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Effect of Pesalink and Mvisa on Financial Deepening among Tier 1 Commercial Banks in Kenya

Daniel Mitau Serah[1], Dr. Gladys Bunyasi[2]

Abstract: ***The study sought to determine the joint effect of Pesalink and M-visa on financial deepening among tier I commercial banks in Kenya. Descriptive research design was adopted and a total of 8 tier I commercial banks were targeted. Census was used and thus all the 8 banks were covered. Primary data was collected using the questionnaire. The collected data was analyzed using descriptive statistics like means and standard deviations and inferential statistics covering correlation and regression analysis. The results were presented using tables and charts. The study concluded that PesaLink as well as M-visa are significant drivers of financial deepening among tier I commercial banks in Kenya. The study recommends that the sales managers of the tier I commercial banks should invest a lot of resources to create more awareness among customers on the need to increase the adoption of Pesalink and Mvisa. The Central Bank of Kenya should formulate regulations and guidelines that would promote Pesa link and m-visa models among tier I commercial banks in Kenya. The study was limited by a small sample size of 8 tier I commercial banks operating in Kenya. Future studies are recommended to be conducted linking electronic banking with other concepts aside from financial deepening. Besides the tier I commercial banks, future studies can be conducted focusing on the whole commercial banks for generalization of the findings.***

Keywords: Financial deepening, Pesalink, Mvisa, Tier I commercial Banks, Market Capitalization.

1. Introduction

The increasing forces of competition have affected the way organizations carry out their operations. The business environment is ever changing requiring organizations to come with the best way of remaining competitive and therefore improving on their financial Deepening. The forces of globalization have shaped the landscape of business operations today by ushering in new forms of technologies. Advancement in technology has made it possible for firms to effectively meet or exceed customer expectations. Technology had opened up alternative channels and streams of revenues of organizations today resulting into maximization of the wealth of shareholders (Pham, Cao, Nguyen & Tran, 2013).

Commercial banks are strongly regulated by the Central Bank of Kenya (CBK). They play an important role by mobilizing savings and deposits from customers hence contributing towards the growth of the economy. Commercial banks institutions today face a lot of competition from other firms offering financial services including Microfinance, insurance companies, SACCOs and digital lending platforms.Most corporate and high-income customers today require banking services at their convenience without the need to physically visit the banking halls. Customers today seek for payment channels that are secure, timely and reliable. This however can only be attained through adoption of technology in the electronic banking platform (CBK, 2016). It is therefore against these challenges and issues that many tiers I commercial banks today have adopted electronic banking in their operations.

E-banking is simply the automation of the operations of the bank (Turban, Outland, King, Lee, Liang & Turban, 2017). Electronic banking is the electronic link between customers and the bank aimed at preparing, managing and controlling all the financial transactions.

PesaLink facilitates transfer of money between different banks, from bank account to the mobile phone, in different currencies and also enable customers to pay for their goods. PesaLink is a real time 24-hour digital platform that allows bank to bank money transfers. Customers using PesaLink initiate the transfer through five main platforms namely mobile banking, ATM, internet banking, bank branch, agency banking outlets/Point of Sale terminals. PesaLink was conceptualized in 2012 and launched in February 2017. The money transfer platform is revolutionizing how money changes hands, creating innovative solutions that would lead to creation of global currency, establishing cheap and efficient payment and money transfer solutions. PesaLink is an initiative of the Kenya Bankers' Association (KBA), an umbrella body of the institutions licensed and regulated by the Central Bank of Kenya, with a current membership of 47 financial institutions. The idea for the conceptualization of the product came about in 2012 when commercial banks in Kenya realized that they were losing over Kshs 2.3 billion annually to telecommunication companies through mobile money transfer services, mostly Safaricom's MPESA platform (Thegeya, 2012).

These partnerships will have a huge positive impact on financial inclusivity as the cost of banking services will be lowered (Demombyenes, 2012).

Financial deepening has been used to refer to a condition where there exists sufficient liquidity and smooth process of financial institutions carrying out the financial intermediation process. It is a way in which quantity, quality and efficiency of financial intermediary services is improved (Sackey &Nkurumah, 2012). This means that deep financial market ensure that financial institutions can mobilize all surplus resources and channel them into deficit households in the most efficient way. Deep financial markets support economic activities of the nation which is an ingredient of economic development.

