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ABSTRACT

The study's overarching goal was to learn how different financial innovations have affected the efficiency of Kenya's third-tier commercial banks. *A descriptive methodology was used for this study. Data was analyzed using the Statistical Software for the Social Sciences. A descriptive analysis was performed, including measures of central tendency, dispersion, and frequency, on the data set. Tables of frequencies and percentages, bar charts, and scatter plots were utilized to display the information. Multimodal regression analysis was utilized as a statistical method to examine the connection between financial growth and prosperity. According to the findings, the bank relied heavily on the convenience of internet banking. One positive effect of internet banking is the rise in commission income at Tier 1 financial institutions. The findings suggested that commercial banks' interest-based revenue was only somewhat affected by the rise of online banking. The research found that the introduction of pay bill innovations increased the commercial bank's commission service charge income. According to the numbers, financial institutions had implemented biometric authentication for their customers. The biometric has a positive effect on commercial banks' interest-based income to a little extent. The results showed that customers may get instant online loans from banks anytime, anywhere thanks to digital lending. In addition, it let people check their own financial accounts, which simplified banking and saved money. Most people who were asked about bank interest costs claimed that they were all over the place. The bank has seen a fall in income from financial assets such as shares, CDs, notes, and bonds, as well as an increase in the cost of borrowed money from sources such as customers' deposits and wholesale financing. The use of online banking has a substantial, positive impact on business results. Biometric client identification was shown to have a large and beneficial impact on financial results. In Nairobi County, Kenya, it has been shown that mobile-based lending affects the profitability of microfinance. This is why mobile lending has to be a top priority for bank management. The government should thus prioritize the use of mobile lending for all aspects of the lending process, including loan distribution, loan evaluation, repayment schedules, and mobile bank loans.*

***Key Words**: Financial Innovations, Liquidity Ratios, Non-Performing Loans, Organizational Control Frameworks, Online Banking, Pay Bill Innovations, Biometrics Information Sharing*

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INTRODUCTION

Banks and other financial institutions are crucial to economic development because they regulate the money supply, promote adaptability, and guarantee the financial system's long-term stability (Nasieeku, 2018). Financial difficulties are only one of several problems plaguing the industry (Kamau & Oluoch, 2016). The soundness of the banking sector is an essential condition for economic growth and development. Thus, several parties consider it crucial to assess the health of financial institutions. High failure costs need prompt rescue efforts from regulatory authorities for struggling financial institutions (Athreya, Mustre-del-Ro, & Sánchez, 2019).

The three largest Islamic banks in the United Arab Emirates—Dubai Islamic Bank, Kuwait Finance House, and al-Rajhi Bank in Saudi Arabia—have all been severely impacted by a number of factors, including oil price volatility, geopolitical unrest, a drop in global equity performance, and technological innovations by rival financial institutions (Husna & Rahman, 2012). Husna and Rahman (2012) noted that Malaysian banks were very troubled during the 1997 recession. Six domestic financial organizations in Malaysia were mandated to combine in order to withstand the assault of increasing competition and poor operational performance; these financially challenged banks, particularly survivors, had to implement technology advancements like digital loaning to reassure shareholders.

Kenya's financial industry has grown rapidly over the last several years, making it the biggest in East Africa. Banks in Kenya are praised for their size and diversity in comparison to those in other East African countries. Kenya has a more diverse selection of financial institutions and marketplaces than do other EAC countries. Non-performing loans, leverage, inadequate technology, liquidity, income smoothing techniques owing to faulty corporate governance, and shortcomings in corporate governance leading to the demise of a number of Tier III commercial banks have all hampered the sector's development, particularly in 2016-2020. (Fwamba, Nasimiyu, Toroitich, 2020).

Banks' financial performance may be measured in a variety of ways, each with its own objectives and audiences(CBK,2019). Commercial banks often evaluate their success by looking at metrics like return on assets (ROA), return on equity (ROE), and net interest margins (NIM). Return on Assets (ROA) is a crucial indicator of a bank's financial success since it compares the bank's revenue to its total assets (Mwando, 2013). Management's ability to maximize profits from available resources is one indicator of performance. Net interest income refers to the amount by which interest received by banks exceeds interest paid to lenders as a percentage of total assets (NIM). It is often calculated as a ratio between the average value of securities from which a bank generates income and the total value of loans and other assets from which the bank generates revenue, less the amount of interest paid on borrowed funds, for a certain time period (the average earning assets). Return on equity (ROE) is a financial ratio that compares a company's profit to the entire amount of shareholder equity that is either invested in the business or shown as an asset on the balance sheet. Investors are looking for a return on their equity (ROE) (Aris & Mutri, 2015). This study's objective is to examine the financial outcomes of the banks by analyzing their ROA, ROE, and NIM (NIM).

