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Process Innovation and Financial Inclusion of Microfinance Customers in North Rift Region of Kenya

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Abstract

Conventional banking methods have failed to effectively address the problem of financial exclusion that contributes to poverty and income inequalities among low-income segments of the market. This study assessed the effect of processes innovation (mobile and internet banking) on financial inclusions of selected MFIs' customers in Kenya. Specifically, the study tested if there was no statistically significant effect of mobile banking and internet banking on financial inclusions of selected MFI customers in Kenya. It was conducted among MFIs in Samburu and Turkana counties in North Rift Kenya. Explanatory research design with semi-structured questionnaires were used to collect data from customers of 10 MFIs in North Rift Kenya. Using Nassiuma's formula, a sample of 418 respondents from a population of 2185 customers was drawn. Data was collected using questionnaires and analysed using descriptive (frequencies, percentages, mean and standard deviation) and inferential statistics (linear regression) with the aid of SPSS. The findings showed that mobile banking had a significant effect on financial inclusion, that internet banking had no significant effect on financial inclusion, and process innovation had a significant effect on financial inclusion. Subsequently, the study recommends that the government of Kenya should develop and implement policies that promote innovation and mobile banking in Kenya. Secondly, MFI and mobile service providers should invest in mobile infrastructure and networks. The study, therefore, seeks to improve MFI strategies and systems in addressing financial inclusion that promote growth opportunities that enhance persistent incomes and economic growth among the rural and

marginal people.

Keywords: Process Innovation, Microfinance, Financial Inclusion

1. Introduction

A business that provides microfinance services is known as a microfinance institution (MFI). Small non-profit organizations all the way up to sizable commercial banks are ideally microfinance institutions. The rise of specialist MFIs in recent decades can be explained in part by the historical background. Governments and donors focused on giving small and marginal farmers subsidized agricultural financing between the 1950s and the 1970s in the hopes of raising output and income. In the 1980s, the primary goal of microenterprise credit was to provide loans to underprivileged women so they could start small businesses, accumulate assets, and improve welfare and household income. As a result of these initiatives, non-governmental organizations (NGOs) provided financial services to the underprivileged emerged. Many of these institutions turned themselves into legitimate financial institutions in the 1990s to facilitate access and lend money to customers, thus expanding their reach (Quaye, 2011).

Microfinance institutions (MFIs) provide low-income communities in developing nations like Kenya with loans and technical support in company growth. They offer a wide range of goods such as microloans, savings and other deposit products, remittances and transfers, developing payment systems, insurance, and any other financial products or services that commercial banks do not provide to low-income consumers in the financial system (Hoque, Chishty & Halloway, 2011). The microfinance sector has strived to develop sustainable enterprises since it emerged in the 1970s, and its developments have been recreated from nation to nation, each time with renewed enthusiasm and entrepreneurship, leading to global best practices that have profited and guided the practitioners of microfinance-credit (Nugroho & Miles, 2009).

Financial inclusion has often been described as banking sector outreach. It is a process that has offered a wide range of necessary financial products to community members at a low cost, at the appropriate location, form, and time, and without discrimination (Aduda & Kalunda, 2012). It is an intervention approach aimed at removing barriers that prevent markets from working in favour of the poor and oppressed. Its goal is to let the unbanked people be part of the formal financial sector so that they may obtain financial services. Conventional banking methods still need to effectively address the problem of financial exclusion that degenerates into poverty income inequalities among low-income segments of the market. Consequently, MFIs, as new organizational outfits, have come into play with innovative strategies to reach the unreached with banking services. These efforts have opened economic opportunities for small and small enterprises and families (Zogning, 2023). Because of this evidence, financial inclusion has been globally perceived as a tool to end poverty and bridge economic inequalities in communities. Development agencies and countries, developing nations especially, have made financial inclusion a top agenda and policy issue.

The study picked process innovation aspect of Schumpeterian innovation to understand how

MFIs achieved financial inclusion among marginalized communities in Kenya. Financial process innovation entails the new methods, new techniques, software and equipment that MFIs opt for to deliver financial services.

1.1 Statement of the Problem

Globally, statistics show that out of the 3 billion people characterized by very small income and business in informal setups, only 20% have secure means of storing or investing money and accessing credit (Dellepiane *et al.*, 2015). The rest (70%) are still financially excluded; living and working outside the banking system. These financially excluded people miss out on economic activities that could transform their lives and consequently contribute to economic growth (Cadena *et al*., 2017). The financial exclusion problem intensified the further you went towards sub-Saharan Africa (Hannig & Jansen, 2010).

