FINANCIAL INNOVATION AND BANK EFFICIENCY OF MICROFINANCE BANKS IN KENYA

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ABSTRACT

Microfinance banks are important financial intermediaries given their ability to provide credit to the unbanked populace. The bank efficiency of microfinance banks contributes to the economic development of the financial sector as well as the overall economy. Nonetheless, this bank efficiency might be jeopardized, resulting to its upward trend because of not being innovative. Therefore, in light of this context, the study aimed at evaluating the effect of financial innovations on the bank efficiency of microfinance banks in Kenya. The target audience was 14 registered and regulated microfinance banks in Kenya. The study employed census survey since the population is small. The time scope of the study was five years from year 2017 to the year 2021. Primary data and Secondary data of audited financial reports of microfinance banks was collected from MFB'S website, CMA and CBK reports using a data abstraction tool. Descriptive statistics was used to analyze data in terms of means and standard deviation, and inferential statistics was analyzed using Ordinary least square linear regression model to ascertain the connection between financial innovations and bank efficiency of MFBs in Kenya. The study revealed that financial product innovation, financial process innovation and financial institutional innovation all individually had a statistically significant effect on bank efficiency and therefore rejected. On product innovation, the study recommends that MFB's should employ strategies of opening new deposit accounts for their customers and encouraging customers to utilize the use of credit cards, debit cards and prepaid cards services to enhance bank efficiency of MFB's. On process innovation, the study recommends the adoption of digitalization, office automation, process innovation and automated clearinghouse to increase efficiency and reduce operational costs and thus improving to bank efficiency of MFB's. Finally, on institutional innovation the study recommends the adoption of mobile money transactions, ATM withdrawals and internet banking that contribute to improved bank efficiency of MFB's.

Keywords: Financial Innovation, Bank Efficiency, Financial Process, Financial Product.

INTRODUCTION

Background of Study

Globally, microfinance's development as a complement to conventional financial services supply has been a breath of fresh air for most individuals and institutions that haven't been able to participate in the official financial sector, despite the fact that its (microfinance's) arrival has also posed certain problems (Chortareas, Logothesis, Magkronis, Zekente, 2016). Microfinance has a proven track record of 130 million clients as a crucial instrument in the fight against poverty, despite the fact that this represents less than 20% of the world's potential market of three billion unbanked

or poor people (KPMG, 2016). The principal activity of MFBs is to offer loans and advances as well as to operate as social savings depositories. They generate revenue by charging interest on loans and earning interest or dividends on their investments in equities and bonds (Laryea, Ntow-Gyamfi &Alu., 2016). Loans are thus the MFBs' most important product, yet they are a risky output (EL-Maude, Abdul-Rahman & Ibrahim, 2017).

In India, the banking sector is now a flourishing sector and the sector is mainly focused on the new financial innovations (Rishi & Saxena, 2014). In the 1990, the banks embraced the use of technology to offer quality services to the customers and at greater speed. Internet banking and mobile banking made it convenient for the bankers to carry out their bank transactions from geographically diverse locations. Commercial banks directed their focus on the rural markets by introducing variety of services that are directed towards special needs of the customers living in rural areas. In the recent scenario things are changing with close to 340 banks operating in the Indian banking sector both public and private (Al-Hawar, 2014). Indian banking sector has fully embraced the use of financial innovations and the sector is set to be the fifth largest banking sector in 2020 and while in 2025 it will be the third largest banking sector in the world (Kaushik & Rahman, 2015). China on the other hand, it can be observed that the Chinese banking sector emphasizes on process innovation. Currently, almost all the banks operating in the Chinese economy offer online banking services among other multiple services like electronic funds transfers, checking accounts, foreign currency buying and selling and even personal financial services (Fu, 2013). As a matter of fact, internet banking technology in China is more than a brand new innovation since it is sometimes regarded as a process innovation that can leverage new avenues for more innovation as far as banking is concerned. China’s financial innovation is defined by technological inventions, institutional as well as product innovation (Deb & Agrawal, 2017). The most remarkable thing that had been overwhelmingly changing the dynamics of the Chinese banking sector is information and communication technology (Ferracane & Lee-Makiyama, 2017).