Financial deepening has been found to act as a catalyst for rapid economic growth as it accelerates the level of investment in an economy. Deep financial markets ensure that all resources available in an economy are put into useful use as opposed to markets with low depth which means that some resources are stored outside the formal financial system thus making it difficult to account for them (FSDK, 2011).

2. Statement of the Problem

Commercial banks are under pressure to offer services that meet the ever-changing needs of their customers. There is also growing level of competition given by the fact that different digital lending Apps like Tala and Branch have emerged offering some products like loan facilities similar to commercial banks. As noted by CBK (2016), banks are now facing high operational cost, Management inefficiencies and liquidity difficulties which led to the wave of mergers, acquisition and even collapse of some banks as witnessed recently in Kenya. Commercial banks have been losing billions to mobile firms particularly Safaricom Mpesa payment platform (Thegeya, 2012). Thus, it is through adoption of e-banking that commercial banks are able to meet these challenges. Although tier I commercial banks have largely adopted e-banking platforms over the last decade, there is no sufficient evidence to conclude whether this has influenced their financial deepening. M-visa and Pesalink (CBK, 2017) are some of the latest innovation in banking sector in kenya. Empirical analysis of the link between e-banking and financial performance has yield mixed results of positive and negative influence. It is therefore economically feasible to determine whether investment in e-banking among commercial banks has in any way influenced their financial performance.

In some regions and specifically rural areas where there is no access to banks and where telecommunication network is very poor still complain of poor banking services offered through electronic banking hence challenge of financial deepening also resulting into more gaps. To fill these gaps, the current study sought to determine the effect of Pesalink and Mvisaon financial deepening among tier I commercial banks in Kenya?

Objective of the study

To investigate the joint effect of PesaLink and M-visa on financial deepening among tier I commercial banks in Kenya

Research Question

What is the joint effect of PesaLink and M-visa on financial deepening among tier I commercial banks in Kenya?

3. Literature Review

Technology Acceptance Model

Warshaw, Bagozzi and Davis (1989) advanced this theory to explain the factors that influence adoption of new technology based on a social setting. As per this theory, two factors; Perceived usefulness and perceived ease of use determine the adoption of technology in such a social system. In perceived usefulness, an individual believes that the acceptance and adoption of technology would increase efficiency and thus improving the performance of the job being undertaken. Perceived ease of use on the other hand arises when employees believe that the use and operation of a particular technology is easy.

However, these two important factors to some extent are influenced by external factors like forces within the environment. TAM has been used extensively in much research on information and communication technology. For instance, Arnett and Liu (2000) looked at critical variables in building a website in view of the TAM theory. Pavlou (2003) proposed the separation in the use of surveys and experiment designs based on the Electronic Commerce Acceptance Model of Online Consumers. Based on this theory, a positive relationship is expected between adoption of electronic banking and financial deepening of firms.

Diffusion Innovation Theory

The theory formulated by Rogers (1995) suggests the stages an innovation follow as it gets spread through a social system. Diffusion is the adoption of an innovation over time in a social system, as result of this it leads acceptance of new idea, behavior or even tangible innovation. Roger identified key characteristics that influences adoption of an innovation. According him this are Relative advantage, complexity, compatibility and observability. Information with regard to an innovation, the key features flow through social systems where adopters are located. Through information seeking behavior, potential adopters get to know the benefits accruing from the use of that innovation.

Whenever a new innovation is introduced in an organization, there exist a number of adopters ranging from innovators all through to laggards.

A clear comprehension of the features and attributes of such individuals plays an important role in implementation of new forms of technology in an organization. One of forms of technologies is the Pesa link and Mvisaplatform. Adoption of Pesa link and Mvisais expected to have a Joined positive effect on financial deepening because it's found to be convenient, timely and requires less mental effort.

Burns (2015) did a study on mobile money and financial development with a focus on M-PESA in Kenya. With a focus on Kenya as a point of reference, it was indicated that revolutions on mobile banking and the issue of agency banking have changed the way banking entities carry out their activities.

Muhoro and Mungai (2018) focused on real time gross settlement (RTGS) and its interaction with the ability of Kenyan banking entities to remain profitable. The proxy of the dependent variable was ROA and it was supported by development and testing of hypotheses. In total, 43 banking entities were covered and the census was adopted. It was shown that RTGS and ROA are significantly linked with each other.

