

PAYMENT CARDS AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS LISTED AT NAIROBI SECURITIES EXCHANGE IN KENYA

Kyalo Susan Mukulu^{1*}, Dr. Joshua Matanda² & Dr. Hesbon Otinga³

^{1*}Msc Finance: Jomo Kenyatta University of Agriculture and Technology, Kenya

^{2,3}Lecturer: Jomo Kenyatta University of Agriculture and Technology, Kenya

Accepted March, 14th, 2024

Abstract

Even though commercial banks in Kenya have over the years reported an increase in profitability, in the last five years (2014-2019) some have reported losses while others reported profits. In an effort to improve efficiency and reduce cost service delivery, commercial banks have adopted the payment cards. The study therefore sought to investigate the influence of the payment cards on the financial performance of commercial banks listed at Nairobi Securities Exchange. This study used casual research design. This research was conducted in listed commercial banks in Kenya and a covered a period of 5 years on monthly basis, starting from 2018 to 2022. This period was selected due to availability of data. In addition, this study used secondary time-series data. This data was obtained from central bank of Kenya and capital market authority. The secondary data was collected by use of a data extraction checklist. The data collected was quantitative in nature (continuous data), which was edited, coded and entered into a Stata version 15 for analysis. Both descriptive and inferential statistics were used to analyze quantitative data. In descriptive statistics, the study used frequency distributions, mean, standard deviation and percentages. In addition, correlation analysis and regression analysis were conducted after diagnostic test. Regression analysis indicated a positive and significant effect of payment cards on financial performance of commercial banks listed at Nairobi Securities Exchange. The study recommends that commercial banks in Kenya should increase the utilization of payment cards including point of sales machines, automated teller machines and credit cards. This can be done by reducing the requirements of credit cards issuance. Point of sales machines utilization can be increased by reducing the requirement for issuance and increasing acceptability in retail chains, pharmacies, petrol stations among other retailers.

Key Words: *Payment Cards, Financial Performance, Automated Teller Machines*

Introduction

Commercial banks act as intermediaries in the distribution of resources for finance among those involved in the system of finance. The primary players in the sector of banking include businesses, governments, individuals and commercial banks. In the circumstance of financial

intermediaries that provide finance indirectly, commercial banks play a significant role (Weber & Gladstone, 2019). However, the implementation process of the policy of monetary is intimately related to the operation of the system of banking (Naik & Rathi, 2017). The extent of effectiveness of financial intermediaries has an impact on economic growth. Because of this, the effectiveness of commercial banks is of paramount importance.

Technological advancements remain the greatest traction behind the evolution in financial market structures. With increased consumption of technology in the banking sector, new financial instruments in retail payments continue to make banks more attractive. Major developments have taken over the retail payments, and through the emergence of innovative electronic payments instruments, that are gradually replacing the paper based instruments, the banking system progressively changes its image. Onuorah (2020) asserts that the distribution network for payment services attract many people to the bank, hence increasing revenue for the bank. Antwi, Kasim and Wusah (2019) contends that effective payment infrastructure is crucial in assisting banks to institute long-term connections with their clients, as both private and corporate consumers seek to invest in banks to tap into the tremendous benefits attached to the system.

In essence, a functioning payment infrastructure is required to increase market efficiency in order to enhance financial institutions and operate as a confidence booster to the consumer while facilitating market-based economic exchanges. According to Were and Wambua (2018), effective payment services bear a substantial effect on the performance of banks generally. Notably, these services encourage financing and investment and also operate as economic boosters. Specifically, the technological development that have resulted to the electronic payment systems have significantly increased confidence of the consumer in the banking sector. Infrastructural changes in the payment systems have brought about significance changes within the banking sector such as gaining of the massive traction around it as everyone angles to partake of the benefits inherent in the system. According Horațiu and Pineta (2019), some of the most commonly used methods of electronic payments adopted by commercial banks include POS (Point of Sale) and ATM (Automated Teller Machine).

