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Electronic Banking And Financial Performance Of Deposit Taking Microfinance Institutions In Nairobi County, Kenya

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Abstract:
To maintain profitability, deposit taking financial institutions have come up with various electronic banking aimed at avoiding the negative consequences of liberalization. However, DTMIs have had imperceptible growth over the past ten years, both in terms of their operational performance and financial performance. The research that are currently available present contrasting perspectives on the elements that influence DTMIs' financial performance. In order to determine the impact of technical breakthroughs on financial performance, the current study is conducted due to the contextual, methodological, and conceptual gaps arising from previous investigations with a focus on the DT-MFIs in Nairobi. The specific objectives of the study were to explore the effect of Mobile Banking, ATM Banking, Internet Banking and electronic funds transfer on financial performance of DT-MFIs in Nairobi County, Kenya. Descriptive research design was adopted in this study. The population of study in this research was the 12 DT MFIs in Nairobi County. In this case, the census befits this study as the entire population consisted only of 12 deposit taking MFIs in Nairobi making it manageable and small. Data collected was purely quantitative and it was analyzed by descriptive analysis. The researcher also conducted a multiple regression analysis. The findings indicated that electronic banking constructs (Mobile banking internet banking, payment card banking and ATM banking) had significant relationship with financial performance of deposit taking microfinance banks. Multiple linear regression revealed that Mobile banking internet banking and ATM banking has significant positive effect on the financial performance while on the other hand, payment card banking had insignificant positive effect on financial performance of deposit taking microfinance banks. The study concluded that electronic banking contributed significant variation in the financial performance of deposit taking microfinance banks. The study recommended that deposit taking microfinance bank management need to decrease electronic banking bill payment services in deposit taking microfinance bank so as to enable customers to undertake transaction through electronic banking. The banks should also enhance electronic banking customer security and privacy to reduce fraud and cyber-crime associated with electronic banking.

Key Word: *Electronic Banking, Financial Performance, Mobile Banking, ATM Banking, Internet Banking*

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I. Introduction

In the vibrant global environment that organizations operate in today, organizations are faced with a huge responsibility of understanding and implementing electronic banking in order to keep up with the ever-changing technological advancements. According to Ahmed, Khuwaja, Brohi and Othman (2018) the financial performance of financial institutions is very essential in the economy since they act as economic growth engines in every country. Financial institutions serve as financial intermediaries as they form a crucial link which facilitates transactions and other financial services for their customers. Githui (2019) alludes that the changing operating environment, social trends, rivalry and globalization have caused the financial sector to undergo persistent changes which affect their financial performance.

Rantyanti and Halim (2020) averred that global financial crisis over the past showed that there is need for adoption of effective electronic banking for sustainable financial performance. Financial performance is a numerical indicator of the spread to which financial goals are met (Ghosh & Ansari, 2018). Profitability, liquidity, leverage, and efficiency are all ways to gauge financial success. Financial performance also involves the ability to efficiently and effectively use resources to achieve the objectives and goal of a firm (Ghosh & Ansari, 2018). As per Ahmed, Khuwaja et al., (2018) profitability is widely viewed as the best measure of firm performance, especially in transition context. This indicator is usually calculated using the financial information of companies which is publicly available. Among the financial ratios, the most commonly used performance measures are return on assets (ROA) and return on equity (ROE).

Electronic banking indicates the arrival of a new or better products or processes that cut the cost of producing existing services. Chapman (2021) opined that electronic banking are the creation and popularization of new financial instruments, new channels or platforms, as well as new institutions and markets to facilitate access to financial information, trading and means of payment. According to Towers-Clark (2019), technological innovation implies the development of new thoughts, items, administrations, and procedures that will improve technology solutions. To financial institutions, electronic banking are viewed as the organizational approaches which provides scope and direction over a long period of time to achieve advantages for a given organization through configuration of resources within a challenging environment, to meet the needs of markets and to fulfill stakeholder expectations (Sousa & Rocha, 2019).

Ingves (2019) reiterated that the advancements of financial institutions in terms of technological innovation has enhanced their efficiency resulting to operations at a reasonable cost with financial performance results that can be accurately measured using sales, the number of products and services launched, customer satisfaction levels, market share and return on investments. The use of Information Communication and Technology (ICT), for instance, as done by use of Automated Teller Machines (ATMs), mobile phone banking, internet banking, and Agency banking has completely changed how banking is done. A study by Kimotho and Muturi (2019) observed that despite their durability, microfinance institutions get transformed over time to suit the needs and circumstances of the times with varying degrees of disruption.

Kenya's financial system has evolved rapidly over the years. Wanalo, Mande and Ng'ong'a (2021) reported that Kenyan commercial banks have kept making significant expenditures in technological advancements and training employees to exploit new technologies. CBK Report (2021) indicated that there are various development and financial electronic banking that have taken place in Kenya including use of agency banking, growth of Microfinance Banks (MFBs), Kenya Electronic Payment and Settlement System (KEPSS), Automated Clearing House operations (ACH), automated teller machines (ATMs) and plastic card usage, and mobile phone usage for funds transfer. According to Financial Services Department (2018) the number of agency banking has increased from 8,809 agents in 2009 to 35,789 agents in 2014.

