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The Effect of Mobile Banking on Financial Performance of Commercial Banks Listed in Nairobi Securities Exchange

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Abstract: The study sought to examine the effect of mobile banking on financial performance of listed commercial banks in Kenya. The research adopted a causal research design. The research targeted the 12 listed commercial banks that operated between 2016 to 2020. Annual panel data sources running from 2016 to December 2020 was adopted in the current study." The collected panel data for the period of between 2016 and 2020 was analyzed using Microsoft excel. The study adopted OLS regression model for the purpose of estimating the coefficients and associated p-values to enable the fitting the model and forecasting. The effect of mobile phone-based loans on financial performance was direct and major. The study also showed that Mobile Banking Volume of Transactions had a direct and significant effect on financial performance. Mobile Banking Value of Transactions also had a direct and significant. The analysis also revealed that the effect of asset quality on financial performance was inverse and significant. The effect of Capital Adequacy on financial performance was direct but not significant. Finally, the effect of Bank size on financial performance was positive and significant. The study thus concluded that mobile banking, asset quality, capital adequacy and bank size had a significant effect on financial performance of listed commercial banks in Kenya. The study thus suggests to management of listed commercial banks to improved mobile banking technologies and platform for easy access and use by customers. Management of listed commercial banks to issue high quality loans to customers. The banks should continue performing back ground check on customers' credit worthiness to lower incidences of nonperforming loans. Management of listed commercial banks to continue increasing the size of their banks. The banks can increase their investment in financial assets such as treasury bills and bonds.

Keywords: Mobile Banking, Financial Performance, Asset Quality, Capital Adequacy, Bank Size.

1. Introduction

The introduction of mobile banking has revolutionized and redefined the ways banks are operating with mobile banking considered as a critical aspect of banks service provision and a driver of financial performance (Ongore & Kusa, 2013). The need to lower cost of operations has pushed financial institutions to adopt financial technologies like Mobile Banking (MB) among other financial technologies. However, significant fall in cost can only be achieved if more banks customers adopt the product (Gikandi & Bloor, 2010). Empirical and theoretical literature has tended to establish a direct causal effect link between financial performance and MB. Mobile banking can aid in lowering the cost of financial intermediation by financial institutions that further leads to their improved profitability level among other indicators of financial performance. Okiro and Ndungu (2013) established that MB and internet banking has improved the efficiency of banking institutions. Mobile banking is the process of offering banks customers an opportunity to transact through the mobile phone device (Anyasi & Otubu, 2009). MB includes any transaction carried by bank customer, without having to visit the banking hall, via a mobile phone device (Tiwari, Buse and Herstatt, 2006). The term MB is often used interchangeably with other terms like M- money, M-banking, M-transfer and they refer to a combination of applications that makes it possible for mobile phone users to access the bank accounts and perform transactions just like they would in a brick-and-mortar bank. Mobile banking in the context of this study refers to transactions carried by bank customers through the mobile phone gadget without having to visit the banking hall (Shaikh & Karjaluoto, 2015).

The use and adoption of MB has enabled the population in both advanced and developing economies to access financial services including credit, savings facilities, insurance among other services. MB has proved critical in complementing financial services being given by brick-and-mortar banks (Baabdullah et al. 2019). MB platform makes it possible to carry out transactions without having to use the hard currency. MB in the form of M-Pesa in Kenya provided by Safaricom has made it possible to lower cost of money transfer from one person to another or from one organization to another. Most financial institutions like Equity and National B have partnered with Mpesa to offer financial services like loans to their customers in Kenya (Njiraini & Anyanzwa, 2008). Financial performance is an indicator of how best business organization utilises assets at their disposal to earn revenues to their owners. Financial performance is the extent to which an enterprise has achieved its objectives of profitability (Singla, 2008). All firms need to have good performance to ensure growth and survival. A firm with poor performance cannot easily attract capital; similarly, it cannot withstand the competitive environment. As per Adeusi eta al (2014) noted that financial performance is the monetary related state of a firm in at a given time, which is otherwise called financial stability. Financial performance in this study will imply the quantitative performance of a firm in terms of profitability level achieved within a financial year. Financial performance is critical to any business organization as it generates resources needed to settle business cost operation and compensate the providers of capital (Adam, 2014). The capability of an organization to perform is based on their ability to harness the worth of its resources like assets to generate revenues in an efficient way. There is direct link between book keeping, financial consultancy, budgeting and positive financial performance (Musyoki & Kadubo, 2012). Financial performance also acts as an indicator for measuring the effectiveness of the management in achieving the goals of the business. Financial performance is therefore an economic goal of the business firm where other objective draw from i.e., profits for the owners, salaries for the employees among other stakeholders.