In China, Yao and Xianrong (2018) found that payment cards have a significant effect on the financial performance of financial institutions, which in turn aided the growth of the financial sector and sped up the industrial evolution processes. In Bangladesh, Bazmi, Nazir and Raza (2015) indicate that new technologies for payment like payment cards have not only decreased the time for settlement but also the costs of finance associated with processing of payments of clients. In Pakistan, Assalam (2017) found that technology development with respect to the systems of payment like Point of Sale (POS) machines and Automated Teller Machines (ATMs) are leading to convenient, effective, and efficient service delivery in commercial banks. In Nigeria, Jenevive and Anyanwaokoro (2017) demonstrated that Automated Teller Machine (ATM) have significant impact on the profitability of Nigerian commercial banks. However, the Point of Sale (POS) has got an insignificant impact on the profitability of the commercial banks in Nigeria. In addition, Ngumi (2020) indicated that payment cards had a significant effect on profitability, income, customer deposits and assets' return of Kenyan commercial banks.

Statement of the Problem

Commercial banks in Kenya contribute to the national development and specifically contribute to about 1.3 percent of the real GDP growth. However, banks and some other financial intermediaries are at the center of the world's current financial crisis (Ngumi, 2020). The decline of their portfolios for asset mostly brought on by faulty management of credit and non-performing loans were the main structural sources of crisis (Bernal, 2017). The fast-changing competitive environment, demand for more efficient services, globalization and economic changes have significantly influenced performance of commercial banks. As a result, commercial banks have resulted to digital channels like payment cards to reduce the cost of service delivery and increase efficiency, customers' satisfaction and customer deposits (Marya & Tortell, 2016).

Despite the fact that Kenya's commercial banks have recorded higher profits over time, some have reported losses and others have issued profit warnings in the past five years (Central Bank of Kenya, 2016). For example, in the years 2016, the National bank of Kenya recorded a 1.2 billion loss for the fiscal year 2015. In the year 2016, Family bank of Kenya issued a profit warning announcement showing that its profit for the year was probably going to decline by at least 25 per cent. Additionally, the Standard Chartered bank also reported a profit warning for the year 2017 due to of low performance caused by the rise in Non-Performing Loans (NPL) portfolio in the institution (Capital Markets Authority, 2017). Further, pre-tax profit of commercial banks in Kenya decreased by 5.03% from 141.1 billion in 2014 to 134.0 billion in 2015. Return on assets in commercial banks in Kenya decreased from 3.5% in 2018 to 2.8% in 2019 and 2.7% in 2020 before increasing to 3.3% in 2021. In addition, return on equity in commercial banks in Kenya decreased from 22.5% to 21.8% in 2019 and 13.9% in 2020 before increasing to 22.0% in 2021 (Central Bank of Kenya, 2021).

Various studies have been carried out on payment cards and financial performance of commercial banks. For instance, Kyalo (2017) carried out a survey on the influence of payment card usage on the performance of Kenyan commercial banks; Muiruri and Ngari (2020) carried out an investigation on the influence of payment cards on commercial banks financial performance in Kenya; and Okello, (2016) conducted a research on the influence of payment cards and commercial banks' performance portfolio in Kenya. However, Okello (2016) concentrated on the period between 2011 and 2015; Kyalo (2017) covered the period between 2009 and 2013; and Muiruri (2020) focused on the period between 2008 and 2012. This study will cover the duration between 2008 and 2022. Therefore, little is known on the impacts of payment cards on the financial performance of the commercial banks in Kenya.

Literature Review

Theoretical Review

The study was anchored on the diffusion of innovations theory. In accordance to Dillon and Morris in 1996, the elements that influences how quickly an innovation spreads are; relevant benefit (degree which technology gives benefits over present tools), compatibility (dependency with societal norms and customs for its members), trialability (chance to test an innovation prior to committing its' adoption), complexity (simplicity of its learning or use), and observability (degree which a technology's results and benefits are obvious). These factors are not competing

with one another, making it impossible to forecast the amount or rate of innovation dissemination (Chen, Hsish & Teng, 2018).

The numbers of innovation traits were later increased to 7. 3 out of the 7 innovation traits are borrowed from Rogers' comparative benefit, trialability and compatibility. The fourth quality, usability, is closely related to Rogers' complexity. It's important to remember that comparative advantage and simplicity of use are both subjective qualities because people may perceive them in various ways. Scott and McGuire (2017) agree that sentiments about an attitudes and object toward a specific conduct linked to that thing are typically at odds with one another. Jamshidi and Hussin (2016) also produced three additional qualities. While Tompkins and Olivares, (2016) incorporated a relative advantage's intrinsic component for image, Scott and McGuire (2017) discovered it to be a reliable predictor of use. Image is the belief in oneself that embracing a new idea will elevate one's social status.

