seeks to have effect on financial sector, however this study concentrated on agency banking thus this study will be current will be unique by exploring based on Munoru (2013) understanding.

Mwende, Bichanga and Mosoti (2015) in a case study of Equity banks in Kitui central districts investigated the functionality and contribution of agency banking in Kenya. The study used a descriptive survey design on a sample six equity agents having 100 equity bank account holders. The results showed that agency banking saved on costs, times and gave access to most of the banking products. However, there was need to advertisement the services offered by agents for their popularity. The study only covered a small region and as recommended by the research there ought to be other studies that should give a wider picture. Other banks that have engaged in agency

banking should then be included for clarity as well in mode of administration. Possibly one of the greatest benefits of agency banking in Kenya is the transfer of banking products and services to regions where until now would have been go on unbanked for a long period of time (Barasa & Mwirigi, 2013).

Jegede (2014) also sought to examine effect of ATM on performance of Nigerian banks. This was informed by the desire to move away from virus technology to secured chips cards that are free from credit/debit frauds. Data was collected by use of questionnaires issued conveniently to a sample 125 employees of five banks in Nigeria capital city. The results of the analysis showed that deployment of ATMs terminals had improved averagely the performance of banks. Maximum benefits were not reaped due to increased ATM frauds. Thus, to reap maximum banks have to improve security in bid to subvert the tricks used by fraudsters.

One of the major reasons why banks in Nigeria are investing heavily in ATMs is to try and increase efficiency. To ascertain whether in deed there is improvement in efficiency, Adewoye (2013) studied the impact of ATMs investment on banks cost efficiency. The study incorporated 20 listed banks whose financial reports for six years were surveyed. The intensity of ATMs was found to have a significant impact and positive contribution to the cost efficiency- as measured by operating cost rate and asset management cost rate. As Adewoye (2013) further report, ATMs serves as teller labour substitution which lower the personnel expenses and pressure for a given bank.

Njogu (2014) studied the impact of internet banking on the commercial bank (CB) customer deposits in Kenya. The study adopted a descriptive survey design to report on all the 43 commercial banks from year 2009 to 2013. Internet banking was weighed by the number of customers who transact using internet sources from the CB, volume of transaction handled via internet and deposit mobilized via internet transactions such as electronic fund transfers while customer deposits was checked in using domestic credit provided by

banking system using internet channels as proportion of GDP. Even though the data was a time series in nature, multiple linear regressions was used to analyse the data. A statistically positive and significant relationship was found between the two variables. Due to the error in the model used to analyse, the current study serves to correct this methodology as well check the impact of internet banking on financial deepening.

A descriptive exploration into internet banking was further conducted by Ngungi (2013) in Kenyan commercial banks. Including all the 43 registered banks, a census was also carried out to extract information from annual reports and issue of questionnaires. Using multiple regression, it discovered that although there was a weak positive relationship between online banking and banks financial performance, it was significant. This would be explained by online banking impact in cutting costs, increase in commission income and reduce staffing levels which was expected in the initial stages. According Ngungi (2013) internet banking is being used as marketing for customer satisfaction while expanding market to unbanked individuals as well as improve service quality and intensity of banking products. There need for time series data that can be used to compare whether there is any change in the financial depth which is what the current study endeavours to expound on.

METHODOLOGY

The causal Research design was adopted in this study as explained by (Kombo & Tromp, 2006). The study aimed to explain the causal relationship between banking innovations and financial deepening in Kenya. The choice of this design supported Oso and Onen (2009) who argued that correlation research design is appropriate whenever the study seeks to establish causal relationship between study variables. A complete count of all individuals or elements under consideration is known as target population (Kothari, 2011). Empirical examination was limited to only six tier one commercial banks. In the current study the target population composed of six banks

in tier one. Panel data was collected over eight-year period from 2010 to 2018. The quantitative data collected was analysed by descriptive statistics such as mean and standard deviation using Stata version 14. Inferential statistics were applied and included Product moment correlation coefficient for strength evaluation and regression modelling for nature of effect evaluation. According to Oso and Onen, (2009) the p value of an independent variable is compared with 5% and if it is less than 5% then there is enough evidence to reject the null hypotheses. P-value was used as a benchmark for

rejecting the null hypotheses as stated by (Sekaran & Bougie, 2013). The regression model that was applied is defined by the general equation: $Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \epsilon$

RESULTS AND DISCUSSIONS

Descriptive Analysis

Descriptive statistics were applied to show mean, standard deviation, Skewness and flatness of secondary data used in the study. The results of descriptive analysis are summarized in Table 1.