There are 43 commercial banks licensed by Central Bank of Kenya (CBK) of which 12 banks are listed at the Nairobi Securities Exchange. The listed banks include Kenya Commercial bank, Standard chartered bank, Equity Group Holdings, Absa bank Kenya, Co-operative Bank, Housing Finance group, National Commercial Bank of Africa Group, National Bank of Kenya, BK Group, Stanbic bank, Diamond Trust Bank and I & M Bank (NSE,2020). The listed banks apart from being licensed by CBK, they are also regulated by the capital market authority (CMA). The adoption MB among the commercial banks in general and listed commercial banks in particular has been rising occasioned by stiff competition which has been flattening their profitability. The MPESA product provided by Safaricom, a communication firm in Kenya, has also stiffen the competition in money transfer and payment services. “This has threatened the financial performance of listed commercial banks in Kenya. The banks have been steadily adopting mobile banking plus other financial technologies to stay ahead of competition. As at 2020, the central bank reported there were about sixty-one million mobile phone subscribers in 2020 a rise from fifty-five million active mobile phone subscribers in 2019. Further, the number of mobile money agents increased to 282,929 in 2020 from 224,108 agents in 2019 leading to increased value of transactions from 383 billion in 2019 to 606 billion in in 2020 (CBK,2020). The adoption of mobile banking has been rising among listed commercial banks in Kenya. The banks have been steadily adopting MB plus other financial technologies to stay ahead of competition. Banking sector realised a deep in financial performance in 2020 due to the impacts of COVID-19 pandemic. The profit before tax of the industry declined from 159 billion Kenyan shilling in 2019 to 112 billion Kenyan shillings in 2020. The decline in in financial performance was occasioned by reduced uptake of credit and upsurge of non-performing loans. The adoption of mobile banking can help shore up the financial performance of listed commercial banks that was greatly dented during the COVID-19 pandemic (CBK, 2020). Empirical literature has revealed a number of gaps in literature that needs to be filled. Firs, majority of studies have tended to examine the effect of MB on financial innovations with few studies on financial performance. Secondly, studies in Kenya have tended to examine all commercial banks with few studies on listed commercial banks. Finally, few studies have introduced control variables like bank size, asset quality and capital adequacy. The study thus sought to answer the research question: What is the effect of mobile banking on financial performance of commercial banks listed at the Nairobi Securities Exchange?

2. Literature Review

The study was based on financial innovation theory and financial intermediation theory. Financial innovation theory proposed by Silber (1983) holds that that expansion of financial services by financial institutions was a critical role leading to financial (Li & Zeng, 2016). The theory postulates that innovations in finance are the barriers of present in old model of commercial banking. The financial intermediation theory initially proposed by Akerlof (1970) holds that financial intermediation is a process that connects those in need of funds to those with surplus funds through the commercial bank. The theory offers an insight in explaining that mobile banking in financial sector assists in financial intermediation lowering information asymmetry, cost of running physical banks and other operational costs hence reduced cost of financial intermediation that eventually result to increased financial performance. In the Kenyan banking sector, Mutua (2017) evaluated the contribution of mobile banking to financial performance. The study adopted applied descriptive approach to collect and analyse data sourced from 43 commercial banks. The dependent variable was financial performance measured by ROA and the

independent variable was mobile banking. The study adopted multivariate regression where mobile had a direct effect on ROA. Mutua (2017) focused on all commercial banks which could be affected differently by mobile banking. Ouma, Odongo and Were (2017) examined the connection between use of mobile phones in providing in mobilization of savings in sub–Saharan Africa. The study adopted logistic regression where results revealed that accessibility and use of mobile phones in delivering financial products enhances the chances of saving at household level. Furthermore, study showed that mobile financial services have major effect on amount saved. Ouma, Odongo and Were (2017) was however limited to one financial technology hence there is a gap in other financial technologies that may also have role on financial inclusion.