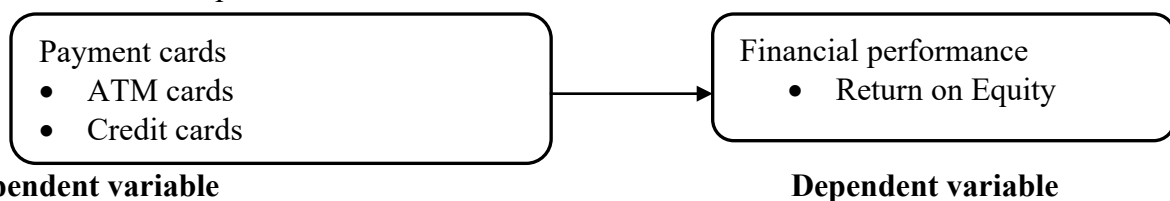
One of criticisms of the Diffusion of innovations theory is the pro-innovation bias. The pro-innovation bias suggests that it's advantageous for an innovation to be spread and be embraced by everyone (Chen, Hsish & Teng, 2018). In practice though, people should only use ideas that make sense in their environment. The second critique is individual-blame bias, which happens when adopters are held accountable for not adopting (Scott & McGuire, 2017).

The Innovation Diffusion Theory is used in this investigation to explain the significance of plastic cards on commercial banks' financial performance. The theory indicates that diffusion of an innovation depends on comparative advantage, trialability, compatibility, complexity and observability. Plastic cards are easy to use, convenience and efficient when used by customers. This is because they can be used in making payments in buying of products like in supermarkets of chemists. In addition, the use of plastic cards is not complicated and it is compatible with other services such as agency banking.

The Innovation Diffusion Theory has several limitations. The first is that it does not encourage the adoption of technology through participation. Second, it functions best when behaviors are adopted rather than when they are stopped or prevented (Chen, Hsish & Teng, 2018). Thirdly, it does not consider a person's ability to embrace the new habit (or innovation) or their social support system. Additionally, the idea does not account for a person's social structure or resources. Another critique is that, despite the fact that a lot of people misunderstand the Diffusion of technologies Theory and believe that invention is a personal trait, adopters of various technologies frequently fall into distinct categories.

Conceptual Framework

The research aims to investigate how payment cards affect the financial performance of commercial banks in Kenya. The independent variable was payment cards and the dependent variable was financial performance of commercial banks listed at NSE.



Independent variable

Dependent variable

Figure 1: Conceptual Framework

Empirical Review of Literature

Yran, Leonardo, Ibañez, Massunaga and Sawaya (2020) research on the effects of payment cards on company's performance in Latin America. The research employed a data panel from 2009 to 2011. The research discovered that payment cards have an important and affirmative impact on the company's operation. The research discovered that payment cards are increasingly significant profits source for a large span of Latin American companies such as grocery chains, department stores, telecom providers and commercial banks. Further, the results revealed that payment card agreements are a high-growth prospect, as they offer banks access to a lot of new customers at a minimal cost.

Kamal (2017) carried out a research on the Electronic payment cards adoption and their effects on Bank's gain in Jordan. The research was adopted on a selection of commercial banks operating in Jordan; information was gathered from yearly reports offered by banks and returning to the administration of commercial banks' credit. The research discovered that positive effect exist between the quantities of payment cards, payment cards' net income and the commercial banks profitability (ROE).

In Pakistan, Rauf, Qiang and Sajid (2017) conducted a research to examine the influence of payment card adoption on financial performance (measured in terms of ROE) of Pakistan banking industry. The research adopted a panel data for duration of 2004 to 2013. The findings have revealed that rise in card for debit employment improves gain of banking sector in form of ROA over duration of 2004 to 2013 partly.