Banks, especially Tier 3 institutions, have launched a cost-rationalization approach because to the flattening of revenue growth. Expenses will climb by 4.8% in 2019 compared to just 2.0% in 2018, so it seems that no matter what we do, we can't seem to slow the rate of inflation. (KBA, 2020). Since 2016, communication banks have seen cost reductions, whereas large banks and financial institutions are the biggest contributors to the growth of expenses. Banks' multi-tiered, reactive cost-cutting tactics mirror the trajectory of profit growth. Between 2003 and 2013, there was an improvement in net investment margins, one of numerous indicators used to assess the competitive climate in the

banking industry. Nevertheless, it started shrinking after 2014, which is indicative of increased competition in the market. This year's net investment margins were 5.4%, down from 1.7% in 2018 and 5.8% the year before. Net interest margins behave differently among institutions, with smaller banks seeing the worst declines.

Biometrics is a new technology that allows people to be identified mechanically by the use of physical traits like their voice, fingerprints, hand shape, signature, or retinal image (Bolle et al., 2004; Capoor, 2006; Song et al., 2007). This cutting-edge technology has the potential to greatly aid in the safeguarding of financial assets and the establishment of a trustworthy financial system. Yet, biometrics' use in finance is only getting started, and there are many open questions about how to best put this cutting-edge technology into effect (Ivine and Lvine, 2001; Zedner, 2003; Baton et al., 2005; Chanda and Caldron, 2005; Lyseki, 2006). Banks may someday use biometric technology as the standard method for doing identification and customer verification (Bielki, 2010). There is a lack of research on the impact of biometric identification on commercial bank profitability, hence the exact nature of that impact is unclear. Although it is evident that biometric identification helps banks cut down on fraudulent activity, the exact effect this has on banks' bottom lines remains an empirical mystery (Karger et al., 2016; Mortlock, 2013; Hunter et al., 2016). This calls for an empirical investigation to be conducted into how developments in financial technology (digital lending, biometric identification, and automated queuing system) have impacted the bottom lines of commercial banks.

The Central Bank of Kenya divides Kenya's commercial banks into three distinct categories (CBK). Market share, assets, capital, and customer deposits all play a role in this breakdown (CBK, 2016). Around 65.4% of the bank lending market is controlled by Tier 1 banks, while these banks also hold 66.7% of all deposits, 90.3% of all savings accounts, and 94.10% of all credit accounts. The total value of these banks' properties, capital, and customer deposits is measured in the billions of shillings (CBK, 2019). Kenya is home to six top-tier financial institutions. Twenty-six percent of all commercial banking sector deposits, 0.25 percent of all respondents' deposits, 7.6 percent of all savings accounts, and 3.8 percent of all loan accounts are held by the eleven banks that make up the second tier (CBK, 2019). Tier 3 commercial banks consist of twenty-one institutions accounting for 8.9% of the commercial banking sector, 8.2% of total deposits, 1.8% of savings accounts, and 1.8% of loan accounts (CBK, 2019).

The Tier III bank failures and scandals in Kenya have led to greater bank reform and regulation, such as a 20% increase in the capital adequacy level for commercial banks. From 2015 to 2020, the banking industry expanded at a rapid clip. The total value of all assets rose by 5.8 percent in 2016, from Ksh3.5 trillion to Ksh3.7 trillion. The Ksh. 2.17 billion in Kenyan shillings in 2015. In 2016, total loans increased by 5.6% to Ksh. 2.2 billion. $3.7 Trillion (CBK 2016; 2017). Earnings before taxes in this sector increased by 10.91 percent, from Ksh 134.0 billion in 2015 to Provided online 147.4 million in December 2016. When analyzed by tier, however, it was shown that tier three financial institutions suffered a 2.2% drop in pre-tax profits between 2015 and 2016, a 3.5% drop in ROA in 2017, a 4.2% drop in ROA in 2018, a 4.7% drop in 2019, and a 5.5% drop in 2020. Loss-making financial institutions within this group and the remaining banks struggling for survival were held responsible for this decline. Amounts of Kenyan shillings lost. About $41.0 million. In addition to the Ksh. First Financial Institution, Jamii Bora Financial Institution, and Consolidation Bank all made a total of $277 billion (CBK2019;2020).

Statement of the Problem

Kenyan banks have suffered from chronic accounting issues, which have led to many high-profile bankruptcies (Gathaiya, 2017). Pre-tax earnings for tier-three financial institutions declined 2.2% between 2015 and 2016, a span of two years.

