
# STRATEGIC TECHNOLOGICAL INNOVATIONS AND PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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# STRATEGIC TECHNOLOGICAL INNOVATIONS AND PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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**ABSTRACT**

*The purpose of the study was to investigate the strategic technological innovations and performance of commercial banks in Kenya. The study specific objectives include self-service technique, bank digital card, back office automation process and point of sale terminals. The study was anchored on Schumpeter theory of innovation, task-technology fit theory and transaction cost innovation theory. The study unit of observation was Tier one commercial banks in Kenya. The study unit of analysis was the management employees of the 9 Tier 1 commercial banks in the Head Quarters. Stratified random sampling technique was used to select a sample size of 74 participants by help of Yamane statistical formula. Primary data was collected using structured questionnaire based on the objectives of the study. The collected data was edited, coded for processing using the Statistical Package for Social Sciences (SPSS v.25) and results were presented in frequency tables. Descriptive and inferential statistics were used to analyze information generated from the respondents. On regression results, the study adopted multiple linear regression model to regress performance of commercial banks in Kenya against strategic technological innovations. Based on correlation coefficient index it was revealed that performance of commercial banks in Kenya had a positive significant correlation with strategic technological innovations constructs. Consequently, ANOVA was used to measure the regression model validity and indicated that the model was valid to measure the relationship between the study variables with $p<0.05$. The coefficient of determination ($r^2$) results revealed that strategic technological innovations had a significant and positive effect on performance of commercial banks in Kenya. The study concluded that the customer care has been automated and customers can self-serve themselves. This has been made possible by deploying chat bots which were able to virtually attend to customers' queries. The study recommended that the commercial banks should ensure security with digital cards so as to safe guard customers from fraud. This could be achieved through encrypting the bank customer data. The banks digital cards should be dynamic in that card holders can use any digital point of any other bank to transact. This would increase the volume of transactions by the customers. In addition, the banks should design incentive programs geared towards stimulating customers to transition to digital cards. They would lead to increased transaction fees revenue.*

***Key Words**: Self-Service Technique, Digital Card, Back Office Automation Process, Point Of Sale Terminals*

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## INTRODUCTION

The world over, technology is transforming how people access and use financial products and services (Cruz-Garca, 2021). Banks and other financial organizations have a long history of utilizing technology to better their operations, develop new goods and services, and replace outdated IT systems. The rate of technological development is quickening, posing new problems. Yet, banks will continue to adapt their services to changing customer expectations while also fostering trust in the use of technology. Customers have more choice and convenience because to the cutting-edge financial technologies (FinTech) being offered by banks and FinTech companies.

Internationally, Taiwan's government encouraged the growth and innovation of financial technology by establishing and carrying out the Digital Financial Environment 3.0 Project in 2016. (Wang & Xin-Yuan, 2022). In the United Kingdom, financial institutions have used bank strategic innovations as a strategy to give direction that realizes advantage in a changing environment through its configuration of competences and resources with the aim of fulfilling stakeholders' expectations in the bank, according to Chen, Li, Wu, and Luo (2017). Information and communications technology (ICT) has had a profound impact on banking in Malaysia. Malaysian banking organizations are now vying with one another on the basis of services rather than tangible goods. Service innovation involves assimilating enhanced service processes through the design and improvement of service delivery systems, going beyond the traditional bounds of product innovativeness (Tan, Chew & Hamid, 2016).

Regionally in Ghana, Sampong (2016) noted that the Bank of Ghana's liberalization of the banking sector and the ensuing rise in competition among financial institutions have highlighted the need for the development of novel financial assets or products that would retain existing clients and draw in new ones. Through innovation, customers may now bank more easily and conveniently at home or online. The benefits of home banking include privacy, speed, accuracy, and the opportunity to conduct business around-the-clock. With the capacity to manage personal accounts, do additional tasks like online bill payment and auto loan application, and provide customers with a 24-hour telephone response, internet banking has the potential to be a convenient banking option for users.

The combined total of internet users in the other analyzed African countries, according to Olusesan, Oluwanishola, and Williams (2016), is still much below the benchmark for Nigeria alone. Nigerian banks have implemented several innovations around their predominantly ICT-driven goods and services to take advantage of new trends in technological progress. The Central Bank of Nigeria (CBN) is the apex bank, and its policies are what are driving this step in addition to technology. For instance, the Nigerian economy has been defined as a cash economy with approximately 95% of transactions taking place in cash, in contrast to industrialized countries where a large portion of transactions have been automated and replaced with electronic transactions. The expense, corruption, and money laundering activities that characterize Nigerian society have been significantly decreased as a result of the use of internet banking.