Information and communication technology is changing how consumers access products and financial services in sub-Saharan Africa (Hussien & Aziz, 2013). In Ghana, financial developments have created new avenues for the distribution of goods and services, like the utilization of automated teller machines (ATMs), mobile banking, and online banking. These financial innovations have become more essential in Ghana's commercial banks over time (Nkegbe & Ustars, 2015). Commercial banks have traditionally looked for novel approaches to better serve their clients while also increasing their profitability and acquiring a competitive edge. Their main aim has been to serve their consumers more conveniently while at the same time raising their earnings. It is argued that the most revolutionary banking innovation in Ghanaian economy has been the Automated Teller Machine. Banks in Ghana that provide ATM services have well-coordinated machines to increase their utility to the clients. Since Trust Bank of Ghana introduced ATMs in the year 1995, the innovation has gained acceptance on a large scale from the banking sector and today almost all the banks in Ghana offer ATM services to their customers (Idun &Aboagye, 2014). the combination of automated services and human tellers suggests that Ghanaian banks are currently becoming more productive, as well as their customers, who greatly benefit from short lines when they do banking since the ATM services act as an alternative banking channel (Narteh, 2013).

In Ethiopia, both internet banking and mobile banking innovations have been widely adopted by the banking sector since the majority of commercial banks collaborate with telecommunications firms to provide banking services by employing the internet and mobile phones in order for the banks to draw a competitive edge over the long run, (Verhoef, 2017). The entire purpose of internet banking in Ethiopia is to provide individuals with accessibility to their bank accounts via a webpage and support them in carrying out transactions on such accounts while adhering to rigorous security measures. The majority of commercial banks in Ethiopia now use online banking technologies in their daily business (Sarpong-Kumankoma & Abor, 2017). Internet banking by its nature gives customers a great deal of convenience and flexibility, in addition to having near-complete control over their banking operations. Mobile banking has also become a critical channel for delivering financial services and products to the Ethiopian banking customers since customers have been empowered to check their account balances and even tracking transaction history without physically visiting the banking halls (Nkegbe & Ustars, 2015).

Nigerian banking sector as well as the performance of Nigerian banks is highly influenced by financial innovation (Dauda & Akingbade, 2011). In the last decade, tremendous achievements were attained by Nigerian commercial banks in terms of service delivery, networking, profitability and enhanced customer's responses. Commercial banks were forced to cope with the demands of information and communication technologies that proved to be the driving force of the global banking industry (Ani & Uchendu, 2013). At the same time customers benefited from improved service delivery and networking which inevitably enhance banks' profits and competitiveness. Despite the achievements through financial innovations, Nigerian banks have also witnessed severe losses in their financial performance and many almost collapsed (Oluwatobi, 2015).

In East Africa, Kenya, one of the partners of the East African Community, has embraced information technology, which has improved the country's utilization of its human resources and organizational resources, boosted revenues, and improved public access to financial services (Misati, 2014). In a span of four years that is between the year 2007 and 2011 the presence of mobile money transfer services in the country, four telecommunication companies had accumulated over 16 million customers and over 40,000 agents to help facilitate banking services through the use of telecommunication network. The role that financial innovation have in efficiency and cost reductions in the banking industry is essential to the performance and profitability of financial institutions in Kenya. Kenyan banks have invested substantially in staff training programs and technological breakthroughs (Narteh, 2013).

Kenyan banking services have developed throughout time so as to implement a number of improvements. A high-tech banking business model has replaced traditional banking in the industry. The shift toward a universal economy and its accompanying weights, as well as the shifting needs of the clients, are to blame for this. Worldwide, the usage of ATMs, mobile phone banking, wireless banking, debit and credit cards, smart card machineries, and agency banking podiums is rising at a rapid rate (James, 2014). Financial product innovation has benefits and drawbacks, just like any other part of finance, yet it has made a major beneficial and bad contribution.

Statement of Problem

The ability of microfinance banks to offer loan facilities to the unbanked society makes them important financial intermediaries. Banks offer a variety of services to both borrowers and depositors (lenders) (Sheefeni, 2015). These services enables depositors to enjoy steady consumption throughout time by, among other things, providing liquidity and protection for funds. Nevertheless, these banking organizations can only perform their duties well when their financial performance is solid.

Due to the turbulent business environment that is dynamic in nature, globalization, changes in the economies and other related factors have forced microfinance banks to run effectively and efficiently through the financial innovation to develop new products and services (Chen, Joshi, & Birthal, 2013). In Kenya, the introduction of new banking technologies, products, markets, processes and the competition from commercial banks has forced the microfinance banks in the country to use any necessary skills and knowledge to remain competitive and achieve competitive advantage as they compete with other players in the financial markets (Mansour & Hassan, 2016).