Financial year 2017 had the lowest fall, with the majority of tier three banks reporting losses. In 2018 and 2019, more than a quarter of tier-three banks recorded negative ROE. First Local Bank had a loss of Ksh. during the 2016 fiscal quarters. The subsidiary Bora Bank Ltd had a loss of Ksh. 41.0 billion. The deficit of Consolidation Bank was $490,000. $277,000,000,000,000 each year (CBK,2017). Between 2017 and 2019, they and other tier-three commercial banks saw a steady decline in performance. For instance, according to audited financial statements for the fiscal year ending 31 March 2018, Jamii Bora Bank's balance sheet shrank from Ksh 15.3 billion at 31 March 2017 to Ksh 12.5 billion. Throughout the same time frame, interest income as a whole declined from Ksh 414.9 m to Ksh 264.9 m. The amount of money deposited by customers fell from Ksh 220.7 M to Ksh 99.8 M. The bank's deficit for the first three months of the 2017 fiscal year was Ksh 100.7 million, down from the previous quarter's loss of Ksh 51.3 million.

Research has been done in a number of countries, including Kenya, to establish a causal link between financial innovation by commercial banks and economic growth (Kithinji & Waweru, 2017; Gathaiya, 2017). While relying on secondary data, the performance of commercial banks differs from area to region owing to differences in the operating environment and other macro and micro economic variables. Kibara (2015) found a positive correlation between new forms of money and company success. Nevertheless, the research focused only on microfinance institutions in Kenya. In addition, the evaluation exposed a conceptual flaw in Waithera's (2015) study, which only touched on a subset of the banking system's components. When everything else is equal, commercial banks may be anticipated to benefit from adopting new financial innovations. Despite adopting financial advances, some banks have reportedly seen declining profitability, while others have been placed in receivership.

Mudenda (2016) looked at the most pressing threats related to online banking and money transfers in Zambia. The results also revealed that although theft was a low risk, using an online banking system was associated with a medium risk for credit, legal, fire, hacking, technical, and operational concerns. Conceptually, the research shortcomings emphasize was on online banking risks and it was not related to financial performance and contextually, the study was done on Zambian banks with a distinct financial backdrop. The current study will fill in the blanks by tailoring the research to the Kenyan financial sector and establishing a causal link between online banking and financial outcomes. Using online banking, digital lending, biometric, and bill-paying technologies, the present study conceives the innovative banking variable to close any theoretical gaps. The 21 commercial banks in Tier III will provide the primary data used to address methodological issues. Such gaps in knowledge may be filled if the research were limited to the commercial bank division that has shown a predisposition to negative ROA. As a result, banks with a history of solid growth and stability that have been the subject of extensive study were barred from participation. The missing pieces were completed in an attempt to learn how banking innovation has affected the bottom lines of Tier III commercial banks in Kenya.

Objectives of the Study

The study's overarching goal was to learn how different financial innovations have affected the efficiency of Kenya's third-tier commercial banks. The specific objectives were:

- To evaluate the effectiveness of Internet banking and other financial institutions
- To establish the effect that new payment methods have on the results of businesses
- To assess Identification of customers using biometric methods and financial performance
- To Evaluate electronic lending and the performance of financial institutions

LITERATURE REVIEW

Technological Acceptance Model, Version

The Technology Standard Protocols (TAM) is a model that was proposed by Davs, Bagozi, and Washaw (1986). This model places a focus on expressing the boldness of the aim to deploy a particular technology or facility. The TAM model offers a basis for evaluating how technologies are used by and their impact on the performance of an organization. Its operation is based on what factors affect the public's acceptance or rejection of a technology, and the model evaluates how these factors affect an organization's performance. The TAM framework is based on two beliefs: the users' desire to accept new technology and their trust in the value of that technology. Both of these assumptions are essential to the foundation of the framework. According to Park and Kim, a technology's market acceptability or rejection is determined by how helpful, advantageous, and simple it is to put into practice (2014).

The critics of TAM pointed out that consumers' attitudes impact the usage of technologies directly or indirectly, but that customers' attitudes are founded on knowledge of the technology, its use, and its benefits. The dissemination of this information has been shown to have a beneficial effect on the market's and customers' perceptions of the new technology (Legris, Ingham & Collerette, 2003). Information regarding the pay bill innovation system affects consumer and market reaction to the new technology. pay bill innovation has benefited from more publicity, leading to wider adoption, whereas block chain technology has been held back by a lack of publicity. In light of their perceived usefulness and utility in handling financial transactions and service provisioning, the research emphasizes the adoption and usage of the pay bill innovation and the block chain innovation.

The Hypothesis of Innovation Diffusion

Rogers (1962) first articulated this idea, which seeks to investigate the mechanisms by which new innovations spread from their point of origin to the marketplace and the general public. It is the five elements of the theory of diffusion of innovation—relative benefit, conformance with existing beliefs and practices, performance expectation, difference between outcomes, simplicity of use, and pleasure—that account for the widespread adoption of new technology (Al-Jabri & Sohail,2012). New technologies are only adopted and put to use when they prove to be more effective than conventional approaches to the same problem. The innovation will spread across the market as the relative benefits of the technology become more substantial (Dearing, 2009).