Cleveland (2016) evaluated the causal effect link between performance and adoption of mobile banking by bank customers. The study was a correlation study where bank's performance among other variables were related with adoption of mobile banking in Nigeria. The study adopted OLS regression with finding showing that mobile banking enhances banks' balance sheet in addition to improving customer retention capacity of the banks. Further, mobile banking led to reduced investment in brick-and-mortar banking as well as staff costs. In a study of commercial banks operating in Nigeria, Bagudu, Mohd and Roslan (2017) evaluated how mobile banking influences financial performance. The research randomly picked twenty-two commercial banks to participate in the study of which two individuals was picked from each bank to fill questionnaires used in data collection. The study finally concluded that mobile banking was helpful in directly enhancing the financial performance of the studied banks. Bagudu, Mohd and Roslan (2017) was limited to Nigeria that has different operating environment from that of Kenya. In another study in Kenya among commercial banks, Kithaka (2014) sought to evaluate the contribution of mobile banking to financial performance of the firms. The study employed Cross sectional survey to collect and analyse data from the commercial banks that offered mobile banking." The study was based on panel data regression model where mobile banking directly affected the financial performance in a major way. Kithaka (2014) was too based on all commercial banks in Kenya even though commercial banks at different tires have different operations. Harelimana (2017) evaluated the contribution to financial performance by the adoption of mobile banking. The study adopted both primary and secondary data collection tools. Data was mixed methodology kind where data was collected and analysed using qualitative and quantitative techniques. The results showed that firms' revenues were enhanced by adoption of mobile banking. Harelimana (2017) was a case study of one bank in Rwanda and is not usable for application and generalization to other banks. In a study among commercial banks in Ghana, Owusu Osei-Wusu and Amanor (2020) evaluated the combined effect of internet and mobile banking on performance. The study relied on panel data sourced from twenty banks that operated between 2016 to 2019. The study adopted data envelopment analysis where findings showed that the use of internet banking combined with mobile banking has enhanced financial performance significantly. Owusu Osei-Wusu and Amanor (2020) was based in Ghana that has different orating environment from the banks in Kenya and another study in Kenya will increase the usability of the study locally.

Maina and Mungai (2019) sought to evaluate the contribution to financial performance by adoption of mobile banking in Kenya. The study was based on eight major commercial banks that are grouped under tier one banks. The study sourced panel data from the central banks with pooled cross-sectional model being adopted where findings showed that withdrawals made over the mobile banking, mobile credit, mobile banking payment had a major direct effect on financial performance of the studied banks." The study by Maina and Mungai (2019) was limited to only eight tire one banks hence another study that considers all the listed commercial banks with a variety of variables of mobile banking and control variable would enhance the applicability of the current study. Another study in Indonesia was carried out by Limijaya and Martowidjojo (2021) to evaluate how performance of banks was influenced by E-banking. The e-banking was operatonalised in terms of mobile banking, internet banking and ATM. The ROA, ROE and NIM were used as the proxies for financial performance. The study focused on thirty-six banks with secondary data from 2015 to 2019. Multiple OLS regression model was adopted with findings revealing that Internet banking and ATM directly affected performance of commercial banks. However, the effect of mobile banking was inverse implying reduced financial performance with adoption of mobile banking.

3. Methodology

The research adopted a causal research design. This method is preferred since it established how a variable causes the changes in other variables in the research. The focus was on how mobile banking, asset quality, capital adequacy and firm size explains financial performance. The research targeted the 12 listed commercial banks that operated between 2016 to 2020. The listed banks include Coop Bank, KCB, Equity Bank, Absa bank Kenya, HF bank, NCBA, National Bank of Kenya, Standard chartered bank, BK Group, Stanbic bank, DT Bank and I & M Bank (NSE,2020). A census was used without any sampling being undertaken. Annual panel data sources running from 2016 to December 2020 was adopted in the current study. Data on mobile banking volume of transactions, value of transactions, mobile phone-based loans, capital adequacy, firm size and asset quality were sourced from published audited annual reports of banks and CBK annual reports. Microsoft excel was used as a secondary data collection template as its capable for inputting and managing the data. The collected panel data for the period of between 2016 and 2020 was analysed using Microsoft excel. Descriptive statics included Mean, standard deviation, minimum, maximum, Skewness and Kurtosis and trends movement analysis. Regarding inferential statistical analysis, OLS regression model was adopted for the purpose of estimating the coefficients and associated p-values to enable the fitting the model and

forecasting. The study was based on the panel regression model presented in equation (2).

$$\mathbf{ROA_{it}} = \alpha_o + \alpha_1\mathbf{M1_{it}} + \alpha_2\mathbf{M2_{it}} + \alpha_3\mathbf{M3_{it}} + \alpha_4\mathbf{AQ_{it}} + \boldsymbol{\alpha}\mathbf{SIZE_{it}} + \boldsymbol{\alpha}_5\mathbf{CA_{it}} + + \boldsymbol{\mu}_{it} \quad (1)$$

WhereROA- Returns on Assets, M1 – Mobile Phone based loans, M2 – Mobile Banking Volume of Transactions M3- Mobile Banking Value of Transactions, AQ- Asset Quality, CA – Capital Adequacy, SIZE- Bank Size, μ-error term, αi -coefficients measuring magnitude of changes in the dependent variable, α0 – intercept term, t – Current time and i- Cross-sectional Units (listed commercial banks). The research used 5% level of significance to establish whether or not mobile banking and the control variable contributes to financial performance of commercial banks. If p-values in the regression model are less than 0.05 then the study would conclude that mobile banking has a significant effect on financial performance.