In Nigeria, Oladejo (2016) conducted a study to determine the influence of payment cards on gain of Nigerian Deposits Money Banks (DMBs). Secondary information was derived from yearly report and narratives of 10 quoted (DMBs) between 2005 and 2012. Analysis of data was done by the use of panel logistic regression. The study found that when bank used payment cards, their level of performance, such as return on equity changes, return on assets, gain after tax and gross margin. This is represented in an affirmative relationship between usage and gross income of banks. Further, usage of payment cards affected the operation indices determined by the return on assets (ROA), profits after tax (PAT) and gross margin of the selected bank.

Kyalo (2017) carried out a survey on the influence of payment card usage on the performance of Kenyan commercial banks. The research employed a casual design of research. Secondary data from 7 commercial banks operating for duration between 2009 and 2013 was employed. The information was derived from the published annual reports of commercial and Central Bank of Kenya. The research discovered that payment cards have an important and affirmative effect on commercial banks' financial performance. Moreover, the research discovered that payment cards encourage expenditure by consumers therefore producing income to the commercial banks in the form of rates of interest charged which ultimately lead to improvement in financial performance of commercial banks.

Muiruri (2020) carried out an investigation on the influence of payment cards on commercial banks financial performance in Kenya. Secondary data was gathered from 44 commercial banks for duration of 2008-2012. The research discovered that some banks in Kenya had involved the use of payment cards so as to enhance profits, income, and to lower credit and risks of liquidity thus leading to improvement in the banks' financial performance.

Okello, (2016) conducted a research on the influence of payment cards and commercial banks' performance portfolio in Kenya. He surveyed 6 commercial banks in Migori municipality and they were all used in the gathering of data since the managers of the banks were all interviewed. A sample size of 120 credit card holders was derived from the record of the bank. The outcome showed that there was a correlation which is positive between the adoption of the bank portfolio and the credit card.

Makio (2019) carried out an investigation on the elements influencing the use of payment cards in Kenya, a documentation of Post bank staff. Data was gotten from 23 employees from other sectors and from card center of post bank. The research discovered that the management at the top was having credit cards while most of the middle and lower management did not poses credit cards. The investigation also discovered that elements influencing the employment of credit cards were awareness creation, fraud of credit card, complaints on the matters which are predetermined such as merchant service commissions' payment and the system of credit card in bank amid other many factors.

Research Methodology

This research adopted a causal research design. The target population was the 11 listed commercial banks at Nairobi Securities Exchange and covered duration of 5 years based on years, beginning from 2018 to 2022. The study used a census approach because the target population was small and hence involved all the 11 listed Kenyan commercial banks at NSE. The study adopted secondary data, which was collected by use of data collection checklist. The data was collected from the Central Bank of Kenya. Quantitative data gathered was coded, modified and keyed into a Stata version 15 for analysis. Both inferential and descriptive statistics was adopted for analysis of quantitative data. For descriptive statistics, the research employed percentages, standard deviation, mean and frequency distribution. Inferential statistics included correlation analysis and regression analysis.

The regression model was expressed as follows;

$$Y_t = \beta_0 + \beta_1 X_{1it} + \varepsilon_t$$

Whereby; Y_t is the dependent variable (financial performance of commercial banks (ROA)); B_0 is the y intercept (Constant); β_1 is beta coefficients of determination; X_{1t} is the Payment cards; t represents time; i represents listed commercial banks and ε_t is an error term.

Results and Discussions

The study used 11 commercial banks in Kenya for a period of five years, which was between 2018 and 2022. The results encompassed descriptive analysis, diagnostic tests, correlation analysis and bivariate regression analysis.

Descriptive Analysis

The objective of the descriptive analysis was to describe the properties of the data in terms of central tendency and variation. The descriptive statistics of interest included mean, standard deviation, minimum and maximum as presented in Table 1. Payment cards were calculated by finding the ratio of ATM cards to Credit cards. Payment cards ranged from 0.0112 to 3.330234 between 2018 and 2022, this implies that ATM cards amount relative to credit card at its least was 1.12% while at its maximum it was 330.2%. The distribution had a mean of 1.096494 and standard deviation of 1.056038. This implies that within the study period, ATM cards relative to credit cards was 109.6%, implying ATM cards yielded more amount as compared to credit cards

although there was significant deviation of 105.6%. There was absence of normality as indicated by Skewness less than 2 (0.664) and kurtosis less than 6 (2.017).