Concurrently, four factors affect the adoption of novel approaches and the subsequent dissemination of ideas, goods, and ideologies. They include the nature of the invention itself, as well as the accessibility of various means of communication, social structures, and the passage of time, all of which are heavily dependent on human capital (Xiong, Payne & Kinsella, 2016). Hence, the theory reveals how the new financial innovations might permeate the economy. Video teller machines (VTMs) were developed by banks to streamline the delivery of banking services to clients. Customers who want to do their banking business through videoconference may do so with the assistance of bank employees. The video teller machines may expand in the same way as ATMs did after their invention when the advantages of utilizing them were made clear.

Financial Intermediation Theory

In line with the theory regarding financial intermediates that Gurley and Shaw (1960) put up, surplus units' deposit cash with banking institutions, which subsequently lend to deficit expenditure. This is all in accordance with the theory of intermediaries. According to Mahran (2012), there are four characteristics that set intermediaries apart from other actors. To begin, each of their contributions is made for a predetermined amount that is not tied in any way to the profitability of a portfolio. Secondly, the maturities of deposits are often a great deal shorter compared to their assets. Finally, a significant portion of their debts must be

paid by check (can be withdrawn on demand). Fourth, it's not possible to just take over their assets and debts. Intermediaries' primary value is in facilitating the regular transfer of funds derived from excess units (Allen & Santomero,1997).

According to Philippon (2015), the primary responsibility of a financial intermediary is the production of structured financial commodities. When an intermediary discovers that it can sell a good or service at prices that are high enough to pay all of the anticipated expenses associated with its production, both current and future, the intermediary will begin to create such goods or services. Fintech innovations in the form of applications and systems like blockchain make it feasible to swap ownership of things and establish their values in an accurate and secure manner. The proliferation of financial intermediaries such as blockchains may be traced back to the growing need for means of processing financial transactions that are more dependable and secure. Internet banking is another kind of financial middleman since it facilitates rapid money transfer between the sender and the receiver.

The Theory of Transaction Costs [Transaction Costs Theory]

When Commons (1931) argued that activities are primarily interactions in nature rather than having individual personalities or even exchanging items within the economic system, he introduced the key concept that interactions are a part of economic theory. This idea has since become a central tenet of economic theory. The shift from thinking about economic phenomena in terms of commodities to thinking about economic phenomena in terms of transactions and the operational norms of coordinated activity is at the foundation of the movement away from the classic and hedonic schools of economic theory and toward the institution schools. Nonetheless, Coase was the first person to adopt the term "transaction cost" in the year 1960. Using it, he built a theoretical framework for projecting the time of organizations' completion of a variety of economic activities. Specifically, he used it to predict the timing of the completion of different economic chores.

The concept of calculating the cost of trading was used often in Oliver's books (2009). The application of transaction cost theory is pertinent to the current investigation because one of the goals of using this technology in banking is to reduce transaction costs to the mutual advantage of customers and banks. The investigation is looking into the effect that financial innovation has had on the financial performance of banks in Kenya. A decrease in transaction costs should be beneficial to the bottom line of the bank. As a result, the concept of transaction costs contributes to improved financial performance by leading to an increase in total interest income.

Empirical Review

Ogutu and Fatoki (2019) conducted research to determine how the use of internet banking has affected the profitability of Kenya's publicly traded commercial banks. Panel data analysis was the method of choice for conducting the quantitative research that underpinned the study. The eleven commercial banks in Kenya that are listed on a public stock exchange were the ones that took part in the study. The information was mostly gleaned from bank annual reports that were readily accessible to the public as well as CBK banking monitoring reports. The information was written down on specialized sheets. In our study, we made use of both descriptive statistics and inferential statistics. The conclusions and the evidence that supports them are given in the form of tables. According to the findings of this study, there is a significant relationship between the prosperity of Kenya's publicly traded banks and the proliferation of different types of banking, such as online banking, ATM banking, agent banking, and agency banking. The impacts of mobile banking and bank credit on the economy are highly and positively associated with one another. There is a significant positive link between the performance of commercial banks and that of agency banking. This association is substantial and favorable. There is a

significant positive link between the performance of commercial banks and that of agency banking. This association is substantial and favorable. There was only a little relationship between the success of commercial banks and that of internet banking.

Mulwa (2017) investigated the effect that using the internet for banking has had on the profitability of Kenyan commercial banks. Descriptive analysis served as the approach for this study, and forty different commercial banks were used as the sample population. We were able to identify the nature of the link between utilizing an online bank and obtaining financial success in Kenya by using a data collecting sheet and the Pearson correlation coefficient. We also determined the degree of the connection between the two factors. According to ROA's research, using online client savings and internet banking was shown to increase a person's likelihood of achieving their financial goals. According to the findings of the study, one reason contributing to total price rises at the organization was an increase in the cost of internet service. The technique of description was used for the research, and the data for the study came from the whole banking sector. In this particular study, a descriptive research approach will be used in order to investigate Tier III commercial banks.