4. Results

4.1 Descriptive Analysis

The descriptive analysis was based on measures of central tendency and dispersal including maximum, minimum, mean and standard deviation. The findings are presented in Table 1.

Table 1: Descriptive Analysis

	ROA (%)	M1(Billions)	M2(Thousands)	M3(Billions)	CA	SIZE(millions)	AQ
Mean	2.19	3.0	8,737	21.1	0.152417	234,871	0.079843
SD	2.96	2.3	2,566	10.8	0.024618	223,622	0.034485
MIN	1.04	1.9	512	0.2	0.088	115,114	0.0014
MAX	7.4	6.1	13,886	50.5	0.186	758,345	0.47679
N	60	60	60	60	60	60	60

Note: M1 – Mobile Phone based loans , M2 – Mobile Banking Volume of Transactions , M3- Mobile Banking Value of Transactions , AQ- Asset Quality , CA – Capital Adequacy and SIZE- Bank Size

Financial performance was measured by Return on assets. The mean ROA for listed commercial banks was 2.19 % with a standard deviation of 2.96% around the mean. The minimum ROA was 1.04% capturing the listed bank with the lowest ROA in the study period. The maximum was 7.4% capturing the listed banks with the highest ROA in the study period. The mobile phone-based loans was measured by value of loans offered over the mobile phones in billions. The mean mobile phone-based loans was Ksh. 3 billion with a standard deviation of Ksh.2.3 billion around the mean. The minimum mobile phone-based loans was Ksh.1.9 billion capturing the listed commercial bank with the lowest mobile phones loans. The maximum was ksh.6.1 capturing the listed commercial bank with the highest mobile phones loans. Mobile banking volume of transactions was measured in numbers of transactions carried over the mobile phones. The mean mobile banking transactions was 8.7 million transactions with a standard deviation of 2.5 million transactions around the mean. The minimum was 0.512 million transactions while the maximum transactions was 13.8 million transactions. Mobile banking value of transactions was captured by the shilling value of transactions carried over the mobile phone. The mean mobile banking transactions value was Ksh. 21.1 billion with a standard deviation of Ksh. 10.8 billion around the mean. The minimum mobile banking value of transactions was Ksh.0.2 billion capturing the listed commercial bank with the lowest mobile banking value of transactions. The maximum mobile banking value of transactions was Ksh. 50.57 billion capturing the listed commercial bank with the highest mobile banking value of transactions. Capital adequacy was measured by the ratio of equity to risk weighted bank assets. The mean capital adequacy was 0.152417 implying that equity was about 15.2% of the total risk weighted assets. The standard deviation was 0.024618 implying that the capital adequacy of individual banks was spread around the mean with about 2.46%. The minimum was 0.088 capturing the bank with the lowest equity level as ratio of total risk weighted assets. The maximum was 0.186 capturing the bank with the highest equity level as ratio of total risk weighted assets. Bank size was measured by the total assets of the bank. The mean bank size was Ksh. 234.87 billion with a standard deviation of Ksh. 223.62 billion around the mean. The minimum was Ksh. 115.11 billion capturing the listed commercial bank with the smallest size. The maximum was Ksh.758.34 capturing the listed commercial bank with the biggest size. The assets quality was measured ratio pf NPLs to Gross loans. The mean assets quality was 0.079843 implying that about 7.9% of the loans offered by the listed commercial banks were non performing. The standard deviation for assets quality was 0.034485 implying that non-performing loans for individual listed commercial banks was spread around the mean with about 3.4%. The minimum asset quality was 0.0014 and the maximum assets quality was 0.4767.

4.2 Regression Analysis

The study adopted OLS multivariate regression analysis to examine the effect of mobile banking and other covariates on financial performance of listed commercial banks in Kenya. The dependent variable was financial performance, independent variable was mobile banking (mobile phone-based loans, mobile banking volume of transactions and mobile banking value of transactions). The control variables included asset quality, capital adequacy and bank size.

Table 2: Model Summary

Regression Statistics	
Multiple R	0.908253049
R Square	0.824923601
Adjusted R Square	0.805103631
Standard Error	0.000309922
Observations	60

The overall Pearson correlation coefficient (Multiple R= 0.9082) in Table 2 shows that the independent variable (mobile banking), control variables (capital adequacy, assets quality and firm size) were positively and strongly correlated with the dependent variable financial performance. Further, the coefficient of determination (R^2 = 0.824) reveals that, mobile banking, capital adequacy, assets quality and firm size explained 82.4% of the total variation in financial performance. The remaining variation in financial performance of 17.6% being captured by other variables affecting financial performance but not studied in this research.