Table 1: Descriptive Results

	Financial Deepening	Mobile banking	Agency Banking	ATM Banking	Online Banking
Mean	16.61	16.46	20.18	19.41	20.88
Median	15.54	14.92	20.43	19.21	22.36
Maximum	42.70	30.30	28.05	29.75	30.19
Minimum	1.20	13.04	10.14	8.78	12.05
Std. Dev.	9.49	4.29	2.98	3.22	3.95
Skewness	0.82	1.78	-1.19	1.17	-0.50
Kurtosis	3.27	5.10	7.03	8.40	2.92
Jarque Bera	5.48	34.20	43.81	69.15	2.00
Probability	0.06	0.00	0.00	0.00	0.37
Sum	797.31	790.30	968.66	931.60	1002.31
Sum Sq. Dev.	4233.87	865.87	418.47	486.18	732.54
Observations	48	48	48	48	48

As shown in Table 1, the mean financial deepening was 16.61 percent which indicated that access to banking services increased by almost 17 percent per annum amongst commercial banks in tier one from 2011 to 2018. The minimum growth rate was 1.20 and a maximum of 42.70 which indicated wider variations among tier one commercial banks. This variation could be attributed to strategies by respective banks to provide banking services. The mean of tier mobile banking was 16.46 units per annum with a maximum of 30.30, the standard deviation was 4.29 units. Agency banking recorded mean of 20.18 units with minimum of 10.14 and standard deviation of 2.98 which was the least among independent variables.

The mean of ATM banking was 19.41 with maximum of 29.75 and minimum of 8.78 and skewness coefficient of 1.17 which indicated most banks in tier one had incorporated use of ATM banking services. Online banking had mean of 20.88 with minimum of 12.05 and maximum of 30.19 with a standard deviation of 3.95. The data was not normally distributed since it has Jarque Berra coefficients with p values less than 0.05. This provided enough evidence to warrant rejection against an alternative that the data was not normally distributed.

Lack of normality agreed with Githira, Muturi and Nasieku (2019) who found that data from annual financial statements of listed companies in East

Africa securities was not normally distributed. Increased access to financial services was in line with diffusion theory of financial innovation that argued that provision of services should change with changes in technological adoption. These was cemented by Kisaka *et al.*, (2015) who argued that financial deepening is contingent to use of mobile banking. Further, Maina and Mwangi (2014) incorporation of agency banking services has not only promoted financial deepening but supported provision of banking services in secure platforms since there is limited reliance on cash. The results

were in agreement with (Lewis, 2012). From descriptive statistics there is a core movement between adoption of banking innovations and financial deepening of tier one commercial banks in Kenya.

Correlation Analysis

Product Moment correlation coefficient was adopted to show the strength of the effect of banking innovations on financial deepening of tier one commercial banks in Kenya. Findings are shown in Table 2.

Table 2: Correlation Results

	Financial Deepening	Mobile banking	Agency banking	ATM banking	Internet Banking
Financial Deepening	1				
Mobile banking	0.61	1			
Agency banking	0.47	0.37	1		
ATM banking	0.66	0.58	0.58	1	
Internet Banking	0.34	0.20	0.22	0.23	1
	0.00	0.01	0.00	0.12	0.18

As shown in Table 2 there was positive and significant relationship between mobile banking and financial deepening of tier one commercial banks in Kenya ($\rho = 0.61$, p value < 0.05). These findings concurred with Kisaka *et al.*, (2015) and Kenyoru (2013) who reported positive and significant relationship between mobile banking and financial deepening. Agency banking has positive and significant relationship with financial deepening of tier one commercial banks in Kenya ($\rho = 0.47$, p value < 0.05). The findings support Maina and Mwangi (2014) and Munoru (2016) who documented positive and significant relationship between agency banking and banking performance.

ATM banking has positive and significant relationship with financial deepening of tier one commercial banks in Kenya ($\rho = 0.66$, p value

< 0.05). These findings mirror Atavachi (2013) and Adewoye (2014) who documented positive and significant relationship between ATM banking and banking performance. Internet banking has positive and significant relationship with financial deepening of tier one commercial banks in Kenya ($\rho = 0.34$, p value < 0.05). The findings support Njogu (2014) and Sumra *et al.*, (2011) documented positive and significant influence of internet banking on performance of commercial banks.

Regression Analysis

Random Effect Regression model was adopted to evaluate the relationship between adoptions of financial innovations and tier one commercial banks financial deepening in Kenya. Study findings are in Table 3.

Table 3: Regression Results

Variable	Coefficient	Robust Std. Error	t-Statistic	Prob.
C	-31.882	6.861	-4.647	0.000
Mobile banking	0.792	0.263	3.009	0.000
Agency banking	0.596	0.221	2.698	0.000
ATM banking	0.760	0.363	2.092	0.000
Online banking	0.416	0.150	2.771	0.000
R-squared	0.579	Mean dependent variables		8.752
Adjusted R-squared	0.540	S.D. dependent variables		8.010
S.E. of regression	5.435	Sum squared residuals		1270.036
F-statistic	14.773	Durbin-Watson stat		2.024
Probability (F-statistic)	0.000			

The coefficient (β) values present the nature of the relationship between adoption of each financial innovation and financial deepening. Adoption of financial innovations are of the form mobile banking, agency banking, ATM banking and online banking in tier financial deepening levels. Multiple regression model is of the form:

$$\text{Financial Deepening} = -31.882 + 0.792\text{Mobile Banking} + 0.596\text{Agency Banking} + 0.760\text{ATM Banking} + 0.416\text{Online Banking}$$

There was significant influence of banking innovations on financial deepening of tier one commercial banks in Kenya, $F = 14.773$, $p\text{-value} = 0.00$ and less than 5% level of significance. This implies that at least of the slope coefficients was non-zero. An R squared of 0.579, revealed that at least 57.9 percent of changes in financial deepening of commercial banks in Kenya can be accounted for by mobile banking, ATM banking, agency banking and online banking while the remaining percentage can be accounted for by other factors excluded in the model.