In order to reduce insecurity and simultaneously educate its consumers, the banking industry in Kenya keeps implementing more convenient, safe, and secure technologies at their cash points. Banks accelerated their digital strategy in response to the COVID-19 epidemic, according to the CBK Banking Sector Innovation Study (2020). In the COVID-19 era, 56% of the institutions cited the push for the adoption and use of digital channels, particularly mobile and internet banking. Innovations in digital funding were essential in combating the COVID-19 pandemic. Business continuity and rapid scaling up of support for disadvantaged groups were made possible by financial technology (Fintech). Compared to 33% of MFBs, 58 percent of banks developed a product specifically designed to counteract the consequences of COVID-19.


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Between January 1 and December 31, 2020, 79 percent of banks and 72 percent of MFBs offered new Fintech products. Compared to the 2019 Innovation Study, where 86 percent of the institutions introduced new products, this represented a minor fall on the part of MFBs.

In Kenya, the Central Bank of Kenya served as the industry's regulatory body until December 2021, and the country's banking industry included 43 financial institutions, 8 foreign bank representatives, 12 microfinance banks, 3 credit reference agencies, 15 money remittance providers, and 80 foreign exchange bureaus. Using a weighted composite index that includes assets, deposits, capital, the number of deposit accounts, and loan accounts, Kenyan commercial banks are divided into three groups. A major bank is defined as having a weighted composite index of 5% or more, a medium bank as having a weighted composite index of 1% to 5%, and a small bank as having a weighted composite index of less than 1%. 2017 CBK Supervision Report.

Commercial banks' declining profit margins have prompted some to exit the industry and most to engage in merger and acquisition activities. This is demonstrated by the rise in mergers and acquisitions over the past few years, including those of National Bank, Fidelity Bank, CBA, and NIC Bank, which were driven by the desire to improve revenue growth, scale for growth, and optimize operations. The idea of banks and banking has undergone a paradigm shift as a result of the country's falling financial performance and integration of its banking industry with the rest of the world. According to Olweny and Shipho (2017), as there are now more commercial banks in Kenya, there is more competition and a wider variety of product options accessible, which has led to customers becoming more tolerant and always seeking for higher-quality goods and services at reasonable prices.

**Statement of the Problem**

Kenyan commercial banks have persisted in making significant investments in technological advancements and training personnel to use the new technologies. For instance, Equity Bank has seen 97 percent of its transactions take place outside of its branches, with more than 513 million taking place via the mobile banking app and 80 million via agents. 90 percent of Kenya Commercial Bank (KCB) transactions are now supported by technology (CBK, 2020). In 2021, Absa Bank Kenya will introduce a new vertical card that will support contactless payments. Unfortunately, despite these advancements, commercial banks' performance has continued to deteriorate. The market shares of medium-sized banks fell to 17.10% in 2019 from 21.22% in December 2018, and customer deposits decreased to KSh 623 billion from KSh 713 billion in 2018. (CBK supervision report, 2020). Also, the number of automated teller machines (ATMs) fell from 2,529 in December 2018 to 2,459 in December 2019—a fall of 70 machines. Along with Kenya Commercial Bank and I&M Holdings, Standard Chartered Bank released a profit alert in the latter part of 2020, suggesting trouble. Furthermore, despite the fact that banks have improved many of their front-end, customer-facing processes with digital solutions, far too many bank activities still rely on personnel and paper. Thousands of individuals frequently work in back offices handling client inquiries (Dias, Patnaik, Scopa, & van Bommel, 2017).

Many research on banking advances have been conducted. For instance, Iqbal, Hassan, and Habibah (2018) investigated the effects of Pakistan's self-service technique on service quality and behavioral intention. Ireri (2020) conducted a study in Kenya to look into financial innovations and commercial banks' performance there. The study, however, concentrated on significant breakthroughs that are difficult to quantify. Ngumi (2016) conducted research on Kenyan commercial banks' performance in light of bank innovations. The study was conducted several years ago, and a lot has happened in terms of bank innovations since then. The impact of credit and debit cards on Kenya's commercial banks' financial performance was

studied by Chelangat, Kiprop, and Mutai in 2022. However, in the context of commercial banks and given the highly competitive climate these banks found themselves in, unique strategic banking innovations have been largely neglected in reviewed empirical research in favor of financial innovations. An empirical study on the strategic technological innovations and performance of commercial banks in the setting of commercial banks in Kenya was required due to the observed gaps in the literature and the existing state of the commercial banks.