Table 2: Analysis of Variances (ANOVA)

	df	**SS**	**MS**	**F**	**Sig. F**
Regression	6	0.24	0.0400	41.62083063	0.0000
Residual	53	0.05	0.0010		
Total	59	0.29			

The analysis of variances given in Table 3 revealed that mobile banking, capital adequacy, assets quality and firm size have a significant impact on financial performance captured by ROA. This is evidenced by p-value lower than 0.05 level of significance (F=41.6208, p-value = 0.0000<0.05). The study thus concluded that mobile banking, capital adequacy, assets quality and firm size have a major effect on financial performance among the listed commercial banks in Kenya.

Table 3: Regression Coefficients

	Coefficients	**S.E**	**t Stat**	**P-value**	**L.95%**	**Up.95%**
Intercept	0.0143	0.002335	6.137760	0.0009205	0.00964882	0.019016
M1	0.0017	0.000185	9.262516	0.0001426	0.0013429	0.002085
M2	0.0130	0.005112	2.543035	0.0183666	0.0000001	0.042113
M3	0.0210	0.007131	2.944888	0.0073404	0.0000399	0.038312
AQ	-0.0040	0.001858	-2.135349	0.0373724	-0.0024077	0.007693
CA	0.0002	0.000135	1.506293	0.1379293	-0.0004741	0.000674
SIZE	0.3725	0.026712	13.94504	0.0000172	-0.0016664	0.906902

Note: M1 – Mobile Phone based loans , M2 – Mobile Banking Volume of Transactions , M3- Mobile Banking Value of Transactions , AQ- Asset Quality , CA – Capital Adequacy and SIZE- Bank Size

Table 4.4 presents the regression coefficients associated with the explanatory variables. The effect of mobile phone based loans on financial performance was direct and significant (α_1= 0.0017, t = 9.262516, p = 0.0001426< 0.05). Mobile Banking Volume of Transactions had a direct and significant effect on financial performance (α_2= 0.0130, t= 2.543035, p=0.0183666<0.05). The study also revealed that the impact of Mobile Banking Value of Transactions was direct and significant (α_3=0.0210, t=2.944888, p=0.0073404). Further, the effect of Asset Quality on financial performance was inverse and significant (α_4= -0.0040, t=-2.135349, p= 0.0373724<0.05). The effect of Capital Adequacy on financial performance was direct but not significant (α5=0.0002, t= 1.506293, p= 0.1379293>0.05). Finally, the effect of Bank size on financial performance was positive and significant (α6 = 0.3725, t= 13.94504 and p= 0.0000172<0.05).

5. Discussion

The overall Pearson correlation coefficient (Multiple R= 0.9082) shows that the independent variable (mobile banking), control variables (capital adequacy, assets quality and firm size) were positively and strongly correlated with the dependent

variable financial performance. The strong positive correlation implies that increase in financial performance of listed commercial banks was associated with increase in mobile banking, asset quality, firm size and capital adequacy. Further, the coefficient of determination (R2 = 0.824) revealed that, mobile banking, capital adequacy, assets quality and firm size explained 82.4% of the total variation in financial performance. The remaining variation in financial performance of 17.6% being captured by other variables affecting financial performance but not studied in this research. The model was thus well fitted with the explanatory variables under study having major effect on financial performance. The analysis of variances revealed that mobile banking, capital adequacy, assets quality and firm size have a significant impact on financial performance captured by ROA. This is evidenced by p-value lower than 0.05 level of significance (F=41.6208, p-value = 0.0000<0.05). The study thus concluded that mobile banking, capital adequacy, assets quality and firm size have a major effect on financial performance among the listed commercial banks in Kenya. Further regarding partial effect of explanatory variables on financial performance, the effect of mobile phone-based loans on financial performance was direct and significant ($\alpha 1$= 0.0017, t = 9.262516, p = 0.0001426< 0.05). The finding implies that a one unit rise in mobile phone-based loans resulted to increased financial performance by 0.0017 units. The finding means that increased loan growth due to mobile based loans leads to improved financial performance in terms of profitability. Mobile phone-based loans have low transactional cost of management hence they often lead to improved financial performance.