The geographically asymmetric financial exclusion statistics equally indicated that microfinance sector in Kenya has not done well in financial inclusion in the last decade. Few MFIs are profitable (Chan, 2010). Studies have also shown that 30% of MFIs in Kenya are either defunct or are no longer lending capital (Central Bank of Kenya [CBK], 2019). According to CBK (2019), financial access has declined in some regions, especially those with poor infrastructure and regions categorised as marginalised. North Rift, Turkana, Samburu and West Pokot, for example, experience the highest exclusion (29%) compared to Nairobi, Mombasa and central rift regions with as high as 89% financial inclusion (CBK, 2019).

The inept performance of MFIs has been attributed to minimalistic approaches and poor uptake of financial innovations (Kaya, 2015; Mersland, 2013; Zogning, 2023). Continued resistance to innovations and unwavering use of traditional banking methods by MFIs perpetuate the high cost of financial services, hence financial exclusion and inequalities in communities (Zogning, 2023). Despite highlights on the cause of inept MFI performance, current literature is silent on the intensity and direction of influence of emergent financial innovations on financial inclusion for MFIs and how process innovation can increase or reduce financial inclusion of the unbanked people and their business in marginal areas (Drnevich & Kriauciunas, 2017; Kabiro & Maina, 2016; Kibaara, 2015). It is for this reason that the study investigated the effect of process innovation in accelerating access, usage, relevant and quality financial services among the marginalised populations in Kenya.

1.2 Cellular Mobile Usage and Internet Penetration in Kenya

At the end of the year 2023, the estimated population of Kenya was 54.5 million (Worldometer, 2023). Of this population, there is an approximate 17.86 million internet users with Kenya's internet penetration being at 32.7% (Kyalo, 2023). This means that about 17.8 million Kenyans have access to internet services. As of January 2023, Kenya had 10.5 million social media users. Moreover, as of 2023, cell phone usage was at a high of 117.2% in Kenya, meaning there is a significant number of Kenyans who own more than one cellular mobile device. Figure 1 shows the mobile subscriptions and mobile penetration statistics as documented by the Communications Authority of Kenya (2023).

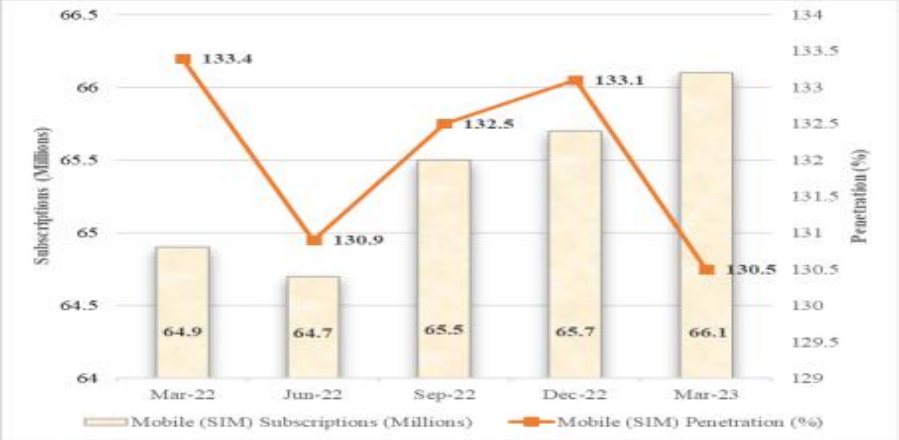

Figure 1. Mobile subscription and penetration in Kenya as per 2023

Source: CAK (2023).

Similarly, mobile money penetration has been fluctuating in Kenya as indicated in Figure 2 below.