The industry has seen the emergence of mobile money transfers (including M-PESA and AIRTEL Money services), the expansion of branch banking or agent banking, investments in long-term government bonds for development financing, and more recently, a trend toward a cashless economy, as evidenced by the preference for Visa cards for bill payment (Owuor, 2018). Technology has led to emergence of innovations in the way that banks deliver services, for example Stanbic has "Digibank", Equity Bank has "Eazzy pay", CBA has partnership with Safaricom to provide "M-Shwari"- a digital bank branch, Commercial Bank of Africa also has "Loop" which is an internet banking platform.

However, there is no exhaustive evidence all these financial innovations improve bank's profits and shareholders wealth. It is true that financial innovations have been adopted by banks with the intention of fostering performance. Among the innovations are use of ATMs, EFTs, RTGS, cheque transaction systems, agency banking, mobile banking and internet banking. The MPESA revolution in Kenya is known as the root of fintech innovation in Africa. Today, over 50% of adults in Kenya own a MPESA account and the transaction volume on the system is roughly equivalent to up to 50% of Kenya's GDP. Muthuri (2018) showed the composition of debts and equity finances being critical in determining the financial stability in the operation of activities and the benefits associated with the financing option.

Statement of the Problem

Firms operating in a highly competitive global industries have over time shown that profitability is not guaranteed due to stiff competition and the oligopoly nature of such industries (Godswill, Ailemen & Osabohien, 2018). Between years 2015 and 2021, the MFI sector contribution to Kenya's GDP has fluctuated between 9.2% and 18.3%. The financial performance of DTMFIs has fluctuated due to several factors and the risk of this fluctuating performance would increase as competitors in the financial industry react similarly to the challenges. According to Sheik and Wang (2018), the liberalized financial market in Kenya has led to electronic banking in the Kenyan financial industry. To maintain profitability, deposit taking financial institutions have come up with various electronic banking modes aimed at avoiding the negative consequences of liberalization. However, DTMIs have had imperceptible growth over the past ten years, both in terms of their operational performance and financial performance.

In 2021, MFI customer deposits made up to 47.9 percent of the total assets financed by DTMIs; borrowed funds accounted for 54.2 percent of the total assets, followed by required deposits (22.5 percent) and voluntary savings (6.32 percent) (CBK, 2022). According to CBK (2022), the debt-to-equity ratio of DTMIs was 5%, indicating minimal equity leverage in the industry. The sector's overall liabilities as of December 2021 were KShs. 64.7Bns. While profitability levels significantly declined with reported declines in return on equity and return on asset, the number of non-performing loans (NPL) rose (Isabwa & Mabonga, 2021). The problem of financial performance and sustainability is thus one that Deposit Taking Microfinance Banks must overcome.

The effect of electronic banking on the financial performance of Kenya's listed banks was examined by Onchong'a (2018) who established that there is a favorable correlation between the performance of Kenyan microfinance institutions and the role performed by fintech, namely mobile money transfer. In their study of the impact of electronic and its consequences on the financial performance of MFIs in Kenya, Kimotho and Muturi (2019) found that internet banking and ATM banking were both beneficial to financial performance. In Nairobi City County, Kenya, Okumu and Jagongo (2020) looked into how debit/credit cards affected the profitability of microfinance institutions that accepted deposits. The study found that fees/commission from debit/credit cards had significant effect on profitability of MFIs. Due to the contextual, methodological, and conceptual deficiencies that these studies had, the current investigation was necessary.

Objectives of the Study

i) To explore the effect of mobile banking on financial performance of DT-MFIs in Nairobi County, Kenya.
ii) To determine the influence of ATM banking on financial performance of DT-MFIs in Nairobi County, Kenya.
iii) To assess the effect of internet banking on financial performance of DT-MFIs in Nairobi County, Kenya.
iv) To find out the influence of payment card banking on financial performance of DT-MFIs in Nairobi County, Kenya.

II. Literature Review

Theoretical Framework

Agency Theory

Jensen and Meckling (1976) defined agency relationship as "a contract under which one or more persons [the principal(s)] engage another person (the agent) to perform some service on their behalf. This principal–agent relationship also involves delegating some decision-making authority to the agent." According to Lan and Heracleous (2010), under law, an agent is a person who acts on behalf of another (known as a "principal"). This theory, therefore, focuses on the relationship between the principal and the agent, which in this study refers to the bank and their agents, respectively. The principal-agent model framework occurs in any social, political, or legal situation where two parties align themselves to fit a situation where the principal with which authority to act originally "hires" or delegates some of this authority onto the agent (Ross, 2018). Agency theory is used to understand the second objective of this study. While intrinsic factors (such as profit-making) can be suggested as reason for taking up agency baking (Venkatesan, 2017), many "agent"-related factors, for example bank expansion, desire to reach the unbanked, regulations that allow the bank to engage the agent, among others, are key in the engagement of individuals for agency banking (CBK, 2010; Ndungu & Njeru, 2014). Agency theory is thus instrumental in examining the influence of agency banking on the financial performance of DT-MFIs in Kenya.