The study also showed that Mobile Banking Volume of Transactions had a direct and significant effect on financial performance ($\alpha 2$= 0.0130, t= 2.543035, p=0.0183666<0.05). A one unit increase in Mobile Banking Volume of Transactions lead to increased financial performance by 0.0130 implying that when number of mobile banking transactions increased, the financial performance also increased. Increasing volume of mobile banking transactions means that more bank financial products are accessed by its customers hence increased interest based and non-interest-based revenues of the listed commercial banks. The study also revealed that the impact of Mobile Banking Value of Transactions was direct and significant ($\alpha 3$=0.0210, t=2.944888, p=0.0073404). A one unit increase in Mobile Banking value of transactions leads to 0.0210 units increase in financial performance of listed commercial banks. Increased value of mobile banking transactions implies that more interest and non-interest income is earned by the bank hence increasing financial performance.

The regression analysis also revealed that the effect of asset quality on financial performance was inverse and significant ($\alpha 4$= -0.0040, t=-2.135349, p= 0.0373724<0.05). A one unit rise in nonperforming loans leads to fall in financial performance by 0.0040 units implying that when the quality of the bank's assets including loans are eroded by non-performing loans, the bank performance falls. Increasing NPLs leads to increasing loan losses expenses that eats into the profits of the bank hence falling financial performance. The effect of Capital Adequacy on financial performance was direct but not significant ($\alpha 5$=0.0002, t= 1.506293, p= 0.1379293>0.05). A one unit rise in capital adequacy leads to increasing financial performance by 0.0002 units implying that increasing capital adequacy leads to rising financial performance given that the bank is exposed to less and less market risks that affect the whole banking industry. Finally, the effect of Bank size on financial performance was positive and significant ($\alpha 6$ = 0.3725, t= 13.94504 and p= 0.0000172<0.05). A one unit increase in Bank size leads to 0.3725 units increase in financial performance implying that increasing bank assets including loans leads to increased financial performance as the assets such loans earn more interest income. The other non-loan assets also earn non-interest income to the bank leading to increased financial performance.

6. Conclusions

The strong positive correlation implies that increase in financial performance of listed commercial banks was associated with increase in mobile banking, asset quality, firm size and capital adequacy. Further, the coefficient of determination revealed that, mobile banking, capital adequacy, assets quality and firm size explained a bigger variation the total variation in financial performance. The model was thus well fitted with the explanatory variables under study having major effect on financial performance. "The analysis of variances revealed that mobile banking, capital adequacy, assets quality and firm size have a significant impact on financial performance. The study thus concluded that mobile banking, capital adequacy, assets quality and firm size have a major effect on financial performance among the listed commercial banks in Kenya. Further regarding partial effect of explanatory variables on financial performance, the effect of mobile phone-based loans on financial performance was direct and significant. The finding implies that that increased loan growth due to mobile based loans leads to improved financial performance in terms of profitability. Mobile phone-based loans have low transactional cost of management hence they often lead to improved financial performance. The study also showed that Mobile Banking Volume of Transactions had a direct and significant effect on financial implying that when number of mobile banking transactions increased, the financial performance also increased. Increasing volume of mobile banking transactions means that more bank financial products are accessed by its customers hence increased interest based and non-interest-based revenues of the listed commercial banks.

The study also revealed that the impact of Mobile Banking Value of Transactions was direct and significant. Increased value of mobile banking transactions implies that more interest and non-interest income is earned by the bank hence increasing financial performance. The effect of asset quality on financial performance was inverse and significant implying that when the

quality of the bank's assets including loans are eroded by non-performing loans, the bank performance falls. Increasing NPLs leads to increasing loan losses expenses that eats into the profits of the bank hence falling financial performance. The effect of Capital Adequacy on financial performance was direct but not significant units implying that increasing capital adequacy leads to rising financial performance given that the bank is exposed to less and less market risks that affect the whole banking industry. Finally, the effect of Bank size on financial performance was positive and significant implying that increasing bank assets including loans leads to increased financial performance as the assets such loans earn more interest income.

Regarding the effect mobile banking on financial perform, the study established mobile banking variables (mobile phone-based loans, mobile banking volume of transactions and mobile banking value of transactions) had a direct and significant effect on financial performance. The study thus suggests to management of listed commercial banks to improved mobile banking technologies and platform for easy access and use by customers. Further, the management of commercial banks to increase product offering over the mobile phone technology to attract more customers and improve the penetration of their products and increase their financial performance. Further, the regulators including the CBK and the CMA should come up with policies and regulations for strengthening and protecting customer while transacting with commercial banks over the mobile phones. The study also revealed that the effect of asset quality on financial performance was inverse and significant. The study thus recommends to management of listed commercial banks to issue high quality loans to customers." The banks should continue performing back ground check on customers credit worthiness to lower incidences of nonperforming loans. The must also share credit information about their customers with credit reference bureaus to improve banking sector stability through lowering of credit risks facing commercial banks. The regulator especially the CBK should continue tightening prudential regulations like those concerning risk weighing, loan loss reserve requirements among others that ensures that banks to do not over lend and hold poor quality loans that threatens their existence and depositors' funds. Finally, the effect of Bank size on financial performance was positive and significant. The study thus recommends to management of listed commercial banks to continue increasing the size of their banks. The banks can increase their investment in financial assets such as treasury bills and bonds. They should also grow their loans books with high quality loans that leads to increased financial performance. CBK should also continue ensuring that the listed commercial banks grow in size by increasing the core capital requirements that provides additional resources need to finance banks assets.