**Objectives of the Study**

The general objective of this research is to establish strategic technological innovations and performance of commercial banks in Kenya. The specific objectives were:

- To establish the influence of self-service technique and performance of commercial banks in Kenya.
- To evaluate the influence of bank digital card and performance of commercial banks in Kenya.
- To establish the influence of back office automation process and performance of commercial banks in Kenya.
- To evaluate the influence of point of sale terminals and performance of commercial banks in Kenya.

The study tested the following research hypotheses;

- **$H_0$1:** Self-service technique has no significant influence on performance of commercial banks in Kenya.
- **$H_0$2:** Bank digital card has no significant influence on performance of commercial banks in Kenya
- **$H_0$3:** Back office automation process has no significant influence on performance of commercial banks in Kenya.
- **$H_0$4:** Point of sale terminals has no significant influence on performance of commercial banks in Kenya.

## LITERATURE REVIEW

### Theoretical Framework

#### Transaction Cost Innovation Theory

Hicks and Niehans, who advocated and argued that the main characteristic of financial success is the ability to reduce transaction costs that respond to technological advancement and contribute to a reduction in transaction costs, laid out the theory in their ground-breaking concept of transaction cost guidance from 1983. Although assuming that money-related technologies reduce the cost of transaction making, the capacity to lower transaction costs helps to financial innovation and financial service upgrading.

Costs associated with transactions while effective communication, data administration, and data utilization are provided by Internet-related information technology (IT), the innovation principle significantly lowers an organization's exchange costs (Remneland-Wikhamn & Knights, 2017). Mobile phones that make use of Internet-related IT reduce trade expenses by granting off-website access to the association's internal data set as well as other fundamental data sources. With the use of mobile and corporate banking, the result further reduces operating costs, which affects the growth of the bank's profitability.

#### Schumpeter Theory of Innovation

In 1928, Schumpeter made the case that innovators, whether they were independent inventors or R&D engineers working for huge firms, provided the potential for new revenues. The result would be a flood of investment that would reduce the profit margin for the innovation due to groups of copycats drawn by super-profits. Yet before the economy could stabilize, a fresh innovation or series of innovations—which Schumpeter conceived as Kondratiev cycles—would appear to restart the business cycle.

Schumpeter's discussion of the banking acts of the 1930s has an especially noteworthy allusion to advances in the banking industry. He said that the 1933 act brought about significant changes, such as


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the separation of commercial banks and their security affiliates and the strengthening of the Federal Reserve's ability to control member banks' granting of credit for speculative purposes. Self-service technique, point-of-sale terminals, and back office automation process are all supported by the idea.

**Task-Technology Fit Theory**

The Task-Technology Fit Model was developed by Goodhue and Thompson in 1995 to explain the utilisation of technology by examining the fit of technology to users' tasks/requirements. The purpose of the theory was to add to the body of knowledge on technology utilisation in the private and public contexts, which had limited explanation as to how the acceptance of technology contributes to individuals' performance.

According to the theory of task-technology fit, the success of an information system should be related to the fit between task and technology, whereby success has been related to individual performance (Goodhue & Thompson, 2015) and to group performance (Zigurs and Buckland, 1998). For group support systems, a specific theory of task-technology fit was developed (Zigurs & Buckland, 2016) and later tested by (Zigurs, Buckland, Connolly & Wilson, 2016) and detailed the requirements of group support systems to fit group tasks. For mobile information systems, task-technology fit has been shown to be generally relevant, but more specific questions regarding the applicability of task-technology fit to mobile information systems remain unanswered (Gebauer & Shaw, 2016).