Both statistical and empirical evidence show that there is a problem with financial performance of MFB's. Statistical evidence of efficiency ratio of these MFB's have been characterized by increasing trends from the year 2017. For instance, in 2017, the efficiency ratio of MFBs was at 13%. Nevertheless, this led to an increase in 2018 to 15%. In 2019, it further increased to 19%. It increased further in 2020 to 22% and deep further to 23% in 2021 (CBK, 2021). Based on the financial performance of MFBs, which continues to plummet despite MFBs adopting financial innovations, there is a paradox to this, which this study sought to investigate as to whether financial innovations have a substantial impact on MFBs' bank efficiency or not.

On the contrary, majority of empirical researches on the link between financial innovations and financial performance were carried out with respect to commercial banks in Kenya. In addition, few studies done on Microfinance banks offered conflicting results, which have a number of research gaps and thus cannot be generalizable. For instance, the impact of financial innovations on bank performance has received mixed reviews from Franscesa and Claeys (2017), Batiz-Lazo and Woldesenbet (2016), and Mwania and Muganda (2018). In their research, Batiz-Lazo and Woldesenbet (2016) and Mwania and Muganda (2018) both found that financial innovation significantly impacted bank results, in contrast to Franscesa and Claeys (2017) who found that it had the least effect on bank performance. It is at the root of the contradictory outcomes that it has produced, necessitating the need to conduct research from a Kenyan perspective to ascertain the impact of bank advancements on the effectiveness of microfinance banks. Based on the preceding statistical and empirical evidence, a problem warrant a further research because of mixed findings from various scholars, both conceptual, contextual and methodological gaps as well as declining financial performance. Consequently, this study aimed to ascertain the effect of financial innovation on Bank Efficiency of MFB, Kenya.

LITERATURE FRAMEWORK

Theoretical Literature

Financial innovations and bank efficiency have a meaningful link that may be comprehended in the framework of the diffusion of innovation theory, theory of transaction cost of innovation and schumpeter theory of innovation. According to Rogers (2003) defined adoption as the decision to fully implement innovation as the most appropriate action to take, whereas dismissal is the decision to avoid innovation. Rogers's characterized diffusion as the processes that invention goes through as it spreads through certain channels gradually inside a specific social group. The four essential components of the diffusion of innovation, according to Rogers, are social system, time, communication channels, and invention. Rogers noted that the social structure, time, the communication channel, and the invention are the four factors that govern how quickly a new idea spreads. The personnel have a significant impact on the process. The innovation needs to be extensively used to survive. There is a period during adoption when a specific innovation reaches a point known as critical mass. At that time, the data passes through via the available network. Depending on the network and the role that opinion leaders play, the invention will be embraced. Through their respective networks, the thought leaders exert their power over the behaviour of their audience. Thus, this theory pinned down the financial institutional innovation variable and established how microfinance banks diffuse these innovations for betterment of their Bank efficiency.

Niehans (1983) postulated the theory of transaction cost of innovation.. The author's perspective was that financial innovations are primarily focused on lowering transaction costs, but in practice, new ideas are developed in an effort to address the advancements in technology that have a positive impact on transaction costs. Due to the decrease in transaction costs, financial innovation is therefore encouraged, which also makes it easier to upgrade the financial services provided in an economy. The researcher looked on financial innovation based on small-scale economic developments. The theory's proponents assert that financial innovation's primary goal is to lower transaction costs.

Schumpeter (1934) asserted that innovations were always taking place in the market and that institutions needed to be aware of them. According to this theory, fresh ideas arise even before new inventions are adopted by businesses, starting a new cycle. As a result, businesses use a variety of technologies to boost their financial results. The development of new business opportunities and the acceptance of the risks attached to them are both requirements for financial innovation. Organizations must have risk mitigation strategies in place because of the increased dimensions.

Empirical Literature

Financial Product Innovation and Bank Efficiency

Aysel and Fatma (2017) investigated the link between profitability and financial product innovations in Turkey utilizing data from the central bank for a period of ten years (2006-2015).