Innovation Diffusion Theory

The notion of Innovation Diffusion Theory can be connected with the acceptance and acceptability of AMT services among users and the general public. Compatibility, complexity (the aspect of it being friendly), relative advantage (the range in which technology gives an improvement to the existing instruments), trialability, and observability (the range in which the output of technology and its benefits can easily be seen) are some of the factors that affect how quickly an innovation spreads (Rogers, 2003), Given that they are not mutually exclusive, these factors are unable to forecast either the amount or the rate of innovation dissemination. Brancheau and Wetherbe (1990) provided support for the claims made by Benbasat (1991), who expanded the number of innovation traits to seven. M-Pesa has been able to establish a personal link with users' bank accounts via innovation and development, enabling quick and affordable money inter-transfers at the user's convenience at any time or location. Comparing the use of M-Pesa, EFT, and ATM systems, as well as their importance to customer service, was done. Priority will be given to client satisfaction based on convenience; cost, effectiveness, and relevancy of the service will be given top consideration. The relative benefit, compatibility, and trialability of innovations—factors that affect and influence client choices and, in turn, their perception of service quality—are emphasized by the innovation diffusion theory. In order to investigate the impact of Mobile Banking on the financial performance of DT-MFIs in Kenya, this hypothesis is pertinent.

Bank-Led Theory

The Bank-Led hypothesis was proposed by Lyman, Ivatury and Staschen (2006) and is made out of a grouping of three principle substances; the bank, the retail operator, and the client. depends on the contention that, an authorized monetary organization conveys money related administrations through a retail specialist. The hypothesis bolsters office banking model by expressing that crafted by a bank is creating money related items and administrations, however conveys them through retail specialists who handle all or most client connection (Lyman

et al, 2006). Retail operators have up close and personal collaboration with clients and perform money/in real money out capacities, much as a branch-based teller would take stores and procedure withdrawals (Owens, 2006). Under this hypothesis, the bank creates budgetary items and administrations yet disperses them through retail specialists who handle all or most client collaborations (Lyman, Ivatury and Staschen, 2006). The bank is the supplier of money related administrations and is the organization where clients look after records.The bank lead hypothesis centers around how monetary foundation like banks convey their money related administrations through a retail operator, where the bank creates budgetary items and administrations, however disseminates them through retail specialists who handle all or most client communication. Monetary organizations in Kenya disperse their money related items through their portable banking and web banking. For this situation the specialists have up close and personal communication with the clients and perform money/in real money out capacities, much as a branch-based teller would take stores and procedure withdrawals. This theory therefore will be relevant in investigating the effects of internet banking on financial performance of DT-MFIs.

Financial Intermediation Theory

Due of the difficulties with asymmetrical information seen in the 1970s, Akerlof (1970) created the hypothesis. The theory is based on informational asymmetry theory, transactional cost theory, and agency theory (Bert & Dick, 2003). According to this idea, the lack of accurate information, high transaction costs, and regulatory mechanisms lead to the creation of financial intermediaries. According to the idea of financial intermediation, by pooling client resources, intermediaries can reduce informational asymmetries and transaction costs, leading to scale economies (Alexandra et al., 2009). The continuous flow of money from units with surpluses to those with deficits is the intermediaries' most significant contribution. Financial intermediaries reduce transaction costs brought on by incomplete information between lenders and borrowers, which increases the efficiency of resource allocation. Due to flaws in the market, financial intermediaries are necessary. As a result, financial intermediaries would not be necessary in a perfect market environment with no transaction or information costs. Generally, digital technologies play a supplementary role in financial intermediation. However, some researchers and economists hold the notion that the reduction of transaction costs due to internet banking makes the financial markets accessible and eliminates the information asymmetries for financial intermediation thereby creating opportunities for financial intermediaries and business models to emerge as a n alternative for some of the activities and functions of the conventional banking models (Molnar, 2018). This theory is relevant in establishing the influence of electronic funds transfer on financial performance of DT-MFIs in Nairobi County, Kenya.

Conceptual Review

The link between the dependent and independent variables is described in the conceptual framework. In this study, the independent variables will be electronic funds transfer, Mobile Banking, ATM Banking, and Internet Banking, while the dependent variable will be financial performance. The study's dependent and independent variables are shown in the figure 1.0.