Conflicts of Interest

"The authors declare no conflicts of interest."

References

[1] Adam, M. H. M. (2014). Evaluating the Financial Performance of Banks using financial ratios-A case study of Erbil Bank for Investment and Finance. European Journal of Accounting Auditing and Finance Research, 2(6), 162-177.

[2] Adeusi, S. O., Akeke, N. I., Adebisi, O. S., & Oladunjoye, O. (2014). Risk management and financial performance of banks in Nigeria. Risk Management, 6(31), 123-129.

[3] Akerlof, G. A. (1978). The market for "lemons": Quality uncertainty and the market mechanism. In Uncertainty in economics (pp. 235-251). Academic Press.

[4] Anyasi, F. I., & Otubu, P. A. (2009). Mobile phone technology in banking system: Its economic effect. Research Journal of Information Technology, 1(1), 1-5.

[5] Baabdullah, A. M., Alalwan, A. A., Rana, N. P., Kizgin, H., & Patil, P. (2019). Consumer use of mobile banking (M-Banking) in Saudi Arabia: Towards an integrated model. International Journal of Information Management, 44, 38-52.

[6] Bagudu, H. D.and Mohd K, S. and Roslan, A. (2017) The effect of mobile banking on the performance of commercial banks in Nigeria. International Research Journal of Management, IT & Social Sciences, 4 (2). pp. 71-76. ISSN 23957492

[7] Bebeji, A., Mohammed, A., & Tanko, M. (2015). The effect of board size and composition on the financial performance of banks in Nigeria. African Journal of Business Management, 9(16), 590-598.

[8] Błach, J. (2011). Financial innovations and their role in the modern financial system-identification and systematization of the problem. e-Finanse: Financial Internet Quarterly, 7(3), 13-26.

[9] Cleveland, C. E. (2016). A Study on How Mobile Banking Has Affected the Banking Industry: Has Mobile Banking Improved Bank Performance? Honors Theses. 228. https://egrove.olemiss.edu/hon_thesis/228

[10] Evian, M., Limijaya, A., & Hutagaol-Martowidjojo, Y. (2021, August). An Analysis on the Effect of E-Banking on Bank Performance in Indonesia. In 2021 International Conference on Information Management and Technology (ICIMTech) (Vol. 1, pp. 187-192). IEEE.

[11] Gikandi, J. W., & Bloor, C. (2010). Adoption and effectiveness of electronic banking in Kenya. Electronic commerce research and applications, 9(4), 277-282.

[12] Harelimana, J. B. (2017). Impact of mobile banking on financial performance of Unguka Microfinance Bank Ltd, Rwanda. Global Journal of Management and Business Research.

[13] Kadioglu, E., Telceken, N., & Ocal, N. (2017). Effect of the asset quality on the bank profitability. International Journal of Economics and Finance, 9(7), 60-68.

[14] Karugu, C., Achoki, G., & Kiriri, P. (2018). Capital adequacy ratios as predictors of financial distress in Kenyan commercial banks.