With the application of regression analysis, it was determined that the development of new financial products by banks is positively correlated with NIM (Net Interest Margin), ROA, and ROE. This study was done in Turkey and focused on profitability measures of financial performance, thus posing both contextual and conceptual gaps that current study addressed by being carried out among microfinance banks in Kenya and using bank efficiency ratios.

Catherine and Herick (2016) looked at the link between financial novelties and performance 43 bank performance for five years (2011-2016). A census of all 43 banks was conducted using primary data. A regression analysis revealed a negative connection between the performance of banks and the introduction of new financial products. This study was done among Kenyan commercial banks, thus posing a contextual gap that current study addressed by being carried out among Microfinance Banks in Kenya.

Phelistus (2015) evaluated the impact of financial product innovation on the financial performance of Kenyan financial institutions in a four-year period (2011-2014). The 43 commercial banks made up the study population, which was conducted using a descriptive design. This analysis was conducted utilizing secondary data from public annual reports of central banks. When regression analysis was done, it was discovered that product innovations have a beneficial impact on financial stability. This study was done among Kenyan commercial banks, thus posing a contextual gap that current study addressed by being carried out among Microfinance Banks in Kenya.

Antonnet (2014) employed an explanatory design to ascertain the relationship between product innovation and the financial stability of Kenyan banks over a three-year period (2012-2014). Questionnaires and interviews were employed in order to collect information from a sample of 106 responders from 9 financial institutions chosen using the census technique. The reports from CBK were also used to acquire secondary data. Data were analyzed with SPSS, and the results revealed a poor and insignificant correlation between performance and creativity. This study was done among financial institutions in Kenya, thus posing a contextual gap that current study addressed by being carried out among Microfinance Banks in Kenya.

Based on the above literature this study sought to interrogate how mobile phone usage affects financial inclusion. **H_{01}**: Financial product innovation has no significant effect on the Bank Efficiency of MFBs in Kenya.

Financial Process Innovation and Bank Efficiency

Muharam, Andria, and Tosida (2019) examined the connection between process innovation, market innovation, and the financial success of Indonesian pharmaceutical enterprises. This analysis also aimed to examine the moderating impact of disruptive technologies on the link between process innovation and market innovation and the financial performance of Indonesian pharmaceutical enterprises. The data for this study came from managers of pharmaceutical companies in Indonesia who responded to a survey form in order to look into the suggested association. The data were analyzed through PLS statistical software. The findings of this analysis showed that process innovation, market innovation, and business financial performance are all positively correlated.

According to the findings, disruptive technology does not play a moderating effect in the association between market innovation and financial performance, but it does moderate the connection between process innovation and financial performance. The study's findings increase the corpus of knowledge pertaining to financial performance and innovative capacities by expanding on the literature already in existence. Furthermore, the study's results have demonstrated that organizations' performance can be impacted by their ability to innovate. Since the study was conducted in Indonesian using the PLS model, there are methodological and contextual gaps that the present study, which was conducted in Kenya using OLS, was to fill.

Monica (2018) looked into how financial innovations affect the operational effectiveness of commercial banks with reference to Equity Bank. 42 Equity Bank branches that are active in Nairobi were chosen for the study, which employed a descriptive research design. While descriptive and inferential analysis was carried out utilizing SPSS v23, primary data for the study through the census were collected using a structured questionnaire. The results of the study showed that there is a statistically significant link between financial process innovations and the operational efficiency of commercial banks. This study was done in Kenya and it centered on one commercial bank which cannot be generalized among the MFBs, thus it posed contextual gap that the current study sought to address by being carried out among MFBs in Kenya.

A PWC (2016) study assessed the connection between technology advancement and the effectiveness of the African banking system. The study, which involved conducting a desk review based on data from 5 African countries, found that while performance efficiency may have increased, the financial services ecosystem was most innovative and most damaging when the pace of technological change was accelerated. According to the study, financial innovation provides little to no productivity gains since there is minimal correlation between the complexity of banking systems and positive growth and because there is no conclusive proof that financial innovation caused the economy to flourish. Whereas this study was done based on regional level in Africa which cannot be generalized in the local context, it posed a contextual gap that the current study sought to address by being carried out in Kenya.