**Conceptual Framework**

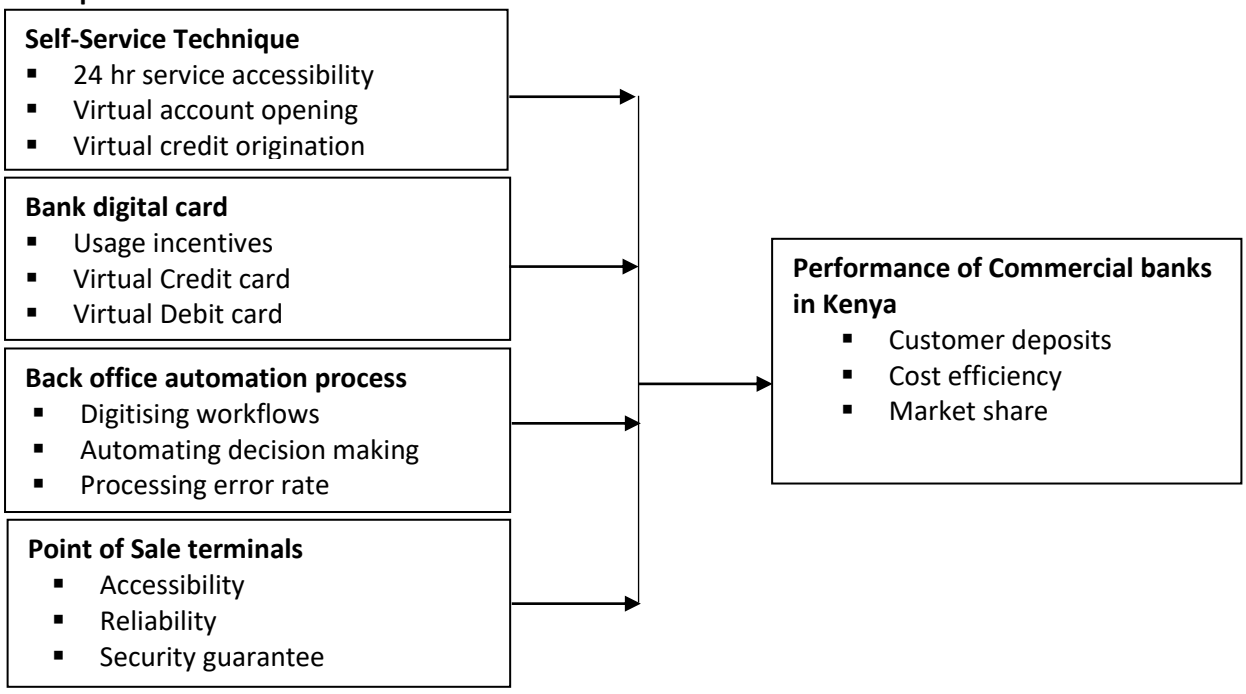


**Figure 1: Conceptual Framework**

**Empirical Review**

In their 2018 study, Abdullai and Micheni looked into how Internet Banking affected banks in Nakuru County. There were 56 employees of commercial banks who made up the research population. The report used a census survey because banks are typically tiny. According to the report, Internet banking significantly improves the operational effectiveness of commercial banks. However, Internet banking alone does not improve financial efficiency, necessitating the addition of additional factors.

The effect of online banking on Kenya's commercial banks' financial performance was examined by Kombe and Wafula in 2015. The study utilized a descriptive survey. 31 employees of KCB, Mombasa Kenya Treasury Square were the target population. The data was gathered through questionnaires, and it was then statistically analyzed. The study found that rather than cost savings, the impact of ICT adoption on banking sector productivity related more to time savings and quality enhancements. The analysis, however, is restricted to accession because it only used simple random sampling.

Abong'o (2016) looked at how mobile phone banking affected Kenya's commercial banks' performance. The descriptive analysis method was used. The findings indicated that the safe holding and transfer of money from one owner to another was not a significant predictor of bank efficiency. Agency banking influence on the performance of a few selected banks in Nairobi County was examined by Musau and Jagongo (2015). The research design used in the study was descriptive. Four banks in Kenya that provide agency banking services were the focus of the investigation. The study's conclusions show that the outlets' access to liquidity affected banks' performance. The study's conclusions might not apply to the entire banking sector because it only used a descriptive research design and only focused on 4 banks.

In their study on the dynamics of financial innovation and performance of banking firms: context of an emerging banking industry in the United Kingdom, Mabrouk and Mamoghli (2016) examined how the adoption of two types of financial innovations—product innovation (telephone banking and SMS banking, for example) and process innovation (Magnetic strip cards (debit, ATM, and credit card), Automatic cash dispenser, (Automatic teller machine; Electronic payment terminal)—affected the performance of banking firms. Both descriptive and inferential statistics were used in the study's descriptive research design. They looked at two adoption behaviors: those who adopted financial innovations first and those who imitated others who did so. They discovered that process initiative has a favorable impact on efficiency and profitability whereas first mover initiative in product innovation enhances profitability. Banks that copy others' strategies are less successful and effective than pioneers.

Malek, Shabudin, and Mohtar (2017) concentrated on the banking agent's moderating effect on Malaysian commercial banks' performance in terms of financial inclusion. It is possible that the effects of banking agent on each of the four elements variables may differ from each other. Therefore, the agents need to balance their adequate cash in the drawer or even their e-money float balance to meet the demand of the customer in doing the daily transaction. It is very crucial for an agent to have the balance or else they must be out of cash or e-float and may not be able to assist the customer needs.