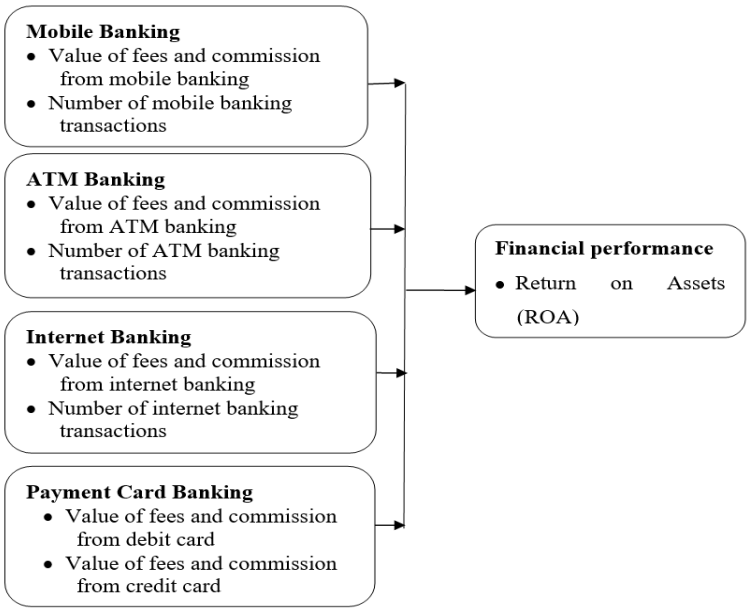

Figure 1.0: Conceptual Framework

Empirical Review

Mobile Banking and Financial Performance

Adhitya and Sembel (2020) investigated the impacts of mobile banking technology adoption on the financial performance and stock performance of big banks in Indonesia. This result shows that the technology adoption on mobile banking have lower performance for ROE and NPL of the banks. On the macroeconomic side, the result shows positive impact and negative impact towards GDP performance to the financial performance of the banks. However, the result shows the technology adoption will strengthen banks financial performance on bank's CAR and LDR. This finding becomes important for banks to accelerate technology adoption to increase their competitiveness against competitors and adapt in a changing market. In their study, Krotov, Junglas, and Steel (2021) showed that mobile technology enhanced organizational agility on the customer, partner, and operational level, and consequently achieving competitive advantage. Operational agility was found to be the most obvious benefit that organizations strived for first by harnessing the accessibility and reachability of mobile technologies and their ability to identify and localize. Once in place, organizations expanded on customer and partnering agility. While this order seems reasonable, it also alludes to the concept that organizational agility cannot be achieved with mobile technology in one go, but has to start with operational processes firstBolat (2018) showed that mobile technology deployment was grounded in establishing an interactive system of mobile technology resources, where infrastructure, skills, relationships and culture interacted to enable operational efficiencies and/or create new solutions. According to the study, mobile technology capabilities were found to form a set of the following capabilities that enabled firms to creatively and distinctively combine and deploy mobile technology resources through: leveraging mobile technology resources capability; transforming business operationally and strategically capability; learning capability; solving problems capability and leading capability.

ATM Banking and Financial Performance

Abdi, Hussein and Kadir (2022) investigated the effect of automated teller machines and mobile banking on financial performance among commercial banks in Somalia. The study found out that automated teller machines banking and mobile banking are significant predictors of financial performance among commercial banks in Somalia. Thus, electronic banking is a significant enabler of financial performance of commercial banks. An empirical study was conducted by Acharya (2020) revealed there is a constructive connection between ATMs and financial performance in rural areas of India. Only electronic banking outlets were included for this analysis, and other factors that were considered for this study were disregarded. In their research, Bek et al. (2017) all measured financial performance by analyzing demographic branch and ATM penetration rates. In addition, demographic branch and ATM penetration rates are often utilized as proxies in the research that has been done on the topic of measuring financial performance. Kamau and Oluoch (2016) investigated the emergence of new forms of money and the state of financial performance in Kenya. The findings of the investigation were laid forth in the form of frequency and descriptive tables as well as graphs. According to the findings of the research, the introduction of new monetary systems has a significant beneficial impact on financial performance. The ease with which people may use ATMs, various forms of mobile money, and mobile banking all have a positive impact on the country's level of financial performance.

Internet Banking and Financial Performance

Rahaman, Luna, Kejing, Ping and Taru (2021) investigated the determinants of accepting internet banking system in Bangladesh. Internet banking is one of the innovative services that have reshaped the traditional banking activities, particularly in Bangladesh. The findings indicate that male students in business have more intention to adopt Internet banking and preference for ease-of-use than female students, and business students will be more favorably inclined to adopt Internet banking service than students in other academic disciplines. Ong and Chong (2022) examined the effect of cashless payments on the internet and mobile banking. Unlike studies on the intention to adopt cashless payments, internet and mobile banking, this study used data of actual transactions paid by a consumer. The study established that the internet and mobile banking were delivery channels for cashless payments. Oniore and Okoli (2022) examined the impact of electronic banking on the performance of money deposit banks in Nigeria from 2006 to 2017 using time series quarterly data. The study adopted Ordinary Least Squares as main tool of analysis. There has been an increase in the services rendered to customers by the deposit money banks through the utilization of electronic banking. The policy implication of the findings is that e-banking has gradual positive impacts on performance of banks in Nigeria and hence could contribute to the process of economic growth. Sambaombe and Phiri (2022) analyzed the impact of internet banking on customer satisfaction in commercial banks based on the TRA model using Stanbic Bank as a case study. A weak positive correlation between the use of internet banking and customer satisfaction was established [(τb = .169, p= .012)]. Interacting gender of "being male", having secondary education or below, negative behavioral belief, negative attitude, negative behavioral intention, and none usage of internet banking reduces customer satisfaction.

Payment Card Banking and Financial Performance

According to Munyocho (2015), there was a strong positive relationship between debit \ credit cards and the financial performance of the commercial banks in Kenya. He discovered that debit cards improve customers' efficiency and flexibility without any need to visit the bank halls while the credit cards have been adopted by banks to increase income, profit and reduce credit and liquidity risks. Chelangat, Kiprop and Mutai (2022) sough to establish the relationship between payment cards and financial performance of commercial banks in Kenya. The results indicate that Debit card on ATM had a positive significant relationship with ROA at 5% significance level. The Credit Cards on ATM and POS Machines were also positively related to ROA but were not statistically significant while Prepaid Cards ATM was negatively related to ROA and non-significant. Nwobu (2022) determined the effect of electronic payment systems on financial performance in Nigeria from 2008 to 2021. Electronic card banking was found to have a statistically significant impact on access to financial services in Nigeria. An investigation of the influence of electronic card banking on financial performance in Nigeria was undertaken by Ene, Abba, and Fatokun (2019). It was shown that point-of-sale devices had a significant effect on the level of financial performance in Nigeria; on the other hand, automated teller machines did not have a significant bearing on the level of accessibility to financial services in the nation.