Githii and Mwangi (2018) studied the effect of technology based financial innovations on non-interest income of commercial banks in Kenya. The key emphasis of the study

was on adoption of ATMs, RTGS, and electronic fund transfer (EFT) and their role as far as non-interest income was concerned. The adopted design was descriptive and it was shown that innovations driven by technology have significantly enhanced the ability of banking entities to perform.

Kirathe (2018) studied the role of pesalink innovation in business model re-alignment of commercial banks in Kenya. The study was aimed at establishing the role of PesaLink innovation as a financial innovation in business model realignment of commercial banks in Kenya. It was specifically aimed to establish how, value creation, quality of resources, imitability and affect business model realignment of commercial banks in Kenya. The adopted design was descriptive and information was gathered from primary sources. In total, 42 banking entities were covered by the study. It was shown that pesalink and enhanced the ability of banking entities to perform in Kenyan context.

Yao, Di, Zheng and Xu (2018) looked at the impact of payment technology innovations on the traditional financial industry. The study was supported by the use of regression analysis with the time horizon covering 2007 all through to 2014. It was shown that for China, the presence of payments by third parties had enhanced and created more value. It was shared that technological innovations as payment solutions had positively and significantly enhanced the growth of economies like China. The gap arising from this study was that it was done in China and not in Kenya.

Danchev, Gatopoulos and Vettas (2018) looked at how payments through digital platforms had penetrated using the context of Greece. The period of consideration was 2014 all through to 2017. The study was informed by the fact that there had been an increase in use of digital payment solutions in China over this period of consideration. It was shown that there had been an improvement in compliance with tax matters after emergence of electronic payment solutions. This study however creates a contextual gap since it was done in Greece and not in Kenya.

Zandi, Singh and Irving (2013) focused on payment solutions that are electronically induced and their impact on the growth of the economy. The period of consideration was 2011 all through to 2015. The growth of the economy was determined through measures like job creation and the level of GDP. The methodology adopted was panel data and it was shown that payment platforms and the growth of the economy are interlinked with each other. The study however creates a conceptual gap as it was conducted on the growth of the economy and not financial deepening.

Research Gap

Most of these studies looked at effect of e-banking and different paradigm such as Financial performance, Return generated on asset, Economic growth or done in other countries which is different from what the current study sought to find out that is, Joint effect of Pesalink and Mvisa on financial deepening among Tier 1 commercial banks in Kenya.

4. Methodology

The study adopted a descriptive research design in determining the joint effect of pesalink and Mvisa on financial deepening among tier I banks. Descriptive Research design is a scientific method which involves observing and describing the behavior of a subject without influencing it in any way. It's about describing people who take part in the study. It uses scientific methods and procedures to collect raw data and create structures that describe the existing characteristics of a defined target population. According to Yin (2014), descriptive research design is ideal since it reports things the way things are in the current state. It also allows for more data to be collected and tested hence suitable for obtaining data on definitive goals of the defined issues in this study (Creswell, 2013). It permits accurate estimation of the population parameters and subsequent generalization (Churchill and Brown, 2007)

This study used primary data to achieve the objectives. Questionnaire was sent through email to operations department, finance department, IT department, Marketing department and customer relationship departments, Digital business department, Cards operations departments, Accounts Maintenance departments, Innovations & creativity department and administrations department from each of Tier I commercial banks. In total, 10 questionnaires were sent through email to each of the 8 banks.

The instruments of the study were piloted to determine their reliability and validity. The research questionnaire was piloted among 10 respondents selected from tier II commercial banks. The resultant piloted instruments used the values of Cronbach Alpha Coefficients to determine reliability. Cronbach Alpha coefficient of 0.7 and above will mean that the instrument of the study is reliable. (According to Cronbach (1951))

The study used descriptive statistics covering the use of means to describe the variables. The presentation of the findings was done using frequency distribution tables, pie charts and graphs, mean and standard deviation. For inferences and deductions, inferential statistics covering correlation and regression was used.