Pay bill is a cutting-edge payment method that may be used in place of conventional cash transactions. It is powered by the MPESA payment platform. The pay bill service offered by safaricom is utilized by a number of different departments and banks to accept payments from customers and then deposit those monies into corporate bank accounts. Company owners and merchants who register their businesses with safaricom and obtain a pay bill number have a variety of options available to them for the electronic collection of payment for the services and goods they provide, including PesaPap from Family Bank, KCB Connect from KCB bank, and other options. As a result of the development of the pay bill system, individuals are no longer need to stand in enormous queues at their local banks in order to make payments for necessities such as water, electricity, and school fees (FSD Kenya, 2019).

Mustapha (2018) conducted research to determine how the use of electronic payment technology has impacted the productivity of Nigerian banks. The paper identifies the development of innovative electronic payment systems as a significant contributor to the role that the financial sector plays in the expansion and development of developing economies. In spite of the universal consensus that successful financial innovation may increase productivity, very few studies have investigated the technological underpinnings of electronic payment systems. The findings of the research indicate that the performance of the banks improved when electronic payment technology was utilized, and the findings also indicate that investors do not need to be concerned about the performance of the banks in the past but should instead focus on investing and allocating resources for innovation. The Automatic Teller Machine (ATM), the Point of Sale (POS) Technology, the Mobile Money Transfer (MMT) Technology, and the Online Money Payment (WEB) Technology are all examples of different types of electronic payment systems (WEB). In this particular instance, the study was conducted in Nigeria; conceptually, there is a connection between e-payment technology and performance in general, and not only financial success in particular.

(2018) Rahman and Akhtar investigated the implications of implementing biometric ATM cards throughout the banking sector in Bangladesh from a country-specific vantage point. The research focused on 11 different banks in Bangladesh. In order to obtain the data that was considered to be an important source of information, a structured questionnaire was sent to the particular sample that was being used for the research. In order to construct a quasi-scale questionnaire, a 5-point Likert scale was used. The primary focus of this research is on analyzing how different sorts of customers at a variety of institutions have adopted the use of biometric ATM cards. A number of

variables, including competition with agency banking services, appealing to farmers and others with low levels of education, ensuring the safety of electronic transactions, and so on and so forth. Several of Bangladesh's financial institutions have been contacted, and their information has been acquired. Many distinct methods of statistical analysis were used, such as sorting mean data, calculating standard deviations, and calculating mean values. According to the findings of the study, the implementation of biometric ATM cards in financial institutions will have a significant impact on the safety of electronic transactions, clarity, and the willingness of farmers to engage in banking transactions; however, it will have a less significant impact on the elderly population of the country and on those who are not banked.

Deepak and Savita conducted research in the year 2019 on the topic of Performance Analysis of Biometric Systems: A Security Perspective. The authors of the research assessed the performance of many different types of biometric systems based on the physiological and behavioral features of the subjects. They came to the conclusion based on their research that physiological characteristics are more reliable than those that adopt features, despite the fact that the latter may be easier to incorporate in some specific applications. Fingerprints are the most reliable kind of biometric identification, in addition to being the least expensive, the fastest, and the most practical. Fingerprint authentication provides several benefits in terms of usability in compared to other authentication methods such as passwords. The article presented a few different privacy and security choices for fingerprint biometrics after conducting an assessment into how well they performed. It is possible that in the future, further research on fingerprint biometrics will be conducted to improve imaging enhancement techniques and provide a better matching method for partial and rotational fingerprint pictures. This will result in an improvement in the overall quality of the photographs.

The research conducted by Okode (2021) looked on the financial performance of Kenya's commercial banks as well as their digital financial services. Independent of banking hours and locations, Digital Financial Services (DFS) is acknowledged with playing an essential part in contributing to the profitability of banks and the delight of their customers. On the other hand, on the contrary, the performance of the banking industry in Kenya has been on the decrease. Research conducted all around the world on the effects of digital financial services on bank performance have come to a variety of conclusions. These conclusions may be explained by the fact that the specifications of analytic constructs vary depending on the location and the author's goals. As a result, the purpose of this research was to investigate the effect that the provision of digital financial services had on the financial profitability of banks located within Kisumu County. The research was conducted using a descriptive research approach, and its target group consisted of 172 managers working at 43 bank branches located in Kisumu County. Moreover, a census survey was conducted. The initial data was collected via the use of structured questionnaires, and it was then analyzed through the use of correlational and descriptive statistics. According to the findings, mobile financial services recorded a significant association ($r=0.633$, $p=0.05$) with financial success, but digital financial data services showed a very high and positive significant link ($r=0.748$) with financial success.

Nduku (2019) conducted research to determine the effect that mobile loans had on the profitability of Kenyan commercial banks that were listed on the NSE during the years of 2012 and 2017. The purpose of the research was to investigate the impact that mobile loans had on the profitability of commercial banks, as well as the ability of those banks to keep expenses under control and successfully operate their operations, and the level of satisfaction experienced by those banks' clients. The study used a qualitative research design but utilized quantitative methods throughout.