In this study, financial performance was calculated by use of Return on Equity. Financial performance ranged from 0.11677 (11.7%) to 0.430671 (43.1%) between 2018 and 2022, this implies that return on equity at its least was 11.7% while at its maximum it was 43.1%. The distribution had a mean of 0.195066 (19.5%) and standard deviation of 0.12573 (12.8%). This implies that within the study period, few listed commercial banks performed better than others as compared to the mean performance although there was significant deviation of 12.8%. These figures are in thousands. There was absence of normality as indicated by Skewness less than 2 (0.516875) and kurtosis less than 6 (2.955208).

Table 1: Descriptive Statistics

Year	Financial Performance	Payment Card Banking
N	55	55
Minimum	0.11677	0.0112
Maximum	0.430671	3.330234
Mean	0.195066	1.096494
Std. Dev	0.12573	1.056038
Skewness	0.516875	0.664244
Kurtosis	2.955208	2.017585

Figure 2 shows trend of financial performance between 2018 and 2022. It reduced from 2018 to 2020 before increasing in 2021 and thereafter in 2022. However, there are notable outliers during the study period implying some firms performed better than others.

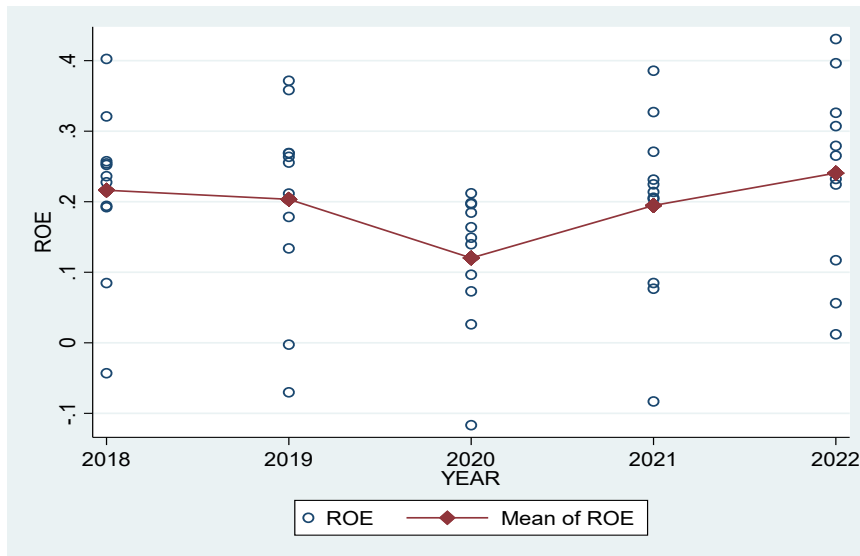


Figure 2: Scatter Plot for financial performance between 2018 and 2022

Diagnostic Tests

The study conducted the following diagnostic tests; normality/ linearity test, test for heteroskedasticity, test for serial autocorrelation for the study variables. Tests of Jarque Bera

were utilized to determine normalcy. A p value of 0.05 or above would indicate that the null hypothesis should be rejected, whereas a p value of less than 0.05 means the null hypothesis should be fail to reject the null hypothesis. When analyzing the data, a p value larger than 0.05 was observed, meaning that the null hypothesis was not supported, hence the data was normally distributed since the alternative hypothesis was supported. Use of this information may now be applied for parametric tests like ANOVA, Pearson's correlation and regression analysis.

Table 2: Normality Test

Stats	Financial Performance	Payment cards
Jargue-Bera	1.904	3.956
Probability	.386	.1383

Test of Linearity

The degree to which the change in the dependent variable is linked to the change in the independent variable is referred to as linearity. This was evaluated using scatter plots where points are close to the linear line as shown in Figure 2. In the plot below, the smoothing line is very close to the ordinary regression line and the entire pattern seems pretty uniform. Therefore, there exist a linear relationship between dependent and independent variables.