5. Data Analysis and Findings

The researcher covered 8 tier I commercial banks and collected primary data, ten questionnaires were administered to each of the 8 banks giving the total value of n as 80. However, from the 80 questionnaires that were administered to the respondents from the tier I commercial banks, 50 of them were dully filled and returned. In other words, out of the 8 commercial banks, 5 of them responded. This was equivalent to a response rate of 62.5% as presented in Figure 1

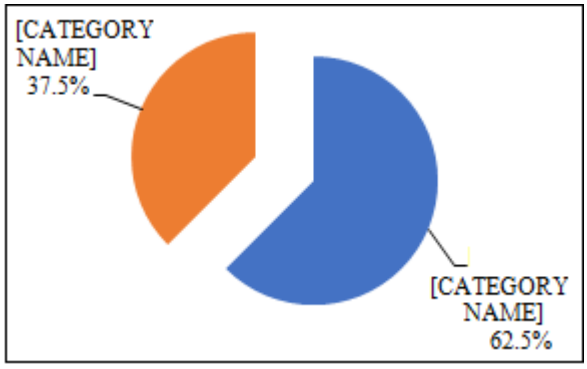

Figure 1: Response Rate
Source: Survey Data (2020)

The response rate in Figure 1 is relatively lower than the anticipated rate of above 70%. It is however consistent with the assertion of Mugenda and Mugenda (2003) who argued that a response rate of above 60% is good for analysis and presentation. One factor that could have contributed towards this low response rate could have been the corvid-19 pandemic that complicated the entire process of data collection.

The research questionnaire was piloted among 10 respondents selected from tier II commercial banks. The essence of piloting the questionnaire was to establish its reliability. The dully flied questionnaire from the pilot test was coded into SPSS and the values of Cronbach Alpha Coefficients were computed so as to determine reliability. Table 1 is a summary of the findings.

Table 1: Reliability Results

Variable	Cronbach's Alpha	No. of Items
PesaLink and M-Visa	.989	17

Source: Survey Data (2020)

From 1, PesaLink and M-visa had a total of 17 items represented by Cronbach Coefficient value of 0.989. According to Cronbach (1951), the values of Cronbach Alpha coefficient above 0.7 indicate that the instrument is reliable. Thus, it can be inferred that the questionnaire used in the study as a tool for collecting primary data was reliable.

Table 2: Descriptive Statistics on PesaLink, M-visa and Financial Deepening

	n	Mean	Std. Dev
PesaLink enable our customers to transfer money from the account in this bank to a different bank	50	3.76	.686
PesaLink helps our customer to send money in foreign currencies	50	3.78	1.035
PesaLink helps our customers to pay for goods conveniently	50	3.64	1.102
Our customers are able to pay for their services through PesaLink	50	3.90	.974
PesaLink helps our customers to send money from the bank directly to their Mpesa Accounts	50	3.68	.998
Most of the revenues of this institution are generated from the huge amount of PesaLink transactions	50	3.90	.762
A large volume of transactionsare moved by our customers through PesaLink	50	3.50	1.035
Payment of goods through PesaLink is secure for our customer	50	3.82	.719
We generate revenue from customer interbank transfer through PesaLink in this institution	50	3.44	.993
Our customers are able to pay for goods through M-visa	50	3.88	.659
It is safe for our customers to use M-visa in paying for bills	50	3.72	.948
It is convenient for our customers to use M-visa	50	3.60	.989
There are no transaction charges for our customers who use M-visa	50	3.50	1.092
Absence of transaction fee when using M-visa has grown the customer base of this institution	50	3.82	.747
The convenience of using PesaLink has increased the amount of transaction moved by customers in this institution	50	3.78	.953
The safety of using M-visa has increased the volume of transaction moved by customers	50	3.58	.882
The huge volume of transaction moved through M-visa have given competitive advantage to this institution	50	3.86	.808
Composite Score	50	3.72	.905

Source: Survey Data (2020)

The results in Table 2 indicate an aggregate score (M=3.72, SD=0.905). This means that respondents agreed on M-visa and PesaLink as some of the electronic banking platforms among their banking institutions. The overall value of standard deviation was relatively lower than 1; which means that respondents shared divergent views and opinions on Pesalink and M-visa as electronic banking platforms in their organizations. Respondents agreed that customers were able to pay for their services through PesaLink (M=3.90, SD=0.974), most of the revenues of the institution was generated from the huge amount of PesaLink transactions (M=3.90, SD=0.762), the customers were able to pay for goods through M-visa (M=3.88, SD=0.659), huge volume of transaction moved through M-visa had given competitive advantage to the institution (M=3.86, SD=0.808), absence of transaction fee when using M-visa had grown the customer base of the institution (M=3.82, SD=0.747) and that payment of goods through PesaLink was secure for customers (M=3.82, SD=0.719).