Participants in the research were drawn from six commercial banks in Kenya that provided mobile loans between the years of 2012 and 2017, and there were a total of 42,549,000 active accounts in the country at the time. A sampling method that included many steps was used on a total of one hundred customers in the study. For the purpose of collecting the data for the research, a question as well as data collection sheets for financial data were used. While doing the analysis of the data, descriptive statistics such as means, modes, and independent - samples t were used. Inferences about relationships were drawn via the use of regression analysis. According to the findings of the research, there is a significant connection between mobile phone loans and the earnings of commercial banks. According to the findings of this research, the use of mobile phone loans contributed to greater revenues for financial organizations. Indicators of operational effectiveness that contributed to an increase in profitability were earnings per share, return on assets net income, availability and surplus liquid, and cash flow. There was no association between mobile telephone loans and either the operational or cost efficiency of the business at the 0.05 level of significance. In spite of this, the results of this study showed that performance management with borrowed mobile phones resulted in reduced operating expenses, lower customer service costs, lower customer acquisition costs, and lower overall personnel costs. These cost-based driving factors were found to be the most important. Product innovation, product pass, loan efficiency, and management efficiency are some examples of non-cost operational efficiency drivers. Other examples include management efficiency and loan efficiency.

Conceptual Framework

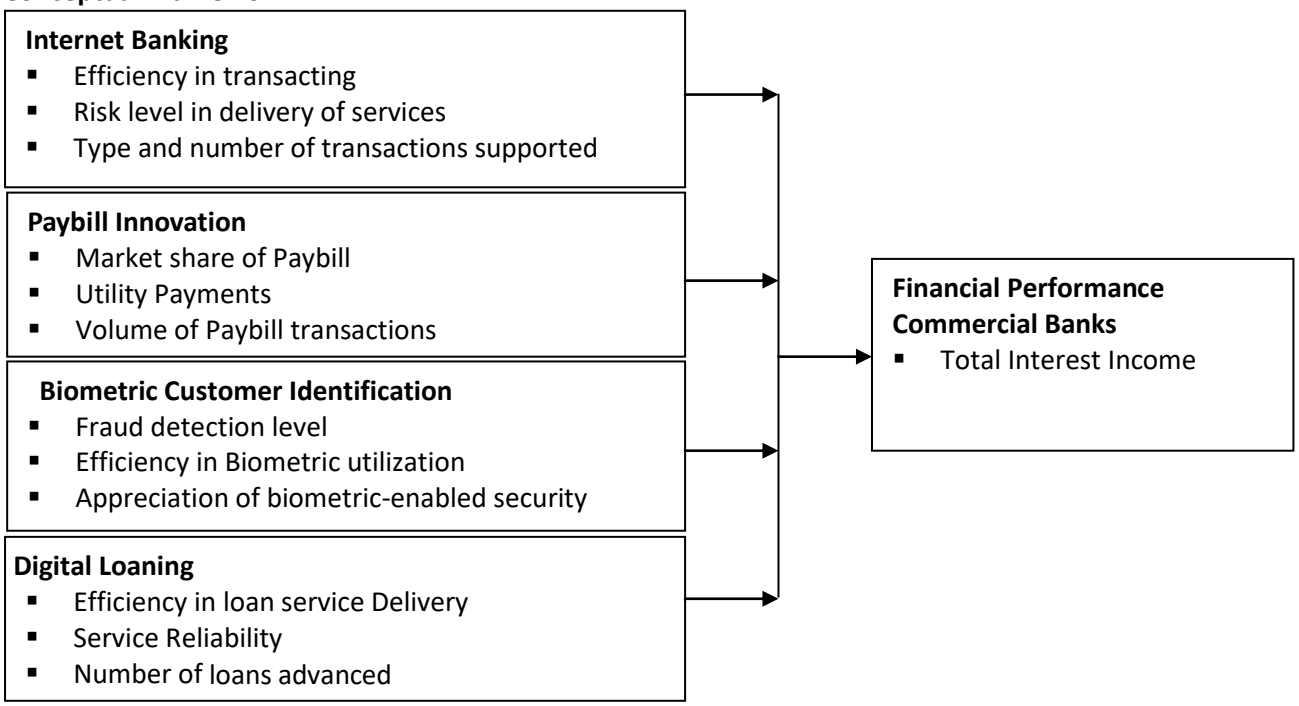

Figure 1: Conceptual Framework

METHODOL OGY

A descriptive methodology was used for this study. Twenty-one (21) Kenyan financial institutions were chosen as the study's focus population. The core data for the study came from a self-administered questionnaire, while the secondary data came from the accounting statements of the 21 financial institutions and the annual reports of the CBK institutions monitoring. The data was analyzed using the Statistical Software for the Social

Sciences. A descriptive analysis was performed, including measures of central tendency, dispersion, and frequency, on the data set. Tables of frequencies and percentages, bar charts, and scatter plots were utilized to display the information. Multimodal regression analysis was utilized as a statistical method to examine the connection between financial growth and prosperity.