III. Material and Methods

A descriptive research design was adopted in this study. The descriptive research collects data in order to answer questions concerning the current status of the subject under study. This methodology is vital in facilitating the development of the multiple linear regression model. The population of study in this research was the DT MFIs in Nairobi County. According to CBK (2021), there are 12 Deposit Taking MFIs in Nairobi County. As such, the target population of study constituted the 12 Deposit Taking MFIs operating in Nairobi County. In this case, the census befits this study as the entire population consisted only of 12 deposit taking MFIs in Nairobi making it manageable and small. The study relied on secondary data that was collected through the use of secondary data collection sheet. The data collected was on the published information regarding electronic funds transfer, Mobile Banking, ATM Banking, Internet Banking, and financial performance during the recent five (5) years from 2018 to 2022.

Both descriptive and inferential statistics were computed using STATA 15. Descriptive statistics refer to methods of organizing and summarizing data, for this study frequencies and percentages as well as measures of central tendency (means) and dispersion (standard deviation) was used. Inferential statistics refer to methods of drawing conclusions from sample data about a population. For this study, regression and correlation analysis was used to determine both the nature and the strength of the relationship between study variables. Correlation analysis is usually used together with regression analysis to measure how well the regression line explains the variation of the dependent variable. The regression and correlation analyses were based on the association between two (or more) variables. Data was presented in form of tables and model.

The researcher was conducted a multiple regression analysis. The multiple regression model equation is as follows:

$$Y= \beta o +\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where;

Y= Financial Performance X_1= Mobile Banking

X_2= ATM Banking X_3 = Internet Banking

X_4 =Payment card banking βo = Constant term/intercept,

$\beta_1, \beta_2, \beta_3, \beta_4$ are regression Co-efficient of variables X_1, X_2, X_3, X_4 respectively,

ε =Error term

IV. Result and Discussion

Descriptive Analysis

In order to describe the features and characteristics of the data set, the study computed descriptive statistics. It provided a summary of the data and measures used in the study. The study calculated standard deviation, mean, maximum and minimum values between 2018 and 2022 for all the variables both dependent variables, financial performance, and the independent variables, mobile banking, ATM banking, internet banking and payment card banking. The descriptive statistics for the variable are presented in Table 1.

Table 1: Descriptive Statistics

stats	Financial Performance	Mobile Banking	ATM Banking	Internet banking	Payment Card Banking
N	65	65	65	65	65
min	-0.58382	0.002434	0.001507	0.000732	0.001111
max	0.039039	0.486024	0.01841	0.024351	0.008129

mean	-0.09046	0.108038	0.007046	0.006967	0.003216
sd	0.144148	0.128833	0.00405	0.006155	0.001893
se(mean)	0.017879	0.01598	0.000502	0.000763	0.000235
cv	-1.59346	1.192476	0.574802	0.883535	0.58849

From Table 1, mobile banking was calculated by taking the ratio of value of transaction to number of transactions. From 2018 to 2022, mobile banking ranged from 0.002434 to 0.486024 with a mean of 0.108038 and standard deviation of 0.128833. The deviation from the mean as indicated by coefficient of variation was 119.2% meaning the variability was high. ATM banking was calculated by taking ratio of value of transaction to number of transactions. Between 2018 and 2022, ATM banking ranged from 0.001507 to 0.01841 with a mean of 0.007046 and standard deviation of 0.00405. The deviation from the mean as indicated by coefficient of variation was 57.5% meaning the variability was moderate. Internet banking was calculated by taking ratio of value of transaction to number of transactions. Between 2018 and 2022, internet banking ranged from 0.000732 to 0.024351 with a mean of 0.006967 and standard deviation of 0.006155. The deviation from the mean as indicated by coefficient of variation was 88.3% meaning the variability was high. Payment card banking was calculated by taking ratio of value of transaction to number of transactions. Between 2018 and 2022, payment card banking ranged from 0.001111 to 0.008129 with a mean of 0.003216 and standard deviation of 0.001893. The deviation from the mean as indicated by coefficient of variation was 58.8% meaning the variability was moderate. From Table 1.0, financial performance which is the dependent variable was determined using the ratio of net income to total assets. Between 2018 and 2022, financial performance ranged from -0.58382 to 0.039039 with a mean of -0.09046 and standard deviation of 0.144148. The deviation from the mean as indicated by coefficient of variation was 159.3% meaning the variability was very high

Inferential Analysis

Correlation Analysis

Correlation analysis was employed in assessing the linearity association among the variables. Table 2 results were to give spearman correlation coefficient ranging from -1 to +1, whereby −1 is total negative correlation, 0 is no correlation, and 1 is total positive correlation. There is a strong correlation if the results are greater than 0.9 and a weak correlation if the results are less than 0.

Table 2: Pearson Correlation Analysis

		FP	**MB**	**ATMB**	**IB**
Mobile banking	Pearson Correlation	0.5897	1		
	Sig. (2-tailed)	0.000			
	N	65			
ATM banking	Pearson Correlation	0.4497	0.3151	1	
	Sig. (2-tailed)	0.0002	0.0106		
	N	65	65		
Internet banking	Pearson Correlation	0.5187	0.8376	0.3383	1
	Sig. (2-tailed)	0.000	0.000	0.0058	
	N	65	65	65	
Payment card banking	Pearson Correlation	0.3283	0.3892	0.2732	0.4044
	Sig. (2-tailed)	0.0076	0.0014	0.0277	0.0008
	N	65	65	65	65
*. Correlation is significant at the 0.05 level (2-tailed).					
**. Correlation is significant at the 0.01 level (2-tailed).					