The respondents of the study were in agreement that PesaLink helped customer to send money in foreign currencies (M=3.78, SD=1.035), the convenience of using PesaLink had increased the amount of transaction moved by customers in the institution (M=3.78, SD=.953), PesaLink enable customers to transfer money from the account in the bank to a different bank (M=3.76, SD=0.686) and that it was safe for the customers to use M-visa in paying for bills (M=3.72, SD=0.948). Respondents also agreed that PesaLink helped customers to send money from the bank directly to their Mpesa Accounts (M=3.68, SD=0.998), PesaLink helps customers to pay for goods conveniently (M=3.64, SD=1.102), it was convenient for customers to use M-visa (M=3.60, SD=0.989), the safety of using M-visa had increased the volume of transaction moved by customers (M=3.58, SD=0.882), there are no transaction charges for

customers who used M-visa (M=3.50, SD=1.092) and the large volume of transactions were moved by customers through PesaLink (M=3.50, SD=1.03). On whether the bank generated revenue from customer interbank transfer through PesaLink (M=3.44, SD=0.993), majority of the respondents were neutral.

Respondents were asked to indicate other ways through which PesaLink affected financial depending in their organization. From the findings, some of the respondents shared that PesaLink was a flexible banking model and that customers could transact through PesaLink any time and thus flexible. Other respondents noted that PesaLink was less time consuming for customers, more convenient and ideal for customers. Respondents indicated that PesaLink facilitated real time transfer of money from one account to another.

The study sought further to establish other ways through which M-visa affected financial deepening in the institutions that were studied. From the results, majority of the respondents noted that M-visa had reduced the number of staffs in the bank, helped the customers to settle their bills more conveniently and that it was convenient for customers. Other respondents noted that M-visa was economical for the customers, it was real time, more flexible for customers to pay their bills real time and that it saved the customers' time of visiting local branches to pay bills.

Correlation analysis was conducted to determine the relationship between electronic banking and financial deepening. In interpretation correlation results, the study relied on the values of Pearson Correlation coefficients (r). This value of r usually ranges from 0-1, it can be positive or negative and it signifies the strength as well as direction of the relationship between the variables of the study. The value of r within the range of 0 to 0.29 indicate weak relationship, moderate relationship is indicated by values of r from 0.3 to 0.49. The values of r above 0.5 to 1 are regarded as a strong relationship. Table 3 is a summary of the results.

Table 3: Correlation Analysis

Correlation

		PesaLink_and_Mvisa	Financial_Depening
PesaLink_and_Mvisa	Pearson Correlation	1	.604
	Sig. (2-tailed)		.000
	N	50	50
Financial_Depening	Pearson Correlation	.604	1
	Sig. (2-tailed)	.000	
	N	50	50

Jointly, PesaLink and M-visa had the value of r as 0.604 which was also positive. The implication of this finding is that PesaLink and M-visa have a strong joint relationship with financial deepening among tier I commercial banks. These findings are echoed by Burns (2015) who did a study on mobile money and financial development with a focus on M-PESA in Kenya and indicated that revolutions on mobile banking and the issue of agency banking have changed the way banking entities carry out their activities. Kirathe (2018) studied the role of pesalink innovation in business model re-alignment of commercial banks in Kenya and indicated that pesalink and enhanced the ability of banking entities to perform in Kenyan context. Yao, Di, Zheng and Xu (2018) looked at the impact of payment technology innovations on the traditional financial industry and shared those technological innovations as payment solutions have positively and significantly enhanced the growth of economies like China.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.604[a]	.364	.351	4.11498

a. Predictors: (Constant), Financial_Depening

From Table 4, the coefficient of correlation R was 0.604; this means that jointly Pesalink and Mvisahas a strong and positive relationship with financial deepening among tier I commercial banks. The coefficient of determination R square is 0.364; The adjusted R square was given as 0.351; this means that 35.2% variation in financial deepening of tier I commercial banks is explained Jointly by pesalink and Mvisa while 64.8% of the variation is explained by other; factors not included in the study.

Table 5: ANOVA[b]

Model		Sum of Square	Df	Mean Square	F	Sig.
1	Regresion	.076	1	.076	27.516	.000a
	Residual	.132	48	.003		
	Total	.208	49			

a. Predictors: (Constant), PesaLink_and_Mvisa
b. Dependent Variable: Financial_Depening

Table 5 give the value of F calculated as 27.516 which is interpreted to imply that the overall model of the study was significant in predicting the link between the effect of Pesalink and Mvisa on financial deepening. The p-value is 0.000 which is lower than 0.05. Thus, it can be deduced that Pesalink and Mvisa has significant effect on financial deepening among tier I commercial banks.