Bagudu, Abdul-Hakim and khan (2017) used a structured questionnaire was employed to help collect the pertinent data that was used for analysis in this study. Data presentation and analysis used descriptive statistics with straightforward graphical displays. The study came to the conclusion that the cost report advised banking institutions to keep providing cheap transaction rates within their mobile networks and make sure that customer deposits are always protected.

The effect of electronic banking on Kenya's commercial banks' profitability was covered in a 2017 article by Vekya. The research design used in the study was descriptive. 43 operational commercial banks made up the study's sample. A census survey was done and descriptive statistics and inferential statistics were adopted. The study found a link between the performance of commercial banks and electronic banking transactions. A rise in transaction volume results in enhanced bank performance. Transactions at the point of sale (POS) benefited bank profits as well. The study came to the conclusion that e-banking has a favorable impact on Kenyan commercial banks' profitability. The survey came to the

additional conclusion that POS and ATM transactions make up the majority of e-banking activity. The investigation came to the conclusion that mobile transactions had no impact on a commercial bank's performance.

In their 2018 study, Njoroge and Mugambi looked at the impact of electronic banking on the financial performance of Kenyan commercial banks, specifically the branches of Equity Bank in Nairobi's Central Business District. As of December 2015, there were 500 Equity Bank workers spread over 10 branches in Nairobi. The study used a descriptive research approach, and the data was analyzed using SPSS. The analysis came to the conclusion that mobile banking had lowered the bank's own overhead costs and transaction-related costs while increasing accessibility to fundamental financial services. The difficulties encountered with ATM usage by customers made a major improvement to the banks' financial position. Since debit cards only require electronic money transfers and do not require cash transactions, transaction costs have decreased as a result of their use.

## METHODOLOGY

Descriptive research design was adopted in this study. Descriptive research design gathers information and draws conclusions about a population of interest at a particular period. The target population of the study was 90 participants. Tier One commercial banks in Kenya served as the observational study unit. The study unit of analysis was the management employees of the 9 Tier 1 commercial banks in the Head Quarters. Stratified sampling technique was adopted in this study. Stratified random sampling technique was used to select a sample size of 74 participants by help of Yamane statistical formula. The management staff of eight Tier 1 commercial banks in Kenya comprised the sampling frame for this study. For this study's primary data, a questionnaire with both closed- and open-ended questions was used. Data collection was done through drop and pick later system. The goal of the pilot test is to evaluate the study's data collection methods and protocol. It is a scaled-down form used to be ready for the core study. The pilot study involved 15 participants who were chosen from commercial banks that weren't among the eight banks that were chosen. The most used internal consistency technique, Cronbach's alpha, was utilized in this study to assess the validity of the questionnaire.

### Hypotheses Testing

A set of four hypotheses were developed to guide the study as indicated in the Conceptual framework. Hypotheses was tested at 95% confidence level ($\alpha = 0.05$) as shown in Table 1.

**Table 1: Hypotheses Testing**

| Hypothesis | Hypothesis test | Decision Rule |
|---|---|---|
| $H_{01:}$ Self-service technique has no significant effect on performance of commercial banks in Kenya | Pearson's coefficient of correlation -F-test (ANOVA) | If p value <0.05 reject null hypothesis, if p value is > 0.05 fail to reject null hypothesis $OP = \alpha + \beta 1SST + \varepsilon$ |
| $H_{02:}$ Bank digital card has no significant effect on performance of commercial banks in Kenya | Pearson's coefficient of correlation -F-test - (ANOVA) | If p value <0.05 reject null hypothesis, if p value is > 0.05 fail to reject null hypothesis $OP = \alpha + \beta 2BDC + \varepsilon$ |
| $H_{03:}$ Back office automation process has no significant effect on performance of commercial banks in Kenya | Pearson's coefficient of correlation -F-test -(ANOVA) | If p value <0.05 reject null hypothesis, if p value is > 0.05, fail to reject null hypothesis $OP = \alpha + \beta 3BOA + \varepsilon$ |
| $H_{04:}$ Point of sale terminals has no significant effect on performance of commercial banks in Kenya | Pearson's coefficient of correlation -F-test -(ANOVA) | If p value <0.05 reject null hypothesis, if p value is > 0.05, fail to reject null hypothesis $OP = \alpha + \beta 4POST + \varepsilon$ |

## DATA ANALYSIS, FINDINGS AND DISCUSSION

### Descriptive Results

Descriptive analysis was conducted on the study variables to check the mean and standard deviation. The results are presented in the following tables.

### Self-Service Technique

The researcher asked respondents to rate their agreement or disagreement on the various aspects of self-service technique. They were required to do this on a 5 point Likert scale where 1 represented Strongly disagree while 5 represented Strongly agree. The results were presented in Table 2.