Tsuma *et al*. (2015) conducted a study on how Kenyan Saccos' financial success was linked to organizational procedures. The inquiry was centred on the notion of transactional cost innovation, it used descriptive design in establishing connections in variables while only employed primary data. The study was conducted at a Kakamega-based savings and credit cooperative society, with only 44 of the 53 employees that made up the population being sampled. Closed-ended survey questions were disliked, and the SPSS v17 program was used to analyze the data and evaluate it inferentially and descriptively. The findings demonstrated a positive correlation between creative practices and financial success. This study was done in SACCOs which cannot be generalized in the local context, it therefore posed a contextual gap that the current study sought to address by being carried out among MFBs in Kenya.

Based on the above literature this study sought to interrogate how mobile phone usage affects financial inclusion. **H_{01}**: Financial process innovation has no significant effect on the Bank Efficiency of MFBs in Kenya

Financial Institutional Innovation and Bank Efficiency

Mwawasaa & Ali (2020) researched on the impact of financial innovation on the financial health of Kenyan banking institutions The primary goal of this analysis was to ascertain how financial innovation influenced the financial stability of financial institutions in Kenya. Whilst the questionnaire was utilized to collect main data, a descriptive survey was employed to gather secondary data. To confirm the communicative and pragmatic validity of main data, secondary data were utilised. The 126 senior management staff members of commercial banks who were randomly chosen were the study's target study units. We employed multiple regression analysis, descriptive statistics, and Pearson correlation. With the help of IBM SPSS Statistics for Windows, version 23, statistical analysis was completed. The study's findings showed that commercial banks in Mombasa County's financial performance benefited significantly from financial institution innovation. The financial performance of financial institutions in Mombasa County also benefited significantly from the development of new financial products. According to the findings, financial process innovation and financial market innovation both had a significant impact on the financial health of commercial banks in Mombasa County. This study was done among Kenyan commercial banks, thus posing a contextual gap that current study sought to address by being carried out among Microfinance Banks in Kenya.

Mensah and Acquah (2015) examined how the performance of SMEs in the Sekondi Takoradi Metropolis was impacted by several innovation categories. This study sought to determine how innovation affected the organizational performance of SMEs in the Sekondi Takoradi metropolis. While a quantitative research approach was used, a survey research design was employed for the research. Data from 243 proprietors/proprietor managers of SMEs in the Sekondi Takoradi Metropolis were gathered using a straightforward random selection technique and self-administered questionnaires. The findings also imply that more than 51% of the variation in organizational performance was accounted for by innovation. Because innovation has a favourable effect on performance, it was advised that managers of SMEs pay close attention to its application in their businesses. This study was done in Ghana using PLS model, thus posing both contextual and methodological gaps that the current study aimed to address by being carried out in Kenya and using OLS.

Lin and Chen (2007) in their analysis on innovation and business performance in Taiwan, discovered that organizational innovation had a favourable impact on firm performance. It has been demonstrated that owners' willingness to engage in innovative concepts, experiments, and creative processes leads to new goods, services, or technological processes can significantly affect how well SMEs perform. Taiwan's business sales increased as a result of innovations. This study was done in Turkey and focused on profitability measures of financial performance, thus posing both contextual and conceptual gaps that current study sought to address by being carried out in Kenya and using bank efficiency ratios.

Based on the above literature this study sought to interrogate how mobile phone usage affects financial inclusion. $\mathbf{H_{01}}$: Financial institutional innovation has no significant effect on the Bank Efficiency of MFBs in Kenya.

RESEARCH METHODOLOGY

Research Design

A research design is the framework for collecting and analyzing data to address research issues and meet research goals. It provides a justification for the selection of data sources, collection methods, and analysis methodologies (Saunders, Lewis, Thornhill, & Bristow, 2015).A causal effect research design was employed in the study. It is applicable since it describes the cause-and-effect connection between the study variables.

Target Population

A population is an entire collection of entities that have a common set of traits. The entire set of demographic components pertinent to the study project constitutes the target audience. The study population is a subset of the target population (Kothari, 2004).

The target populace of the study consist of the fourteen MFBs in Kenya registered as at 31st December 2021. Thus, unit of analysis was MFBs whereas unit of observation were the IT managers of these MFBs since these are the people in charge of organizations innovations and thus suitable to provide information that suit what is on the ground. Thus the target population was forty two IT managers from the fourteen MFBs i.e. three IT manager per MFB totaling to 42 IT managers.