Journal of Financial Risk Management, 7(03), 278.
[15] Kithaka, E. D. W. I. N. (2014). The effect of mobile banking on financial performance of commercial banks in Kenya (Doctoral dissertation, University of Narobi).
[16] Leland, H., & Pyle, D. (1977). Informational asymmetries, financial structure, and financial intermediation. The Journal of Finance, 32(2), 371-387.
[17] Li, X. & Zeng, S. (2010). Finance Innovation Model Literature Review. Beijing University of Technology, China.
[18] Lin, H., Zeng, S., Liu, H., & Li, C. (2016). How do intermediaries drive corporate innovation? A moderated mediating examination. Journal of Business Research, 69(11), 4831-4836.
[19] Mabwai, F. (2016). Effects of mobile banking on the financial performance of commercial banks in Kenya (Doctoral dissertation, University of Nairobi).
[20] Mageto, I., Muturi, W., & Abuga, V. (2017). Effect of mobile banking on financial performance of Commercial Banks in Kisii Town, Kenya. International Journal of Recent Research in Commerce Economics and Management (IJRRCEM), 4(1), 116-125.
[21] Maina, D. W. & Mungai, J. (2019). Mobile banking services and financial performance of tier one commercial banks in Kenya. International Academic Journal of Economics and Finance, 3(4), 232-254
[22] Mbiti, I., & Weil, D. N. (2013). The home economics of e-money: velocity, cash management, and discount rates of M-Pesa users. American Economic Review, 103(3), 369-74.
[23] Mbutor, M. O., & Uba, I. A. (2013). The impact of financial inclusion on monetary policy in Nigeria. Journal of Economics and International Finance, 5(8), 318-326.
[24] Musyoki, D., & Kadubo, A. S. (2012). The impact of credit risk management on the financial performance of banks in Kenya for the period. International Journal of Business and Public Management, 2(2), 72-80.
[25] Musyoka, B. K. (2017). The effect of capital adequacy on the financial performance of commercial banks in Kenya (Doctoral dissertation, University of Nairobi).
[26] Mutua, R. W. (2013). Effects of mobile banking on the financial performance of commercial banks in Kenya (Doctoral dissertation, University of Nairobi).
[27] Mwange, J. A. (2013). The impact of mobile banking on financial performance of commercial banks in Kenya (Doctoral dissertation, University of Nairobi).
[28] Nguyen, T. H. (2020). Impact of bank capital adequacy on bank profitability under basel ii accord: evidence from vietnam. Journal of Economic Development, 45(1).
[29] Nwankwo, S. N. P. (2019). Effect of capital adequacy on commercial bank's financial performance in Nigeria, 2010-2017. European Journal of Accounting, Finance and Investment, 5(4), 1-21.
[30] Nyamweya, J. M. & Obuya, M.O. (2020). Role of Financial Efficiency and Income Distribution on the Relationship Between Economic Growth on Poverty Levels in East Africa Community Countries. International Journal of Finance and Banking Research. 6(4), 65-73. doi: 10.11648/j.ijfbr.20200604.12
[31] Obuya, M. O., & Olweny, T. (2017). Effect of Bank's Lending Behaviour on Loan Losses of Listed Commercial Banks in Kenya. International Journal of Management and Commerce Innovations, 5(1),135-144
[32] Okiro, K., & Ndungu, J. (2013). The impact of mobile and internet banking on performance of financial institutions in Kenya. European Scientific Journal, 9(13), 146-161.
[33] Ongore, V. O., & Kusa, G. B. (2013). Determinants of financial performance of commercial banks in Kenya. International journal of economics and financial issues, 3(1), 237.
[34] Ouma, S. A., Odongo, T. M., & Were, M. (2017). Mobile financial services and financial inclusion: Is it a boon for savings mobilization? Review of development finance, 7(1), 29-35.
[35] Owusu K. K., Osei-Wusu, E.E. and Amanor, K. (2020), Exploring the effect of online banking on bank performance using data envelopment analysis, Benchmarking: An International Journal, 27(1), 137-165. https://doi.org/10.1108/BIJ-06-2018-0154
[36] Oyelami, L. O., Saibu, O. M., & Adekunle, B. S. (2017). Determinants of financial inclusion in sub-Sahara African countries. Covenant Journal of Business and Social Sciences, 8(2).
[37] Raines, J. P., & Leathers, C. G. (1992). Financial innovations and Veblen's theory of financial markets. Journal of Economic Issues, 26(2), 433-440.
[38] Sabir, R.I, Ghafoor, O., Akhtar, N., Hafeez, I. and Rehman, S. (2014), Factors Affecting Customer Satisfaction in Banking Sector of Pakistan. International Review of Management and Business Research 3(2), 1014-1025.
[39] Shaikh, A. A., & Karjaluoto, H. (2015). Mobile banking adoption: A literature review. Telematics and informatics, 32(1), 129-142.
[40] Sharma, S. K., & Sharma, M. (2019). Examining the role of trust and quality dimensions in the actual usage of mobile banking services: An empirical investigation. International Journal of Information Management, 44, 65-75.
[41] Singla, H. K. (2008). Financial performance of banks in India. The IUP Journal of Bank Management, 7(1), 50-62.
[42] Tam, C. and Oliveira, T. (2017), Understanding mobile banking individual performance: The DeLone & McLean model and the moderating effects of individual culture, Internet Research, 27 (3), 538-562. https://doi.org/10.1108/IntR-05-2016-0117
[43] Thoa, P. T. X., & Anh, N. N. (2017). The determinants of capital adequacy ratio: The case of the Vietnamese banking system in the period 2011-2015. VNU Journal of Science: Economics and Business, 33(2).
[44] Waema, T. M., & Omwansa, T. K. (2014). Deepening financial inclusion through collaboration to create innovative and appropriate financial products for the poor.