**Table 2: Self Service Technique**

| | N | Mean | Std. Deviation |
|---|---|---|---|
| The rate of remote account opening has improved over time | 69 | 3.16 | .505 |
| Automated loan origination has reduced the turnaround time for loan approval in the bank | 69 | 4.00 | .883 |
| The frequency of transactions through the bank has increased | 69 | 4.81 | .168 |

Table 2. shows that a mean of 4.96 and a standard deviation of 0.269 of respondents agreed with the statement that the bank has automated customer service through chat bots to answer to consumer concerns 24/7. The assertion that the rate of opening remote accounts has increased over time, as indicated by a mean of 3.16 and a standard deviation of 0.505, did not elicit much interest from the respondents. According to a mean of 4.00 and a mean of 4.81, respectively, the respondents agreed with the assertion that automated loan origination has shortened the turnaround time for loan approval in the bank and increased the frequency of transactions via the bank.

### Bank Digital Card

The study respondents were asked to rate their agreement or disagreement on the various aspects of bank digital card. They were required to do this on a 5 point Likert scale where 1 represented Strongly disagree while 5 represented Strongly agree. The results are presented in Table 3.

**Table 3: Bank Digital Card**

| | N | Mean | Std. Deviation |
|---|---|---|---|
| Bank credit cards are secure and encrypted with latest technologies | 69 | 4.37 | .609 |
| The debit cards provided clients with choice of withdrawal in any bank digital point | 69 | 4.92 | .237 |
| Credit cards are attractive to retail banks because they typically provide higher risk-adjusted returns than other types of loans | 69 | 4.46 | .692 |

A mean of 3. and a standard deviation of 0.609 suggest that respondents did not agree with the conclusion that bank credit cards are secure and encrypted with the most recent technologies. With a mean of 4.92 and a standard deviation of 0.237, the respondents agreed with the claim that debit cards gave users the option to withdraw money from any bank digital point. The respondents also concurred with the statement that credit cards are appealing to retail banks because they typically offer higher risk-adjusted returns than other types of loans (mean=4.46).

### Back Office Automation Process

The study respondents were asked to rate their agreement or disagreement on the various aspects of back office automation process. They were required to do this on a 5 point Likert scale where 1 represented Strongly disagree while 5 represented Strongly agree. The results were presented in Table 4.


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**Table 4: Back Office Automation Process**

| | N | Mean | Std. Deviation |
|---|---|---|---|
| The transactions processing error rate has been put in control through automation | 69 | 4.86 | .162 |
| The bank has digitized and automated all its backend work flow | 69 | 4.56 | .504 |
| The back office efficiency has improved through automation | 69 | 4.60 | .119 |

As revealed by a mean of 4.60 and a standard deviation of 0.119 show that respondents agreed with the claim that automation has increased back office efficiency.

**Point of Sale Terminals**

The study respondents were asked to rate their agreement or disagreement on the various aspects of point of sale terminals. They were required to do this on a 5 point Likert scale where 1 represented Strongly disagree while 5 represented Strongly agree. The results were presented in Table 5.

**Table 5: Point of Sale Terminals**

| | N | Mean | Std. Deviation |
|---|---|---|---|
| The bank has provided adequate security around the point of sale terminals | 69 | 4.68 | .372 |
| The point of sale terminals are available whenever needed hence reliable | 69 | 4.90 | .253 |
| The bank has enhanced 2 step authentication on all transactions through point of sale terminals | 69 | 3.38 | .487 |

The mean and standard deviation in Table 5's results suggested that respondents agreed with the assertion that the bank had increased point-of-sale terminals in all densely populated metropolitan regions to enable accessibility. A mean of 4.68 and a standard deviation of 0.372 in the results further demonstrated that respondents agreed with the claim that the bank had adequately secured the point-of-sale terminals. The results also revealed that respondents (mean = 4.90) agreed with the statement that point-of-sale terminals are trusted since they are always accessible. The remark that the bank has improved two-step verification on all transactions through point of sale terminals, however, received little attention from the respondents (mean = 4.38).

**Correlation Analysis**

Correlation analysis was done to determine the extent and size of the association between strategic technological innovations and performance of commercial banks using the Pearson's product moment correlation analysis. The results are shown in Table 6.