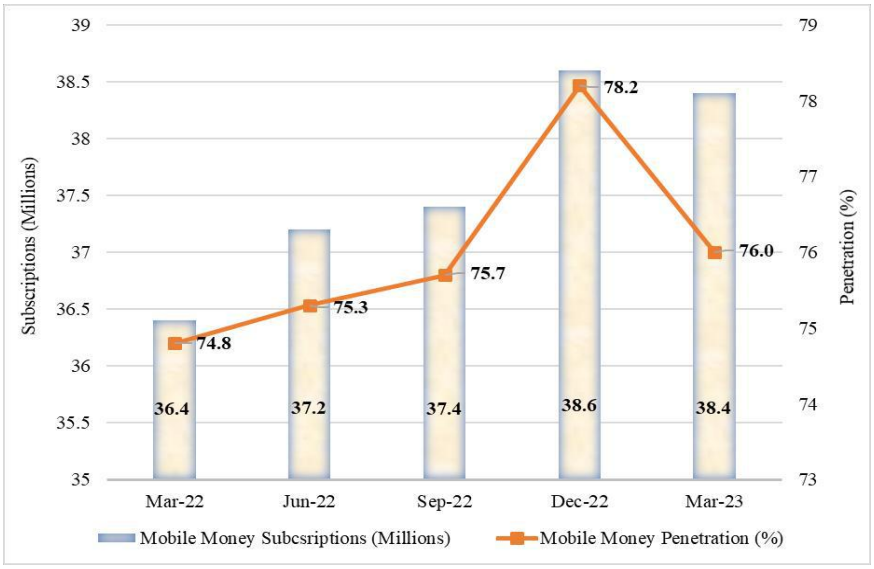

Figure 2. Mobile money subscription and penetration in Kenya

Source: CAK (2023).

According to Cowling (2023), in Kenya, mobile phones are the most used devices in accessing internet at 71.6%. This is followed by laptops and desktops at 27.7% and then tablets at 0.7%. These figures are shown in Figure 3 below.

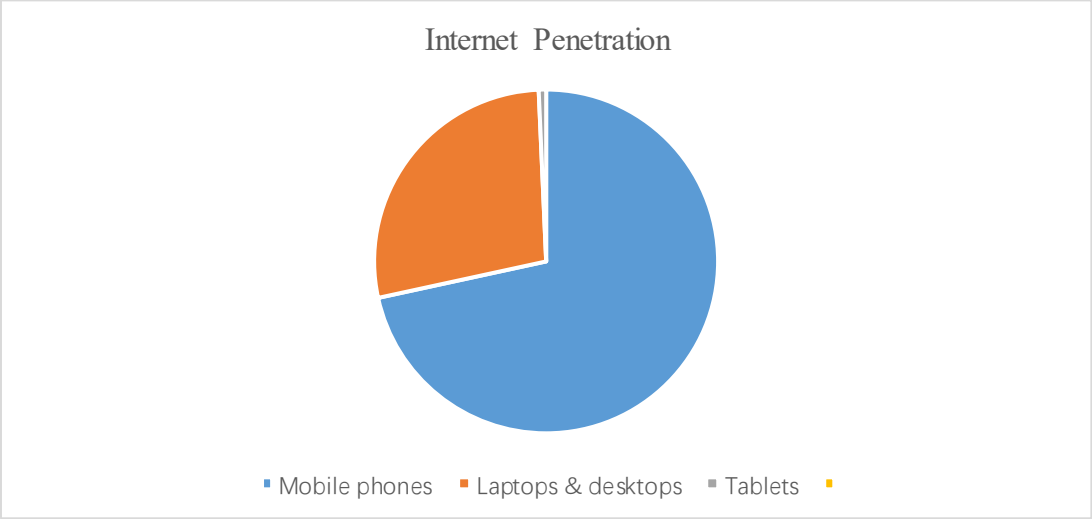

Figure 3. Internet penetration in Kenya as of 2023

Source: Cowling (2023).

Thanks to increase in cellular mobile connectivity and internet penetration, Kenya has witnessed a rise in mobile and e-banking. For instance, a study by Kavila and Kilika (2023) found that financial institutions in Kenya have increasingly adopted mobile and internet methods of processing money.

1.3 Study Objectives and Hypotheses

The overall objective was to assess the effect of processes innovation on financial inclusions of customers of selected MFIs in Kenya. The study specifically sought to find out the effect of mobile banking on financial inclusions of selected MFIs' customers in Kenya; to determine the effect of internet banking on financial inclusions of selected MFIs' customers in Kenya, and to determine the effect of process innovation on financial inclusion by selected MFI customers in Kenya. From these specific objectives, the following null hypotheses were proposed and tested in the study:

H_{01}: There is no statistically significant effect of mobile banking on financial inclusion of selected MFI customers in Kenya.

H_{02}: There is no statistically significant effect of internet banking on financial inclusion of selected MFI customers in Kenya.

H_{03}: There is no statistically significant effect of process innovation on financial inclusion by selected MFI customers in Kenya.