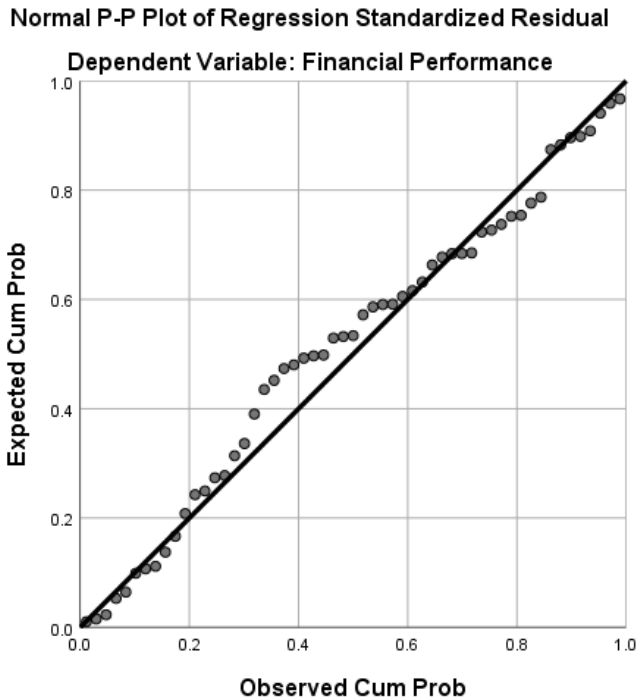


Figure 1: Linearity test using PP plot

Testing for serial correlation (Independence)

The study employed Wooldridge test for autocorrelation to test this assumption. The study sought to test the null hypothesis that no first order serial correlation existed. From the finding presented in Table 3, the study concluded that there was no serial correlation of first order since the p-value (p-value=0.9622) was greater than 0.05 leading to the study to fail to reject the null

hypothesis. The results indicated that the data adhered to the assumption of residuals not being correlated across time hence adequate for panel regression analysis.

Table 3: Test of Autocorrelation

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
F(1,10) = 02
Prob > F =0.9622

Testing for Heteroscedasticity

Cross sectional units tend to exhibit homoscedastic error processes; however, unit specific variances are more common and are referred to as groupwise heteroskedasticity. The command with the heftiest weight is used in computing the Breuch Pagan group wise Heteroskedasticity when residuals are utilized. A test for heteroscedasticity was carried out in the study. The null hypothesis was that there was no heteroscedasticity in the model for the study. The computed p-value implies that the null hypothesis of Homoscedastic error terms was not rejected as the p value was more than 0.05 at 1.14793.

Table 4: Heteroskedasticity Test

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model
H0: $\sigma(i)^2 = \sigma^2$ for all i
chi2 (11) = 1.0413
Prob>chi2 = 1.1479

Stationarity test

The study used Augmented Dickey–Fuller 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 5. 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 Augmented Dickey–Fuller tests. The results indicated that there was absence of unit root for the study variables since the P values were less than 0.05, financial performance (P=0.000) and payment cards (P=0.000) and Mobile payment system (P=0.011). This showed that all variables are stationery, there was no problem of unit root, and the results can proceed for further inferential statistics.

Table 5: Augmented Dickey–Fuller unit root test

Variable	Augmented Dickey–Fuller unit-root Test
Financial Performance	5.2455 000
Payment cards	9.6495 000

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 model 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 in the Table 6 indicated a prob>chi2 value of 0.0289 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 adopted a fixed effect regression model

Table 6: Hausman Test

Coefficients	(b) Fixed	(B) Random	(bB) Difference	sqrt(diag(V_bV_B)) S.E.
Payment cards	0.28183	0.23034	0.05149	0.81318

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

$$\text{chi2}(4) = (bB)'[(V_bV_B)^{-1}](bB)$$

$$= 0.242$$
 Prob>chi2 = 0.0289

Correlation Analysis

To explore the effect of national payment system on financial performance, a correlation analysis was conducted. The results of the correlation between national payment system and financial performance pertinent results are summarized in Table 7.

Table 7: Pearson Correlation Analysis

	Financial performance
Pearson Correlation	0.355*
Sig. (2-tailed)	0.0316
Payment cards N	55

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Correlation results showed that payment cards ($r=0.355$, $P=0.0316$) had a positive and a significance relationship on financial performance of commercial banks listed at NSE. The results are in agreement with Yran, Leonardo, Ibañez, Massunaga and Sawaya (2020) discovered that payment cards have an important and affirmative impact on the company's operation. The research discovered that payment cards are increasingly significant profits source for a large span of Latin American companies such as grocery chains, department stores, telecom providers and commercial banks. Kamal (2017) discovered that positive effect exists between the quantity of payment cards, payment cards' net income and the commercial banks profitability (ROE).