The results indicated that the mobile banking has a significant positive effect on the financial performance of DT-MFIs in Nairobi County, Kenya (r = 0.5895, P=0.000). ATM banking has a positive and significant on the financial performance of DT-MFIs in Nairobi County, Kenya (r =0.4497, P=0.0002). Internet banking has a positive and significant effect on the financial performance of DT-MFIs in Nairobi County, Kenya (r =0.5187, P=0.0000). Payment card banking has a positive moderate and significant effect on the financial performance of DT-MFIs in Nairobi County, Kenya (r =0.3283, P=0.0076).

Inferential Analysis

Unit Root Test

The study used Philips-Perron to test for the presence of unit roots in panels that combine data from the dimension of the time series with that of the cross-section dimension, so that fewer time observations are required for power to be available for the test. The results are indicated in Table 3.

Table 3: Unit Root Test

Variable	Philips-Perron unit-root Test	
Financial Performance	7.1998	0.0000
Mobile banking	8.9063	0.0000
ATM banking	19.2574	0.0000
Internet banking	9.7719	0.0000
Payment cards banking	2.3233	0.0101

A p-value above 0.05 indicates the presence of unit roots, whereas a p-value under 0.05 indicates that the unit roots were not present for Philips-Perron tests. The results indicated that there was absence of unit root for the study variables. This showed that all variables are stationery, there was no problem of unit root, and the results can proceed for further inferential statistics.

Hausman Test (Choice of Model)

The study determined whether to run a fixed effects model or a random effects model when conducting panel data analysis. The difference between fixed and random effects modeling is that the latter uses a multilevel approach to estimate the variation in a response across multiple groups of observations. The null hypothesis is that the preferred model is random effects; the alternate hypothesis is that the model is fixed effects. The p-value was considered significant at 5% and any value below that FEM was to be selected while a value above that then REM was to be selected. The results are indicated in Table 4.

Table 4: Hausman Test

	(b) Fixed	(B) Random	(b-B) Difference	sqrt(diag(V_b-V_B))S.E.
Mobile banking	0.30748	0.09198	0.21551	0.127189
ATM banking	0.40549	0.02434	0.38115	0.094433
Internet banking	0.29152	-0.0763	0.3678	0.086882
Payment cards banking	0.20842	0.11738	0.09104	0.081186
b = consistent under Ho and Ha; obtained from xtreg B = inconsistent under Ha, efficient under Ho; obtained from xtreg Test:Ho:difference in coefficients not systematic chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 9.51 Prob>chi2 =0.0163				

Results in the table 4 indicated a prob>chi2 value of 0.0163 which is less than critical P value at 0.05 level of significance which implies that the null hypothesis that a random effect model is the best was rejected. The study hence will adopt a fixed effect regression model

Multiple Linear Regression

Multiple Regression analysis was used to check connection of independent variables with dependent variables. The main aim of regression analysis is to show how and extent of which each variable separately effects the dependent variables. Regression analysis is used in estimating the weight of the effects of the independent variables on the dependent variable.

Model summary is used to show the percentage of dependent variable that can be explained by changes in the independent variable. In this regression, the four independent variables were entered as a block. Table 5 below shows the model summary of the adopted fixed effect model.

Table 5: Model Summary Fixed Effect of Electronic banking on financial performance

Fixed-effects (within) regression	Number of obs =	55
Group variable: DT-MFB	Number of groups =	11
R-sq:	Obs per group:	

within = 0.1871	min =	5
between = 0.4641	avg =	5
overall = 0.3443	max =	5
	F(4,48)=	2.76
	Prob > F=	0.038

The analysis shows that the panels were strongly balanced for this multivariate analysis as shown by the number of observations per group. They were a total of 65 observations used in this analysis considering 13 groups of entities implying strongly balance panels. The minimum, maximum and average numbers of observations per groups were all equal to 5. The result obtained from fixed effect model indicated that the electronic banking accounted for 34.43% (Overall R square=0.3443) of the variation in financial performance of DT-MFIs in Nairobi County, Kenya. The F-statistic to the model shows is 2.76 which is greater than 0 implying that the estimated parameters in the model are at least not equal to zero. This implies that four electronic banking have an effect on financial performance of DT-MFIs in Nairobi County, Kenya. This effect is significant (P=0.038).

Regression coefficients are estimates of the unknown population parameters and describe the relationship between a predictor variable and the response. In linear regression, coefficients are the values that multiply the predictor values. P-values and coefficients in regression analysis work together to tell which relationships in the model are statistically significant and the nature of those relationships. The coefficients describe the mathematical relationship between each independent variable (electronic banking) and the dependent variable (Financial performance). The p-values for the coefficients indicate whether these relationships are statistically significant. The results are presented in Table 6.