FINDINGS AND DISCUSSION

Descriptive Statistics on Internet Banking

Table 1 presented descriptive statistics results on internet banking in Tier 1 commercial banks.

Table 1: Descriptive Statistics on Internet Banking

	Mean	Std. Dev.
Online banking has expanded paid commission compensation, which is a positive effect.	3.7049	.63749
Attention revenue for corporate finance has been impacted by online payments.	4.0100	.47111
Internet banking has improved the bank's potential to generate more revenue	3.8607	.34702
Internet banking has increased customer deposits and transactions elsewhere	3.8484	.35941
The amount of current cash held by the institution plus currency deposited with the Kenyan central bank have grown as a result of Bank transfers.	3.8197	.38525
Aggregate Score	**3.8487**	**0.44006**

According to the study's overall findings (M=3.8487, Std. Dev=0.44006), online banking was widely used at the institution. The standard error demonstrates that the views of the majority of people did not differ significantly, and that there was little dispersion. Online banking has positively impacted tier 1 financial firms by extending committee based compensation. Additionally, the findings showed that attention income for corporate finance has been considerably influenced by online banking. Additionally, the results indicated that internet banking has improved the bank's potential to generate more revenue. The findings presented that internet banking has increased customer deposits and transactions and the current amount of cash held and cash deposits made by banks with the Kenyan banking system has grown thanks to online banking.

The study agrees with Ogutu and Fatoki (2019) revealed there was a significant positive correlation here between financial results of Kenya's listed firms and the use of digital payments, banking services, Atms financial services, and internet banking. The results agree with Wamuhu (2020) showed a substantial and favorable correlation between online banking and performance. The results also agree with Mulwa (2017) that increase in internet cost resulted to increased cost of doing business.

Descriptive Statistics Analysis on Paybill Innovation

The results on descriptive statistics analysis related to Paybill innovation were presented in table 2.

Table 2: Descriptive Statistics Analysis on Paybill Innovation

	Mean	Std. Dev.
The number of pay bill transactions passing through the bank have increased in the past financial year	3.1053	.49898
Paybill Innovation has positively affected(increase) of commission fee-based income of the commercial bank	3.9631	.51587
Rise in revenue innovations has improved (increased) the business bank's income from attention sources.	3.4590	.49934
Rise in revenue innovation has lower operating costs, increasing the financial performance of the bank.	3.3975	.49040
The bank's profits have motivated the bank to invest more in pay bill innovation	3.3975	.49040
Aggregate Scores	**3.4645**	**.49800**

According to descriptive analysis, the overall mean score for pay bill innovation was 3.4645, or "moderately agree," on the survey's five-point Likert scale. The dispersion rate of the responses was low as indicated by Std Dev of 0.49800. The results indicated that the number of pay bill transactions passing through the bank have moderately increased in the past financial year. The results of the study show that rise in revenue innovations had a favorable effect on a commercial company's compensation service charge income. Nonetheless, the results showed that rise in revenue technology has lower operating costs, increasing the firm ’s financial performance. The bank’s profits have moderately motivated the bank to invest more in pay bill innovation. The pay bill innovation allows all people to be able to pay for utilities like water bills, electricity and even school fees for children and cuts the long queues that one may encounter in banking halls (FSD Kenya, 2019).

Descriptive Analysis Results on Biometric Customer Identification

The results on biometric customer identification were presented in table 3.

Table 3: Biometric Customer Identification

	Mean	Std. Deviation
The bank has been using the biometric consistent for its customers	3.7975	.49040
The fingerprint has improved (increased) the business company's income from attention sources.	3.4770	.51843
The system requires very little maintenance, which boosts the capital adequacy.	4.0925	.46140
The bank has been using biometric identification to verify, validate and track transactions	3.7900	.46660
By use of the biometric system the fraudulent transactions has declined significantly	4.3770	.51843
Aggregate Score	**3.9068**	**.49105**

The biometric customer identification had an overall mean score of 3.9068, which corresponds to a Likert scale response of "agree." The averaged standard deviation was also 0.49105, demonstrating that many employees' replies converge around the mean, as indicated by the low level of variability. The results indicate that the banks have been using the biometric consistent for its customers. Moderately, the biometric had positively affected incomes from interest-based sources of the commercial banks. Nevertheless, this digital authentication requires regular energy, which boosts the profitability of the banks. Additionally, the bank has been adopting biometric identification to identify, trace, and verify the transfer of funds, which has led to a notable decrease in suspicious purchases. The findings backed up Rahman and Akhtar's (2018) claim that trying to introduce bio - metric Credit card in financial institutions had a significant influence on the security, easiness, and farmers' willingness to engage in financial transactions but had less of an influence on the country's elderly population and the un-banked.