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**Table 6. Correlation Coefficient**

| | | SST | BDC | BOA | POST | OP | |
|---|---|---|---|---|---|---|---|
| Self-service technique | Pearson Correlation | 1 | | | | | |
| | Sig. (2-tailed) | | | | | | |
| | N | 69 | | | | | |
| Bank digital card | Pearson Correlation | .296** | 1 | | | | |
| | Sig. (2-tailed) | .000 | | | | | |
| | N | 69 | 69 | | | | |
| Back office automation process | Pearson Correlation | .504** | .776** | 1 | | | |
| | Sig. (2-tailed) | .000 | .000 | | | | |
| | N | 69 | 69 | | | | |
| Point of sale terminals | Pearson Correlation | .361** | .487** | 1 | | 1 | |
| | Sig. (2-tailed) | .000 | .000 | | | | |
| | N | 69 | 69 | 69 | | | |
| Performance of commercial banks in Kenya | Pearson Correlation | .607** | .598** | .384 | .584 | | 1 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .038 | | |

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

**KEY: SST** – Self-service technique, **BDC** – Bank digital card, **BOA** – Back office automation process, **POST** – Point of sale terminals

Self-service technique was discovered to be favorably and strongly connected with performance of commercial banks in Kenya, as shown by the bivariate correlation data in Table 6. This is supported by a correlation coefficient of 0.607 and a p-value of 0.000. As evidenced by a r of 0.598 and a p-value of 0.05, the bivariate correlation between bank digital card was determined to be both significant and positive. Moreover, there was a substantial and positive bivariate connection between back office automation process and performance of commercial banks in Kenya (r=0.384, p=0.000). Point of sale terminals and performance of commercial banks in Kenya were found to have a substantial and positive bivariate connection (r=0.584, P=0.038).

**Multiple Regression Analysis**

The collected data was used to regress performance of commercial banks in Kenya on self-service technique bank digital card, back office automation process and point of sale terminals. The results of regression analysis are presented as follows.

**Table 7: Model Summary**

| Model | | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|---|---|---|---|---|---|---|
| 1 | | .779[a] | .607 | .562 | .70572 | 2.055 |

a. Predictors: (Constant), Bank digital card, self-service technique, back office automation process, point of sale terminals

b. Dependent Variable: Performance of commercial banks in Kenya

According to Table 7, there is a favorable association between organizational success and strategic technical breakthroughs, with the correlation coefficient (R) being at 0.779. According to the coefficient of determination (R2) of 0.607, strategic technological innovations account for 60.7% of the variation in performance of commercial banks in Kenya.

**Table 8: ANOVA**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 20.029 | 4 | 5.007 | 24.787 | .000[b] |
| | Residual | 12.949 | 64 | .202 | | |
| | Total | 32.978 | 68 | | | |

a. Dependent Variable: Performance of commercial banks in Kenya
b. Predictors: (Constant), Bank digital card, self-service technique, back office automation process, point of sale terminals

The anticipated association under the model is statistically significant at a p-value of 0.000, which is less than the significance level of 0.05, according to the analysis of variance data in Table 8. This demonstrates the statistical significance of the relationship between strategic technical breakthroughs and performance of commercial banks. In Table 9, the model coefficient is displayed.

**Table 9: Regression Coefficients**

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | .578 | .498 | | 1.161 | .000 |
| Self-service technique | .706 | .319 | .674 | 2.211 | .007 |
| Bank digital card | .649 | .177 | .984 | 3.667 | .000 |
| Back office automation process | .192 | .088 | .173 | 2.182 | .036 |
| Point of sale terminals | .464 | .182 | .195 | 2.549 | .004 |

a. Dependent Variable: Performance of commercial banks in Kenya

From Table 9, the model would appear as follows:

$$Y = 0.578 + 0.706X_1 + 0.649X_2 + 0.192X_3 + 0.464X_4$$

Table 9's regression results show that, when all other parameters are held constant at zero, performance of commercial banks in Kenya was anticipated to increase by 0.578 for a 1-point increase in strategic technological innovations. The model went on to prove that an increase of one unit in self-service technologies would result in an increase of 0.706 in performance of commercial banks in Kenya. A unit increase in point-of-sale terminals would result in an increase in performance of commercial banks in Kenya of 0.464, a unit increase in back office automation process would result in an increase of 0.192, and a unit increase in bank digital card would result in an increase of 0.649. All predictor variables had significance level of 0.05 and below implying that they were statistically significant in explaining the change in performance of commercial banks in Kenya.

**Discussion of Key Findings**

The regression coefficients served as the foundation for fulfilling the study's goals. This was achieved by considering the P-values that are associated with the relevant regression coefficients and t-values. The initial goal of the study was to find out how self-service technique affected Kenyan commercial banks' performance. The regression results for career planning was $\beta 1=0.706$, $t=2.211$, and $p<0.05$ showing that there was a favorably significant relationship between self-service technique on performance of commercial banks in Kenya. A unit

increase in self-service technique would result in a 0.706 change in performance of commercial banks in Kenya, according to the study's findings.