2. Literature Review

Financial process innovation refers to new financial service delivery methods by introducing new techniques, software and equipment. Examples of financial process innovation are mobile and online banking. According to Kimotho and Muturi (2019), financial process innovation involves the automation of office operations, accounting and client data management. Some MFI sector process innovations include magnetic strip cards (debit, ATM

and credit card) and automatic cash dispensers (automatic teller machine, electronic payment terminal). This form of innovation boosts effectiveness in operations and customer services. Kimotho and Muturi conducted a descriptive study to determine the effect of innovation on the financial performance of 14 licensed microfinance institutions. The findings revealed that product innovation positively influenced the financial performance of MFIs. The study associated process innovation with downsizing, restructuring, automation, delayering, flattering, reorganizing and quality management. Regarding this study, the researcher considered the Internet and mobile banking aspects of process innovation.

Internet banking, or electronic (e-banking) or online banking, is an emergent media of financial transactions. Banks transact and communicate with customers and stakeholders through the Internet and electronic devices. Customers get traditional banking services through the World Wide Web-based financial transactions such as deposits, withdrawals, money transfers and bill payments. Using this media, the customer does bank transactions electronically anywhere using computer gargets at any time. This media originated in New York in 1981 when a test was conducted on four major banks in the United States about innovative ways of transacting business (Farooqui & Rajani, 2017). Across 50 US states, banks that embraced e-banking registered cut-down in costs, long-term growth and positive institutional spread in size (Sullivan & Wang, 2014). Since then, the media has increasingly spread and become an indispensable tool in the financial sector. A quantitative study among 200 workers at bank headquarters in Malacca, Malaysia, revealed that the rapid Internet banking diffusion was an efficient and viable media (Ling *et al*., 2016). Many banking customers in Malaysia were uncomfortable with e-banking for reasons related to web design and content, convenience and speed.

In Jordanian banks, internet banking has engendered improvement opportunities for banks besides being a communication tool with customers. E-banking has equally minimized system errors and formed a strategy to outdo others in the marketplace. Because of dismal customer trust and inadequate employee participation and skills, internet banking is not optimally utilized in Jordan (Al-Weshah, 2013). Despite the innovations in the financial sector, it is quite unclear how MFIs in Kenya have tapped into internet banking to make financial services easily available and affordable with minimized risk and optimum returns.

In an examination of electronic banking's influence on financial inclusion in Nepal, Pradham and Dahal (2021) interviewed 150 respondents. The results of the study demonstrated that Internet banking has positively and significantly increased financial inclusion. The study used descriptive and causal-comparative research designs. According to the study, financial inclusion increased with improved internet orientation. Nevertheless, results in the context of Nepal may not apply in sub-Saharan Africa, specifically Kenya. A panel study of 39 countries (19 in Asia and 20 in Africa) data between 2007 and 2017 revealed that internet use was positively related to financial inclusion (Khatoon & Ahmed, 2019). In addition, financial inclusion significantly and positively led to economic growth. The study does not address innovation as a critical factor in promoting financial inclusion. Secondly, the study is evasive on the role of the entrepreneurial process in the relationship between MFIs' innovative strategies and financial inclusion.

In the Democratic Republic of Congo, a survey was conducted among Internet and non-internet users to ascertain their attitudes and intentions to use Internet banking (Safari, Bisimwa & Armel, 2020). Two hundred fifteen customers (112 non-users and 103 users) were conveniently sampled from Bukavu. Structural modelling of the responses revealed that perceived usefulness significantly influenced the attitudes and intentions of Congolese who used the Internet to embrace Internet banking. Those who did not use the Internet, their attitude and intention to accept Internet banking were heavily influenced by perceived usefulness and web security. The study was done in a post-conflict country. In Somalia, a descriptive survey study collected views of staff and managers of 6 commercial banks and found that electronic banking significantly enabled the financial inclusion of commercial banks (Abdi *et al*., 2022). The two studies in DRC and Somalia may not fit well in Kenya due to different political and economic environments hence the need to explore the relationship between process innovation and financial inclusion in Kenya.

By allowing customers to convert cash to electronic money and vice versa, mobile banking brings financial services closer to those who are not banked (Mazambani, Rushwaya & Mutambara, 2018). In Kenya, Onyango (2011) examined the strategic methods used by Kenya Commercial Bank for mobile money transfer. The study found that the money transfers service business in Kenya may be defined as emergent, fast-increasing, or high-speed. According to the survey, given the strategic positioning of mobile telecom providers, financial institutions find it necessary to cooperate with and integrate mobile money transfer providers to remain relevant and partake in the enormous potential presented to mobile users. A few cross-sectional studies have been conducted on media communications and financial development indicators in developing countries. In any event, concepts have proved the presence of system externalities in the media transmission framework, resulting in greater development consequences. Furthermore, in poorer countries, mobile phones and established lines appeared as alternatives rather than additions.