Bivariate Regression Analysis

The study sought to examine effect of payment cards on financial performance of commercial banks listed at NSE. The study adopted fixed effect model and the results are presented in Table 8. R-Squared (R^2 or the coefficient of determination) is a statistical measure in a regression model that determines the proportion of variance in the dependent variable that can be explained by the independent variable. The coefficient of determination ($R\text{-sq} = 0.1260$) which was

statistically significant at $\text{Prob} > \chi^2 = 0.0056 < 0.05$, an indication that 12.6% of the variations in financial performance is accounted for by payment cards. In addition, the results showed that payment cards positively and significantly affected financial performance ($\beta=0.222635$, $P=0.0056$). This implies that a unit increase in payment cards leads to an increase in financial performance by 0.222635 units. The regression model is as shown below:

$$Y = 20.34986 + 0.222635 X_3$$

Table 8: Regression Fixed Effect of Payment cards on Financial Performance

F.P	Coef.	Std. Err.	T	P>t	[95% Conf. Interval]	
PS	0.222635	0.102517	2.1717	0.0056	0.014959	0.460229
_cons	20.34986	0.194761	104.49	0.0000	19.94222	20.7575
Weighted Statistics						
Rsq:				Number of obs =	55	
within =	0.1684			Number of groups =	5	
between =	0.1449			F(1,43) =	5.85	
overall =	0.1260			Prob > chi2 =	0.0056	

Conclusion and Recommendations

The study concluded that payment cards have positive and significant influence on the financial performance of commercial banks listed at NSE. The positive and significant coefficient for payment cards implied that increase in the payment cards had a significant increased effect on the financial performance for the commercial banks listed at NSE. Therefore, commercial banks in Kenya should increase the utilization of payment cards including POS machines, ATMs and credit cards. This can be done by reducing the requirements of credit cards issuance. In addition, the utilization of ATMs can be increased by reducing the charges involved in the transactions and increasing the number of ATMs in the country. POS machines utilization can be increased by reducing the requirement for issuance and increasing acceptability in retail chains, pharmacies, petrol stations among other retailers.

Recommendations for Further Studies

The main objective of this study was to examine effect of payment cards on financial performance of commercial banks listed at NSE. The study focused on Kenya payment cards as a form of national payment system. The study recommended that further study should consider other national payment system such as East African Payment System (EAPS), settlement system and electronic payment, automated clearing house and mobile payments. In addition, the study was limited to commercial banks listed at Nairobi Securities Exchange in Kenya. As such, the findings of this study cannot be generalized to other commercial banks in Kenya. As such, further studies should be conducted on the effect of payment cards on financial performance of all the 39 commercial banks in Kenya.

References

Antwi, S., Kasim, H. & Wusah, B. S. (2019). Examining the Effectiveness of Electronic Payment System in Ghana: The Case of eZWICH in the Tamale Metropolis. *Research Journal of Finance and Accounting*, 6, 163-177.