The first hypothesis of the study stated that there was no significant effect of mobile banking on financial deepening of tier one commercial banks in Kenya. There was significant relationship between mobile banking and financial deepening of tier one commercial bank in Kenya. Further, this effect was positive, hence unit increase in mobile banking increased financial deepening by 0.792 units while

holding agency banking, ATM banking and online banking constant ($\beta = 0.792$, $p\text{ value} = 0.00$ and less than 5% level of significance). These findings concurred with Ngii (2013), Kenyuru (2013) and Mwangi (2014) who documented positive and significant relationship between mobile banking and performance of commercial banks.

The second hypothesis of the study stated that there was no significant effect of agency banking on financial deepening of tier one commercial banks. Study findings indicates that agency banking had significant effect of financial deepening of tier one commercial banks in Kenya ($\beta = 0.596$, $p\text{ value} = 0.00$ and less than 5% level of significance). This effect was positive; thus, unit increase in agency banking increased financial deepening of commercial banks in Kenya by 0.596 units while holding mobile banking, ATM banking and online banking constant. These results concurred with Maina and Mwangi (2014), Ogetange (2014) and Munoru (2016) who documented positive and significant relationship between agency banking and performance of commercial banks.

The third hypothesis of the study stated that there was no significant effect of ATM banking and financial deepening of tier one commercial banks in Kenya. It was documented ATM banking has positive and significant effect of ATM banking on financial deepening of tier one commercial banks ($\beta = 0.760$, $p\text{ value} = 0.00$ and less than 5% level of

significance). This implies that unit increase in ATM banking increases financial deepening by 0.760 units while holding mobile, agency and online banking constant. These findings concurred with Akhisar *et al.*, (2015) and Danlami and Mayowa (2014) who documented positive and significant influence of ATM banking on performance.

The fourth hypothesis of the study stated that there was no significant association between internet banking and financial deepening of tier one commercial banks in Kenya. Study findings indicates that internet banking has positive and significant relationship with financial deepening of tier one commercial banks in Kenya ($\beta = 0.416$, p value = 0.00 and less than 5% level of significance). These results confirmed Ngungi (2013), Wanja (2014) and Nzioka (2014) who reported positive and significant relationship between internet banking and financial deepening.

CONCLUSIONS AND RECOMMENDATIONS

Based on the study findings several conclusions were made. For objective one, the study concluded that adoption of mobile banking positively affected financial deepening. Secondly, the study concluded that agency banking affect financial deepening. Also, the study concluded that ATM banking positively affects financial deepening in Tier One commercial banks in Kenya. Owing to desire for security while executing cash transactions and also financial inclusion, commercial banks encourage their clients to adopt use of plastic money., Finally, the study concluded that Internet banking positively affect financial deepening of commercial banks in tier one in Kenya. Owing to positive reception and adoption of internet there is need for commercial banks to take advantage of it since it will minimize provision of banking services.

Based on the study conclusions, several recommendations were drawn. First, the study recommends that commercial banks need to adopt mobile banking services to help the government in

achieving the goal on provision of banking services. The growth of mobile phone penetration have consistently aided access to commercial banking services. Since there are operational costs associated with use of mobile phones there is need to evaluate cost benefit analysis associated with integration of banking services and mobile phones. Also, caution should be exercised since there are likelihood of loss of mobile phone or be coerced to withdraw cash.

Secondly, the study recommends liberalization of banking regulators by Central Bank of Kenya and Capital Market Authority for listed tier one commercial banks to enable further financial innovations to enable further penetration of banks and client access of banking services. For the bank managers the study recommends that commercial banks need to integrate mobile banking in their operations since it has significant effect on financial deepening. Adoption of mobile banking, agency banking, ATM banking and internet banking would minimize operational costs. In addition, these operations enhance operations security for the clients

Recommendations for Further Research

From the current study there is need for subsequent study to be carried out to examine the effect of savings and credit cooperative society's innovations and financial deepening since there are key players in the financial sector.

Secondly, there is need for a similar study to be carried out to examine the effect of financial deepening in tier two and three commercial banks in Kenya.

Also, banks can be classified into local and foreign, listed and non-listed and their effect of banking innovations and financial deepening. Further, there is need to examine moderating effect of attributes such as bank size, income diversification on the effect of banking innovation on financial performance.

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