Sampling Design and Sample Size

Due to the limited size of the target audience, the researcher employed a census approach. Census applied was fetched from all the forty two IT managers from the fourteen registered MFBs as at 31st December 2021. Census sampling was ideal for study because the target population was below 100 (Mugenda and Mugenda, 2018). Furthermore, it increased accuracy of the quantitative data that was collected.

Empirical Model

The multiple regression equation presented in equation 3.1 was employed in data analysis

$$\mathbf{Y_t = \beta_0 + \beta_1 C_1 + \beta_2 E_2 + \beta_3 T_3 + \varepsilon} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \mathbf{3.1}$$

Whereby:

$$Y_t = Bank\ Efficiency$$

$\beta_0 =$ Intercept Coefficient
$C_1 =$ Financial Product Innovation
$E_2 =$ Financial Process Innovation
$T_3 =$ Financial Institutional Innovation
$\beta_1, \beta_2, \beta_3 =$ Regression Coefficients
$\varepsilon_i =$ Error Term (Extraneous Variables)

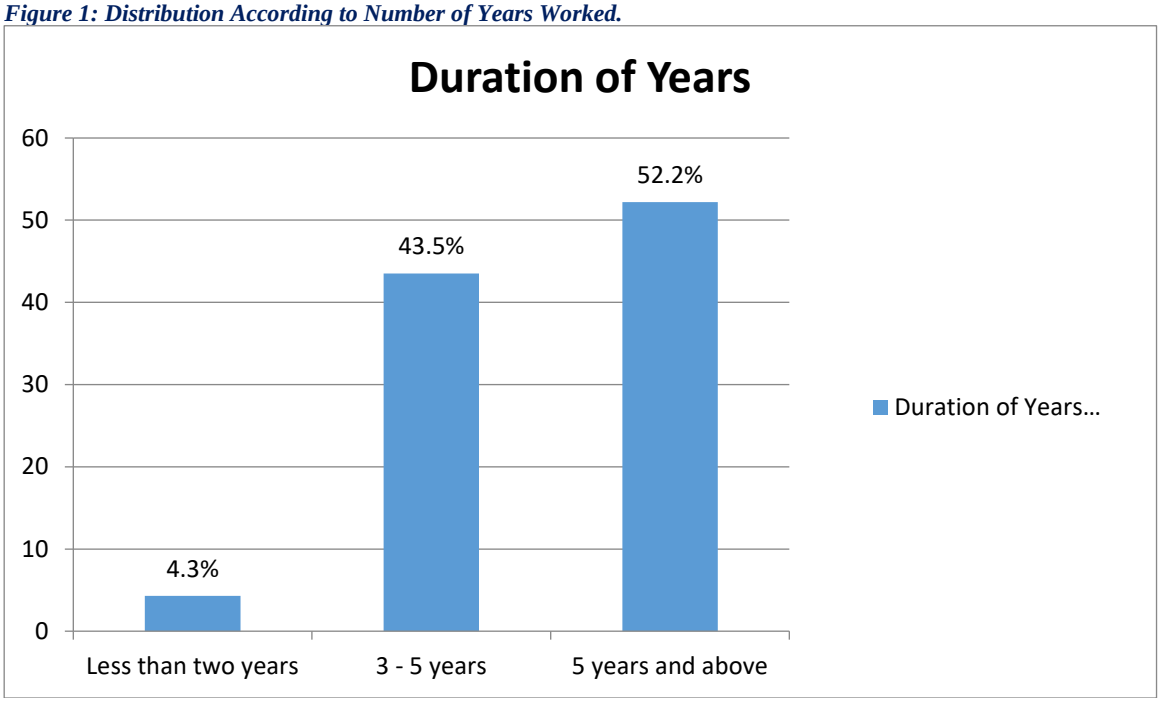
RESULTS AND DISCUSSIONS

Demographic Analysis

Duration of MFBs

The study also determined the length of time that the MFBs had existent and was displayed in Figure 1.

Figure 1: Distribution According to Number of Years Worked.



Source: Study Data (2023)

According to the findings depicted in Figure 1, a majority of the MFBs, namely 52.2%, reported having existed for a period exceeding 5 years. Additionally, 43.5% of the MFBs having existence for a period ranging from 3 to 5 years, while a smaller proportion of MFBs, specifically 4.3%, reported having existed for 2 years or less.