The need for practical methods for accessing financial resources beyond the norm has led to continual growth and modernization of banking designs. In addition, given the high demand for back-end services, other companies aside from banks have entered the market to participate in the evident opportunity in the savings industry. The need for a reasonable and trustworthy method of savings is constantly on the rise. A framework with the potential to enhance long-term savings and eliminate barriers to free access to financial services by all thus merits investigation. The extraordinary uptake of mobile financial services in Kenya exemplifies this (Wambari, 2009).

Porteous (2006) divides mobile banking into two categories. The first is additive, in which more features are added to an existing bank account to make it easier to manage, and the second is transformational, in which users who do not have formal bank accounts with traditional banking institutions are targeted by the financial products and services made available through mobile devices. Understanding the business setting in which banks operate and identifying client groups that banks may try to target through mobile banking is therefore crucial. For instance, in Kenya, many people have mobile phones but no bank accounts, and this unbanked population has billions of shillings' worth of unbanked money exhibited by

MPESA transactions that have taken place since the app's launch (Asongu, 2012). As a result, this clientele has been integrated into the mainstream banking system, enabling banks to access important resources to expand their customer and revenue bases.

Mobile banking allows the bank to provide a wide range of services. Three interconnected aims govern the effect of a mobile banking mechanism. These include boosting sales volume, lowering distribution costs, and improving customer happiness. One of the most important tasks of a circulation channel is to increase the amount of interest in commodities at profitable prices. This aim is achieved by increasing operational productivity to limit losses/costs caused by pauses in reviewing customer purchase orders. Facilitating a favourable reputation of the firm's determined limit may aid in producing further requests. Versatile account management contributes to achieving this goal in the following ways: anytime, everywhere access to money administrations, accessibility of push administrations to suggest transactions and access to credit urgently.

Consumers can carry out various activities on most mobile exchanges in developing nations. According to Kabiro and Maina (2016), customers can maintain value (money) on a mobile-accessible record. When the customer already has a ledger, connecting to a financial balance is necessary. The approach establishes a financial balance for the client if they do not have one, or it creates a fake ledger kept by a third party or the customer's portable administrator. Customers can visit banks to exchange goods and withdraw cash when the record is connected to a ledger. Customers can also frequently visit the retail locations of GSM providers.

Demombynes and Thegeya (2012) assert that a largely coordinated system clearly distinguishes between the roles of the bank and the mobile banking service provider (which provide mobile communication foundations and regulates the operator setup, respectively). The bank offers credit and savings and maintains clients' financial accounts. As a result, it receives the profits after paying experts for access to the system. The volume and frequency of mobile money transfers are used to determine a customer's creditworthiness. The amount of credit that may be received is impacted by this rating. Credit is obtained and applied for using a mobile platform. Kenyan credit systems include Mshwari, Airtel Money, KCB M-PESA, and the Branch loan applications. A truly integrated system, on the other hand, may not elicit the same refinement amongst banks and flexible specialized organizations. The distribution of excess, in this case, is determined by the relative dealing capacity of the bank and mobile expert organization. This type of agreement resembles a value contract between two meetings. Value-like contracts would most likely be perplexing and more difficult to consult than obligation-like contracts, posing a possible barrier to the goal of broadening access.

The web and mobile phones are two creative advances that have greatly altered human behaviour in the last decade and have begun to mix. The result of this collaboration is a diverse set of information systems. Using a variety of phases, systems are being developed to enable mobile phones to execute many of the same activities as the traditional web but in a more compact format for cell phones. One area of mobility is mobile account management –

one of the key areas of commercial exchange on the distant web. Managing an account is a range that has recently reached out in many courses, including phone and online money keeping. Versatile money management provides yet another diversion to managing an account advantage in the rising company sector, with the potential to become a vital channel. One of the most notable innovation initiatives of the past ten years was the widespread use of mobile phones in developing nations. Due to prepaid cards and affordable phones, phone calls and instant messaging have become common for many first-time phone owners. However, many new mobile phone users live in informal or perhaps cashless economies and lack access to financial services that others take for granted.