Table 6: Regression Coefficient

Financial Performance	**Coef.**	**Std. Err.**	**t**	**P>t**	**[95% Conf. Interval]**	
Mobile Banking	0.307483	0.098875	3.11	0.003	0.108682	1.562583
ATM Banking	0.40549	0.186391	2.18	0.036	0.191698	1.605992
Internet Banking	0.291521	0.101981	2.86	0.006	0.054735	0.937893
Payment Card Banking	0.20842	0.17224	1.21	0.232	-0.056286	0.839322
_cons	0.175294	1.18499	0.15	0.883	-2.20729	2.557877

$$\mathbf{Y=0.175294+0.307483X_1+0.40549X_2+0.291521X_3+0.20842X_4}$$

Where Y is financial performance

$\mathbf{X_1}$ is mobile banking

$\mathbf{X_2}$ is ATM banking

$\mathbf{X_3}$ is internet banking

$\mathbf{X_4}$ is payment card banking

What is the effect of mobile banking on financial performance of DT-MFIs in Nairobi County, Kenya?

The first research question sought to answer what is the effect of mobile banking on financial performance of DT-MFIs in Nairobi County, Kenya? To answer this question, the study conducted Pearson Correlation as well as linear regression analysis. Pearson correlation indicated that there is significant positive relationship between of mobile banking and financial performance of DT-MFIs in Nairobi County, Kenya (r= 0.5897, P=0.000). This implies that increase in mobile banking would results to increase financial performance of DT-MFIs in Nairobi County, Kenya. Mobile banking reduces the operational and labor costs since the banks will only require a few staffs to deal with the systems. Increased capital investment in mobile banking was capital intensive hence promoting efficiency and bank profitability. This finding agrees with Mutua (2013) who found out that the adoption of mobile banking by commercial banks in Kenya has resulted in improved performance over the years. However, Njoroge (2014) correlation tests indicated a weak positive correlation between the performance of banking institutions and mobile banking in the country.

Further, linear regression indicated that mobile banking carries positive significant beta coefficient (β1) of 0.307483, p=0.003. Therefore, a unit increase in mobile banking across time and among deposit taking microfinance banks in Nairobi County would result in a significant increase of 0.307483 units in financial performance of DT-MFIs in Nairobi County, Kenya This variable was included in the optimum model. These findings compare favorably with Gikandi and Bloor (2017) who concluded that cost reduction and customer related factors have emerged as the main drivers of e-banking adoption in Kenya. Mobile banking growth is

expected to continue resulting to increase in profits of commercial banks. Okiro and Ndungu (2018) revealed that among the financial institutions surveyed, commercial banks had the highest usage of internet and mobile banking.

How does ATM banking affect financial performance of DT-MFIs in Nairobi County, Kenya?

The second research question sought to answer what extent does ATM banking influence the financial performance of DT-MFIs in Nairobi County, Kenya? Pearson correlation indicated that there is significant positive relationship between of ATM banking and financial performance of DT-MFIs in Nairobi County, Kenya (r=0.4497, P=0.0002). This implies that increase in ATM banking would results to significant increase financial performance of DT-MFIs in Nairobi County, Kenya. An increase in the number of ATMs installed reduced the number of clients in the banking halls and the number of human tellers hence cutting the labour cost, paper work cost and the operational costs and therefore resulting to better financial performance of the commercial banks. The increase also resulted to increased accuracy levels, banking space and proper time management that lead to the banks increased efficiency and profitability.

Abdi, Hussein and Kadir (2022) found out that automated teller machines banking and mobile banking are significant predictors of financial performance among commercial banks in Somalia. The results are also supported by Bek et al. (2017) all measured financial performance by analyzing demographic branch and ATM penetration rates. Further, linear regression indicated that ATM banking carried positive significant beta coefficient (β_2) of 0.40549, p=0.036. Therefore, a unit increase in ATM banking across time and among deposit taking microfinance banks in Nairobi County, Kenya would result to significant increase of 0.40549 units in financial performance. The study outcomes are in agreement with the literature presented. In their research Kamau and Oluoch (2016) discovered that, there was a significant positive relationship between the adoption of ATM and performance of commercial banks, since a unit change in the use of ATM increased commercial banks performance by 0.051. According to research by Wachira (2013) it was found that, despite ATM was a very expensive investment in the banking industry, it is a very important investment because of its merits such as: reduced congestion in banking halls, convenient for the customers to access banking services at any time and is user friendly.

How does internet banking affect financial performance of DT-MFIs in Nairobi County, Kenya?

The third research question sought to answer to how does internet banking affect financial performance of DT-MFIs in Nairobi County, Kenya? Pearson correlation indicated that there is significant relationship between of internet banking and financial performance of DT-MFIs in Nairobi County, Kenya (r =0.5187, P=0.000). This implies that increase in internet banking would results to significant increase financial performance of DT-MFIs in Nairobi County, Kenya. It was also realized that the increase in the number of internet transaction reduced congestion in the banking halls due to the reduced number of clients visiting the banks. Labour costs were also anticipated to fall due to the reduced number of employees hence resulting to increased efficiency and bank performance. This finding concurs with Mulwa (2017) found a moderate, significant and positive correlation between internet banking through internet banking transaction and return on assets of 40 commercial banks in Kenya. The results are also supported by Noah, Jagongo and Ndede (2019) sought to examine the effect of internet banking on financial performance of tier one Commercial banks in Kenya.