Correlation Analysis

For this study, correlation analysis was done using Pearson moment correlation coefficient to establish the link that exists naturally between financial innovation and bank efficiency. It attempts to predict the degree to which one variable will shift in response to a shift in the other. A strong correlation between two variables is shown by a high value (r), whereas a weak correlation is indicated by a low value (r) whose significance was evaluated by comparing the p-value obtained and the significant level of 0.05 as shown in table 1.

Table 1: Correlations Results

		Financial Product Innovation	Financial Institution Innovation	Financial Process Innovation	Bank Efficiency
Financial Product Innovation	Pearson Correlation	1	.751**	-.105	-.587**
	Sig. (2-tailed)		.000	.508	.000
	N	42	42	42	42
Financial Institution Innovation	Pearson Correlation	.751**	1	.024	-.175
	Sig. (2-tailed)	.000		.882	.266
	N	42	42	42	42
financial Process Innovation	Pearson Correlation	-.105	.024	1	.464**
	Sig. (2-tailed)	.508	.882		.002
	N	42	42	42	42
Bank Efficiency	Pearson Correlation	-.587**	-.175	.464**	1
	Sig. (2-tailed)	.000	.266	.002	
	N	42	42	42	42

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

Source: Study Data (2023)

The findings of the correlation analysis demonstrated a positive correlation between financial process innovation and bank efficiency among microfinance banks with a correlation that was moderate at 0.464 but significant at 0.002 that was less than the significant level of 0.005. . This research supports Muharam, Andria, and Tosida's (2019) conclusions that financial process innovation and bank performance are positively correlated. These findings contradict those by PWC (2016) who found no link between financial process innovation and bank performance.

Financial product innovation had a strong negative correlation with bank efficiency with the Pearson correlation coefficient at -0.587 and possessed a significant p-value of 0.000 that was less than the significant level of 0.005. . These results are at odds with those of Aysel and Fatma (2017), who discovered a favorable relationship between the development of new financial products and bank performance. But it agrees with the findings by Catherine and Herick (2016) who found a negative connection between the performance of banks and the introduction of new financial products.

It was established that the financial institution innovation had a weak negative correlation with the bank efficiency with the Pearson correlation of -0.175 and was insignificant for forecasting bank efficiency with a p-value of 0.266 that was greater than the significant level of 0.005.

Regression Analysis

Multiple linear regression analysis was done to determine if financial innovation had a significant effect on bank efficiency of microfinance banks. On bank efficiency, the effect of each independent variable was measured.

Model Summary

The results from the regression output correlated to the model summary results are summarized in Table 2.

Table 2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.790[a]	.625	.595	.12872

a. Predictors: (Constant), Financial Product Innovation, Financial Process Innovation, Financial Institution Innovation

Source: Study Data (2022).

The results from table 2 indicate that the Adjusted R square (coefficient of determination) of 0.595 was evaluated, demonstrating that changes in the financial product innovation, financial institution innovation and financial process innovation were responsible for 59.5% of the changes in bank efficiency. 40.5% of the remaining changes were related to external factors that this model did not take into account.

Analysis of Variance (ANOVA)

This section demonstrates how inferential statistics with p-value (sig' for significance) affect the standard variable. P-values under 5% are typically regarded as significant. The F statistic and its corresponding p-value were also examined in order to calculate bank efficiency. Table 3 displays the results in a logical order.

Table 3: ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.048	3	.349	21.091	.000[b]
	Residual	.630	38	.017		
	Total	1.678	41			

a. Dependent Variable: Bank efficiency

b. Predictors: (Constant), Financial Product Innovation, Financial Process Innovation, Financial Institution Innovation

Source: Study Data (2022)

According to the ANOVA results in table 3 above, the regression model's calculated p-value of 0.000 indicates that it was statistically significant in predicting the link between financial innovation and bank efficiency because the p-value was less than 5%. By application of the F* test table (5%, 3), the tabularized value was 4.2, which demonstrated that the model was significant because it was not greater than the projected F=21.091.

Hypothesis Testing

Table 4 displays the values of the regression constants that supported the researcher's determination of the impact of independent factors on the dependent variable.

Table 4: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.442	.311		4.643	.000
	Financial Process Innovation	.266	.076	.352	3.483	.001
	Financial Institution Innovation	.761	.221	.524	3.443	.001
	Financial Product Innovation	-.811	.132	-.943	-6.162	.000

a. Dependent Variable: Bank Efficiency

Source: Study Data (2022)

The researcher utilized regression analysis to establish a link between financial innovation and bank performance. The following regression equation was developed.