Descriptive Statistics on Digital Loaning

Table 4: Descriptive Statistics on Digital Loaning

	Mean	Std. Deviation
Digital loaning have provided banks with round the clock online loan services to customers	4.3607	.54532
Digital loaning system help check balance enquiries by customers for themselves, thus minimizing the costs of visiting the bank and making banking easier	4.3811	.48667
The digital loan services are reliable	4.2375	.44440
Due to digital lending, there is a rise in the number monthly loans issued.	4.5000	.50103
The digital loans need less cost of monitoring	4.4098	.49281
Aggregate Score	**4.3778**	**0.49405**

The total mean and standard deviation scores for the indicators of digital loaning were 4.3778 and 0.49405, respectively, based on what the quantitative approach revealed. The sampling distribution corresponded to "Agree" on the 5-point Scale that was employed in the study. How little variation there was in the average responses can be seen by looking at the standard deviation. The moderate range of mean responses across the different replies to the digital loaning indicators, which ranged from 4.2375 to 4.5, further collaborated this. The results support that digital loaning have provided banks with round the clock online loan services to customers.

Financial Performance of Tier1 Commercial Banks

The interest margin net is used in this section to show the tier 1 business bank's business results. Table 5. provides a summary of the findings.

Table 5: Financial Performance

	Mean	Std. Dev
The interest expense from the bank has been stable	2.4098	.49281
The bank has experienced increase of money gained from financial assets	2.5287	.50020
The cost incurred by the bank for borrowed funds (customer deposits, wholesale financing) has been minimal	2.4918	.50096
The earning asset (shares, certificate of deposits, notes, bonds) income has increased	2.5205	.50061
The bank is efficiently investing as indicated by positive net interest margins	2.4754	.50042
Aggregate Score	**2.4852**	**0.499**

The study aggregate mean score of 2.4852 corresponded to disagree in the 5 point Likert scale. The standard deviation values indicated that the rate of responses dispersion was low. Majority of the respondents indicated the interest expense from the has been unstable (Mean=2.4098, Std Dev=0.49281). The bank has experienced decreasing money gained from financial assets (Mean=2.5287), the cost incurred by the bank for borrowed funds (customer deposits, wholesale financing) has been on the increase (Mean=2.4918) and the earning asset (shares, certificate of deposits, notes, bonds) income has decreased (Mean=2.5205). The banks were inefficiently investing as indicated by decreased net interest margins (Mean=2.4754).

CONCLUSIONS AND RECOMMENDATIONS

Internet banking had a significant and positive effect on financial performance. There was strong positive relationship between internet banking and financial performance of listed commercial banks in Kenya. The effect of pay bill innovation on financial performance was positive and significant. The pay bill innovation significantly influenced the financial

performance. The performance of the banks improved when electronic payment technologies is being used and any investors should not be worried about past performance but focus on investing and availing resources for innovation.

It was discovered that biometrics client authentication has a favorable and considerable impact on financial results. The biometrics significantly and strongly affected financial results. Financial results were positively and significantly impacted by the developments in digital lending. The economic results of microfinance institutions improved as a result of a rise in the amount of a digital granting loans.

Since it enables commercial banks to provide services via mobile devices, internet banking is recognized as one of the most improvements that are good for the banking sector. This lessens the need for face-to-face interactions by achieve project mobile banking available when it is feasible. Future work on fingerprints identification can improve the imager enhancement techniques and provide a better matching method for partial and rotational fingerprint images, which will improve the quality of the photographs.

0 In addition, it was discovered that the idea of self-efficacy had a role in enabling people to adopt technology. Therefore, it is abundantly evident that user attitudes and their desire to use the technology have a direct impact on how consumers consider how the banks and finance industries are implementing biometric. The need for the banks arises to implement laws and rules that will stop fraudulent practices in the banking industry, minimize the actions of fraudsters there, and ensure that this crucial industry receives the support it needs. The implementation of a reliable banking system has been successfully created via National Identification Credentials (BVN)industry, should be the strategic goal for the banks to address the issue.

According to the research, bank management should accord cellphone lending priority since it has been demonstrated to have an impact on the profitability of microfinance institutions in Nairobi City county, Kenya. The administration should thus promote loan distribution through mobile borrowing, loan evaluation through mobile bank loans, loan repayment conditions through mobile bank loans, and comfort associated with mobile lending.

Suggestion for Further Study

The study looked at the capital markets and performances of Kenya's Tier 3 Financial Institutions. It is advised that more research be done on some other industries, like the insurance industry. The corrected R square score of 0.844 shows that variability in internet transactions, pay bill innovations, biometric client authentication, and digital lending money accounted for 84.4 percentage points of the financial performance differences. The report suggests more research to identify other innovative strategies that affect financial success.

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