- Assalam, O. (2017). Technological Innovations and its Impact on Firm Performance in Financial Sector of Pakistan. *Telematics and Informatics Journal*, 19, 315-330.
- Bazmi, N., Nazir, M. & Raza, A. (2019). Effect of Plastic Money on the Performance of Banking Sector of Bangladesh. *Journal of Research in Economics and International Finance*, 4(1), 22 – 26.
- Bernal, M. V. (2017). Retail payments innovations in Peru: Modelo Peru and financial inclusion. *Journal of Payments Strategy & Systems*, 10(4), 343-351.
- Capital Markets Authority (2017). *Capital Markets Authority Nairobi Securities Exchange (NSE)*. Retrieved from <https://cma.org.sa>
- Central Bank of Kenya (2016). *Bank Supervision Annual Report 2016*. Retrieved from <https://www.centralbank.go.ke>
- Central Bank of Kenya (2021). *Bank Supervision Annual Report*. Retrieved from <https://www.centralbank.go.ke>
- Chen, L.F., Hsish, H.C., & Teng, C.H. (2018). Applying the Diffusion of Innovation Theory to Improve the Prevalence of Use of a Disease Management Information System. *The Journal of Nursing*, 65(4), 109–116.
- Horațiu L. & Pineta. A. (2019). *Operational Risk in Regis: A Systemically Important Payment System*. Retrieved from <https://www.suomenpankki.fi>
- Jamshidi, D., & Hussin, N. (2016). Islamic Credit Card Adoption Understanding: When Innovation Diffusion Theory Meets Satisfaction and Social Influence. *Journal of Promotion Management*, 22(6), 897–917.
- Jenevive, O.C. & Anyanwaokoro, M. (2017). Electronic Payment Methods and Profitability of Banking Firms in Nigeria: A Panel Data Analysis. *International Journal of Finance and Accounting*, 6(3), 67-74.
- Kamal, A. M. A. (2017). Electronic Credit Cards Usage and Their Impact on Bank's Profitability: The Rate of Return on Owners Payment cards Model. *Interdisciplinary Journal of Contemporary Research in Business*, 4(7), 828-841
- Kyalo, F. (2017). The Effect of Credit Card Usage on the Financial Performance of Commercial Banks in Kenya. *Prime Journal of Technology*, 20, 4456-4460
- Makio, J.W. (2019). A Survey of the Factors Affecting the Use of Credit Cards: A Case Study of Postbank. *Journal of Economics and Finance*, 5, 6-20.
- Marya, S. & Tortell, C. (2016). The Evolution of the Retail Payment Market – A Focus on Malta. *Contemporary Studies in Economic and Financial Analysis*, 97, 199 – 225.
- Muiruri, J.K. & Ngari, J.M. (2020). Effects of Financial Innovations on the Financial Performance of Commercial Banks in Kenya. *International Journal of Humanities and Social Science*, 4(7), 51-78.

- Naik, S. V., & Rathi, R. A. (2017). A Study of Financial Performance of Saraswat Co-operative Bank Ltd: A Case Study. *CLEAR International Journal of Research in Commerce & Management*, 6(12), 61–66.
- Ngumi, P. M. (2020). Effect of bank innovations on financial performance of commercial banks in Kenya. *Journal of Finance*, 10, 34-78.
- Okello, I. (2016). The effect of electronic retail payment services on financial performance of commercial banks in Kenya. *Accounting, Business and Financial History*, 14, 339-353.
- Oladejo M. (2016). Epayments adoption and Profitability performance of Deposits Money Banks in Nigeria. *International Journal of Information Technology*, 4(3), 1-9
- Onuorah, A.C. (2020). Automated Clearing System and the Banking Sector Performance: The Nigerian Experience. *Journal of Business and Economics*, 10, 43-62.
- Rauf, S., Qiang , F. & Sajid, K.U.(2017). Electronic Debit Card Usage and their Impact on Profitability of Pakistan Banking Sector: ROA, Model. *European Journal of Business and Management*, 6(4), 1-7.
- Scott, S., & McGuire, J. (2017). Using Diffusion of Innovation Theory to Promote Universally Designed College Instruction. *International Journal of Teaching and Learning in Higher Education*, 29(1), 119–128.
- Tompkins, M. & Olivares, A. (2016). Clearing and Settlement Systems from Around the World: A Qualitative Analysis. *Bank of Canada Staff Discussion Paper*, 1-45.
- Weber, J., & Gladstone, J. (2019). Rethinking the Corporate Financial-Social Performance Relationship: Examining the Complex, Multistakeholder Notion of Corporate Social Performance. *Business & Society Review (00453609)*, 119(3), 297–336.
- Were, M., & Wambua, J. (2018). What factors drive interest rate spread of commercial banks? Empirical evidence from Kenya. *Review of Development Finance*, 4, 73–82.
- Yao, M. & Xianrong, X. X. (2018). Impact of payment technology innovations on the traditional financial industry: A focus on China. *Technological Forecasting and Social Change*, 135, 199-207.
- Yran, B. D., Leonardo, G. Ibañez, D., Massunaga, S. & Sawaya, A. (2020). Creating value through credit card partnerships in Latin America. *Journal of Electronic Commerce*, 1, 3–23.