Y (Bank Efficiency) = 1.442 + 0.266X_1+0.761X_2-0.811X_3

Based on the findings, the subsequent hypotheses were tested to answer the corresponding objectives:

$HO_{1:}$ **Financial Product Innovation has no significant effect on Bank Efficiency of Microfinance Banks, Kenya**

On hypothesis one, the study noted that financial product innovation was statistically significant. Thus, this hypothesis was rejected and this confirms that objective one on financial product innovation significantly improved bank efficiency. These results are congruent with those of Phelistus (2015) who evaluated the impact of financial product innovation on the financial performance of Kenyan financial institutions in a four-year period (2011-2014) and discovered that product innovations have a beneficial impact on financial performance. These results contradicted with the findings of Antonnet (2014) who employed an explanatory design to ascertain the relationship between product innovation and the financial stability of Kenyan banks over a three-year period (2012-2014) and found a poor and insignificant correlation between performance and creativity.

HO_2 **Financial Institution Innovation have no significant effect on bank efficiency of microfinance banks, Kenya**

On hypothesis two, the study noted that financial institution innovation was statistically significant. Thus, the hypothesis was rejected and this confirms that objective two on financial institution innovation significantly improved bank efficiency. These findings concur with those of Mwawasaa & Ali, who researched on the impact of financial institution innovation on the financial health of Kenyan banking institutions and discovered a strong association.

HO_3 **Financial Process Innovation has no significant effect on bank efficiency of microfinance banks, Kenya**

On hypothesis three, the study noted that financial process innovation was statistically significant. Thus, the hypothesis was rejected and this confirms that objective three on financial process

innovation significantly affected bank efficiency. This research supports findings from Muharam, Andria, and Tosida (2019) who examined the connection between process innovation, market innovation, and the financial success of Indonesian pharmaceutical enterprises and found that process innovation, market innovation, and business financial performance are all positively correlated. This findings also agree with those of Monica (2018), who looked into how financial innovations affect the operational effectiveness of commercial banks with reference to Equity Bank and found that there is a statistically significant link between financial process innovations and the operational efficiency of commercial banks.

Conclusion

The study's findings show that financial product innovation significantly improved the bank efficiency of MFB's, Kenya. In view of this finding new deposit accounts, credit card record, debit card, debit and credit cards and prepaid cards services influence bank efficiency of MFB's, Kenya. This suggests that addressing financial product innovation issues improves the bank efficiency of MFB's. Financial product innovation helps with the process of inventing a new product or improving an already existing one to better serve clients and so ensure the MFB's long-term success. The study equally suggested that financial process innovation has significant positive effect on bank efficiency of MFB's in Kenya. This informs the conclusion that time savings in MFB, digitalization, office automation, process innovation and automated clearinghouse influence bank efficiency of MFB's in Kenya. This implies that adopting financial process innovation improves bank efficiency of MFB's in Kenya. Financial process innovation aims to improve the financial services sector, improving bank efficiency by altering how we save, borrow, invest, and pay for goods.
The study also established that financial institution innovation positively and significantly impacts bank efficiency of MFB's in Kenya. Therefore, the study concludes that mobile money transactions, ATM withdrawals and internet banking influence bank efficiency of MFB's in Kenya. This indicates that addressing the financial institution innovation increases the bank efficiency. Innovation in the financial sector enhances institutions' capacity to support themselves and assist the disadvantaged. As a result, there is a direct connection between the growth of financial markets and the IT industry.

Recommendations

The study demonstrated that financial product innovation significantly improves bank efficiency of MFB's in, Kenya. This study hence recommends the MFB employing strategies of opening new deposit accounts for their customers and encouraging them to utilize the use of credit cards, debit cards and prepaid cards services to enhance bank efficiency of MFB's.The researcher ascertained that financial process innovation has significant positive effect on bank efficiency of MFB's in Kenya. This study hence recommends the adoption of digitalization, office automation, process innovation and automated clearinghouse to increase efficiency and reduce operational costs and thus improving to bank efficiency of MFB's.The researcher established financial institution innovation positively impacts bank efficiency of MFB's in Kenya. This study hence recommends the adoption of mobile money transactions, ATM withdrawals and internet banking that contribute to improved bank efficiency of MFB'S.

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