Table 6: Regression Beta Coefficients and Significance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.172	0.093		-1.851	0.07
	PesaLink_and_Mvisa	0.008	0.001	0.604	5.246	0

a. Dependent Variable: Financial Deepening

The joint effect of PesaLink and M-visa on financial deepening among tier I commercial banks in Kenya was sought by the study. The study found out that when all the variables of the study are held constant, a unit change in PesaLink and M-visa would jointly result into 0.008 unit increase in financial deepening among tier 1 commercial banks. At 5%, PesaLink and M-visa had $p<0.05$ and therefore they were significant. Githii and Mwangi (2018) studied the effect of technology based financial innovations on non-interest income of commercial banks in Kenya and showed that innovations driven by technology have significantly enhanced the ability of banking entities to perform. Kirathe (2018) studied the role of pesalink

innovation in business model re-alignment of commercial banks in Kenya and indicated that pesalink and enhanced the ability of banking entities to perform in Kenyan context. Yao, Di, Zheng and Xu (2018) looked at the impact of payment technology innovations on the traditional financial industry and shared those technological innovations as payment solutions have positively and significantly enhanced the growth of economies like China. Danchev, Gatopoulos and Vettas (2018) looked at how payments through digital platforms have penetrated using the context of Greece and noted that there had been an improvement in compliance with tax matters after emergence of electronic payment solutions. Zandi, Singh and Irving (2013) focused on payment solutions that are electronically induced and their impact on the growth of the economy and indicated that payment platforms and the growth of the economy are interlinked with each other.

6. Summary of the Findings

All the studied banks offered PesaLink and M-visa services to their customers. The results of correlation analysis indicated that PesaLink and M-visa have a strong joint relationship with financial deepening among tier I commercial banks. These findings are echoed by Burns (2015) who did a study on mobile money and financial development with a focus on M-PESA in Kenya and indicated that revolutions on mobile banking and the issue of agency banking have changed the way banking entities carry out their activities. Kirathe (2018) studied the role of pesalink innovation in business model re-alignment of commercial banks in Kenya and indicated that pesalink and enhanced the ability of banking entities to perform in Kenyan context

When all the variables of the study are held constant, a unit change in PesaLink and M-visa would jointly result into 0.008 unit increase in financial deepening among tier 1 commercial banks. The results are consistent with Burns (2015), Muhoro and Mungai (2018) focused on real time gross settlement (RTGS) and its interaction with the ability of Kenyan banking entities to remain profitable and shared that RTGS and ROA are significantly linked with each other. Githii and Mwangi (2018) studied the effect of technology based financial innovations on non-interest income of commercial banks in Kenya and showed that innovations driven by technology have significantly enhanced the ability of banking entities to perform. Kirathe (2018) studied the role of pesalink innovation in business model re-alignment of commercial banks in Kenya and indicated that pesalink and enhanced the ability of banking entities to perform in Kenyan context.

7. Conclusion and Recommendations

The study sought to investigate the joint effect of PesaLink and M-visa on financial deepening among tier I commercial banks in Kenya. It was noted that all the studied banks offered PesaLink and M-visa services to their customers. The results of correlation analysis indicated that PesaLink and M-visa have a strong joint relationship with financial deepening among tier I commercial banks. The study further noted that PesaLink and M-visa jointly have significant effect on financial deepening among tier 1 commercial banks.

From, regression analysis, Pesalink and m-visa had the less but significant effect on financial deepening among tier I commercial banks in Kenya. These are the latest innovations in the banking sector that probably had not been highly adopted by the customers of the banks. Thus, more awareness should be created among customers on the need to constantly adopt PesaLink and M-visa so as to enhance financial deepening of tier I commercial banks.

8. Limitation of the Study

The study was limited by a small sample size of 8 tier I commercial banks operating in Kenya. The small sample size emanated from the relatively smaller target population of these institutions. The small sample size made it hard for generalization of the findings to the rest of the commercial banks in Kenya. The study was limited to collection of both primary data and questionnaire was used in collection of primary data. During collection of primary data there was a health care crisis that had been created by Covid-19 pandemic and this affected the entire process of data collection. This limitation resulted into a relatively low response rate of 62.5% that was reported in this study.

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