Further, linear regression indicated that internet banking carried positive insignificant beta coefficient (β_3) of 0.291521, p=0.006. Therefore, a unit increase in internet banking across time and among deposit taking microfinance banks in Nairobi County, Kenya would result to a significant increase of 0.291521 units in financial performance. These findings compare favorably with Onay (2018) showed that internet banking starts contributing to banks' ROE with a time lag of two years confirming the findings of while a negative impact is observed for one year lagged dummy. Malhotra and Singh (2019) indicated that multiple regression results reveal that the profitability and offering of internet banking does not have any significant association, on the other hand, internet banking has a significant and negative association with risk profile of the banks. Ayinla (2018) examined the effects of adoption of internet banking on performance in the banking industry in Nigeria. Similar results were also found by Oniore and Okoli (2022) who examined the impact of electronic banking on the performance of money deposit banks in Nigeria from 2006 to 2017 using time series quarterly data.

What is the effect payment card banking on financial performance of DT-MFIs in Nairobi County, Kenya?

The fourth research question sought to answer to what is the influence of payment card banking on financial performance of DT-MFIs in Nairobi County, Kenya? Pearson correlation indicated that there is significant positive relationship between of payment card banking and financial performance of DT-MFIs in Nairobi County, Kenya (r =0.3283, P=0.0076). This implies that increase in payment card banking would results to significant increase financial performance of DT-MFIs in Nairobi County, Kenya. Increase in the number of Debit/Credit Card Banking resulted to reduced paper work and also increased the retention of the customers thus leading to increased efficiency and profitability for the commercial banks. The use of Debit/Credit Cards was

found to be convenient to the users since they could use the cards at any particular time to do their transactions. They also required less acquisition and maintenance costs. Chelangat, Kiprop and Mutai (2022) sough to establish the relationship between payment cards and financial performance of commercial banks in Kenya. The Credit Cards on ATM and POS Machines were also positively related to ROA but were not statistically significant while Prepaid Cards ATM was negatively related to ROA and non-significant. This finding compares favourably with Aduda and Kingoo (2012) whereby there exists positive relationship between electronic card banking and bank performance in Kenya. Similar results were obtained by Kingoo (2011) also in Kenya.

Further, linear regression indicated that payment card banking carried positive insignificant beta coefficient (β_4) of 0.20842, p=0.232. Therefore, a unit increase in payment card banking across time and among deposit taking microfinance banks in Nairobi County, Kenya would result to insignificant increase of 0.20842 units in financial performance. An investigation of the influence of electronic card banking on financial performance in Nigeria was undertaken by Ene, Abba, and Fatokun (2019). The results indicated that card banking did not have a significant bearing on the level of accessibility to financial services in the nation. Midika (2016) found there is no relationship between the banking industry in Kenya and financial performance via the use of digital finance. These findings do not agree with Kingoo (2016) who found out that there exists positive relationship between e-banking and bank performance. The results indicated that bank performance (measured by return on assets) are explained by independent variable the e-banking measured by Investments in e-banking and n umber of debits cards issued to customers. Nwobu (2022) determined the effect of electronic payment systems on financial performance in Nigeria from 2008 to 2021. Electronic card banking was found to have a statistically significant impact on access to financial services in Nigeria. According to Munyocho (2015), there was a strong positive relationship between debit \ credit cards and the financial performance of the commercial banks in Kenya.

V. Conclusion and Recommendation

The first research question was what is the effect of mobile banking on financial performance of DT-MFIs in Nairobi County, Kenya? The study established that mobile banking has significant positive effect on financial performance. An increase in mobile banking value of transaction as compared to the number of transactions would results to significant increase in financial performance. The second research question was to what extent does ATM banking influence the financial performance of DT-MFIs in Nairobi County, Kenya? From the linear and multiple regression results, the study established that ATM banking affected financial performance of DT-MFB positively and significantly. Therefore, ATM banking has a significant positive effect of financial performance of Deposit taking microfinance banks in Nairobi County. An increase in value of ATM banking would results to significant increase in financial performance. The third research question was how does internet banking influence the financial performance of DT-MFIs in Nairobi County, Kenya? From the linear and multiple regression results, the study established that internet banking affected financial performance of DT-MFB positively significantly. An increase in the value of internet banking would results to significant increase in financial performance. The last research question was what is the influence of payment card banking on financial performance of DT-MFIs in Nairobi County, Kenya. The study established that payment card banking has insignificant positive effect on financial performance as indicated by multiple linear regressions. Hence, payment card banking is a not significant predicator of financial performance of DT-MFIs in Nairobi County, Kenya.

From objective one, the study recommended that bank management need to decrease mobile bill payment services in Deposit-taking Microfinance bank. This would result to customer loyalty which in turn would lead to increase in financial transactions undertaken through mobile banking. The study recommended that microfinance bank management need to decrease internet banking bill payment services. This would result to increase of interbank fund transfers as well as attract new users. The banks should also enhance internet banking customer security and privacy to reduce fraud and cyber-crime associated with internet banking. The study recommended that bank management need to keep on upgrading their electronic card banking technology in order to have an up-to-date system for effective service delivery. Further, microfinance bank management should establish country wide training and training for clients on usage of various e business applications for efficient performance of the bank. For example, training on ATM and VISA usage, internet banking, and mobile banking. The study recommended that commercial banks management should increase the number of services offered through payment card banking. This would result to increase in bank revenue due to the number of active accounts. Electronic banking should be employed by banks through proper management policies since it has shown that it cuts down the operational and labor costs that are unnecessary to the microfinance banks.

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