The second goal was to determine how bank digital card affected performance of commercial banks in Kenya. According to the regression analysis's findings ($\beta 2 = 0.649$, $t=3.667$, $p<0.05$), bank digital card significantly impacted performance of commercial banks in Kenya. According to the study, an increase in bank digital card lead to a 0.649 percent improvement in performance of commercial banks in Kenya. The null hypothesis that bank digital card has no meaningful impact on performance of commercial banks in Kenya is rejected since the p-value is less than 0.05.

Finding the impact of back office automation process on performance of commercial banks in Kenya was the third research goal. According to $\beta 3 = 0.192$, $t=2.182$, and p0.05, the regression analysis results showed a substantial positive relationship between back office automation process and performance of commercial banks in Kenya. According to the findings, an increase in back office automation process will improve performance of commercial banks in Kenya by 0.192 units.

The study also aimed to determine how point of sale terminals affected organizational effectiveness. According to regression analysis, point of sale terminals and performance of commercial banks in Kenya have a significant positive connection ($\beta 4 = 0.464$, $t=2.549$, and $p<0.05$), which means that adding one more point of sale terminal would result in an increase in performance of commercial banks in Kenya of 0.488.

**CONCLUSSIONS AND RECOMMENDATIONS**

According to the study's findings, customer service is now automated and customers can self-serve. The use of chat bots, which can virtually respond to client inquiries, has made this possible. According to the results, respondents weren't sure whether the rate of accounts being opened remotely had increased. The turnaround time for loan approval in the bank has decreased as a result of automated loan origination. The study's findings indicate that the frequency of transactions at the bank is rising.

The analysis concluded that the banks' adopted credit cards are safe. The information on the cards is encrypted using secure methods. We can derive the conclusion that bank debit cards give customers the option to withdraw money from any bank digital point. According to the study's findings, credit cards are appealing to retail banks because they frequently offer higher risk-adjusted returns than other types of lending. Customers are given appealing incentives by the banks to encourage them to use their digital cards.

The study concluded that process automation has reduced the banks' mistake rate in transaction processing. It is concluded that the back office process of banks has been digitalized and automated, reducing the need for humans to perform repetitive operations. The analysis concluded that increased operational efficiency has been a result of automation in back office processes.

The study concluded that banks have increased point of sale terminals to provide accessibility in all densely populated urban regions. Furthermore, the banks' point-of-sale terminals have been sufficiently secured, enabling them to be accessible throughout the year. To prevent fraud and financial loss, it was concluded that it is still unknown whether the bank has implemented two-step authentication on point of sale terminals.

The report suggests that, in order to reduce operational expenses, the management of commercial banks should invest in self-service technique. To virtualize customer-bank interactions, banks should create aggressive systems. The banks should encourage potential clients to open bank accounts virtually by discouraging them from visiting the branches. These tactics would increase efficiency and cut costs for the banks.

According to the survey, commercial banks should enhance digital card security to protect their consumers from fraud. The data of bank customers


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could be encrypted to do this. The digital cards issued by the banks should be flexible, allowing cardholders to transact using any digital point issued by another bank. The number of transactions made by the customers would rise as a result. Also, banks ought to create incentive plans that encourage clients to switch to digital cards. These would lead to greater transaction fees revenue.

The study advises the management of commercial banks to fully automate all back office procedures because it was found that doing so lowers the error rates associated with processing transactions. The bank should digitize its back-end operations so that staff members can access them from wherever. Employee productivity would grow as a result of the flexibility to work from the comfort of their chairs. The bank should automate these operations to reduce the human factor in performing regular jobs as it increases efficiency.

According to the study, commercial banks should provide point-of-sale terminals in all busy metropolitan districts with shops and other businesses to entice people to conduct business there. In order to provide customers, trust in utilizing the terminals, commercial bank management should offer proper security around these terminals. Commercial banks should likely take into account implementing two-factor authentication via the customer's smartphone whenever a transaction is started. This would stop terminals from being used maliciously to cheat customers.

**Suggestions for Further Research**

The scope of this study was restricted to performance of commercial banks in Kenya and strategic technical breakthroughs in the setting of commercial banks. Nonetheless, the researcher advises that further research be done on other strategic technological developments that can affect both organizational performance and the strategic performance of commercial banks because only 60.7% of the results were explained by the independent variables in this study. Additional research could concentrate on different industries, as Kenyan SACCOs and insurance companies.

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