In the developing environment, more people have flexible handsets than ledgers (Porteous, 2006). Various activities use mobile phones to provide budgetary services to the unbanked. These services are delivered in various structures, including long separation settlements, micropayments, and casual broadcast appointment trading plans – all of which go by various names, for example, portable keeping money, portable exchanges, and portable instalments. The terms M-saving money, M-instalments, M-exchange, and M-back allude to a group of applications that enable individuals to use their cell phones to control their financial balances, store an incentive in a record linked to their handsets, exchange finances, or even access credit or protection items. Customers in the artificial world were the primary focus of these programmes. By enhancing services given by the cost-saving framework, for example, cheque books, ATMs, Voice mail/landline interfaces, smart cards, the purpose of offer systems, and online assets, the portable stage provides a useful additional strategy for managing cash without managing money (Karjaluoto, Mattila & Pento, 2002). The attraction of these mobile managing account/M-instalments frameworks for customers in the developing scene may be less about accommodation and more about availability and reasonableness.

Kenya is a global pioneer in mobile money services, one of the most recent advances in informal financial services. Safaricom, a telecom provider, established M-PESA in 2007 as a convenient way for consumers to make modest payments to one another. M-PESA users are better equipped to manage health and other shocks than non-users because they can get money from their social network more promptly and at a lesser cost. According to the poll, M-PESA users are becoming more impoverished, rural, and female each year. Data from FSD Kenya and World Bank financial inclusion surveys show that mobile money services reach a sizable proportion of the poorest families (World Bank, 2016).

In emerging economies, the informal sector accounts for up to 42% of the official GDP. By transferring these corporate transactions from cash to mobile banking, firms are making it more difficult to avoid paying taxes. In the first year of accepting mobile payments, Mauritius recorded a 12% increase in tax returns. Rwanda, Kenya, Tanzania, and Uganda also accept mobile tax payments (World Bank, 2016). The three forces have brought mobile phones and the Internet to the fore as the new media for moving money. Studies show that the innovations in transacting media have come with disruptive challenges. However, the business landscape has experienced significantly faster, cheaper and human-centred financial services through new media transfers (Varga, 2018). These emergent channels, such as digital

and cashless money transfers via mobile phone services and Internet media, have demonetized and highly digitized the financial market (Arenaza, 2014).

In Nigeria, an aspect of innovation, mobile banking, has led to both improved e-commerce and electronic transaction services, consequently leading to reduced amounts of money in circulation (Aderonke, 2010). According to Gardachew (2010), banks in Ethiopia have found it difficult to achieve higher levels of efficiency because of the very slow and poor adoption of technological innovations. Porteous (2006) notes that adopting mobile and other varied forms of electronic banking has increased accessibility to banking services. Nonetheless, it points out that there is a need for additional structures because innovation generates performance improvements (Wilden *et al*., 2013). Kenya has established mobile phone financial services, enacted microfinance banking legislation, and developed agency banking, ATM services, and Sharia-compliant services. These efforts have seen the country grow its MFI sector in the last few decades, leading to remarkable financial inclusion (Mugo & Kilonzi, 2017).

Mutsune (2014), in a research, examines money-related considerations using flexible account management in Kenya. The inquiry focused on Kenya's extremely profitable cash exchange display, M-PESA, to investigate the nature and role of budgetary comprehensiveness in empowering financial activity. The investigation explored a technique that may be used to examine how money-related consideration in Kenya has influenced financial dynamism via adaptable management of an account. The ideas presented are a creative inquiry combining financial considerations with portions of common science to construct a framework linked to appropriate information. Because of the increasing speed of exchanges in Kenya and the growing presumption of managing account benefits through mobile specialized firms, financial specialists should return to the design stage to re-calibrate restrictions on cash supply and maintain money benefits separately. In future studies, Mutsune urges close attention to arrangement concerns.

Aside from the opportunities availed by technology to the banking sector, studies have also identified some challenges. For instance, in a study in India, Subburaj (2023) identifies lack of government policy and regulatory framework in the use of mobile and internet banking as a key challenge. Other challenges include the digital gaps between different regions and cultures of India, poor perception and reception among banking customers, and security risks. In Kenya, Meshack and Mutuku (2023) aver that although mobile and e-banking have enhanced efficiency, challenges of low reception, lack of technical know-how and security risks pose a threat to adoption of technologies in banking.

3. Materials and Methods

Explanatory research design was used in this study. The target population was MFIs registered with the Central Bank of Kenya and working in the study area, that is, Samburu and Turkana. According to CBK (2019), there are ten (10) MFIs working in Turkana and Samburu, with a total of 7150 customers. The population was 2185 and 4965 clients from Turkana and Samburu counties, respectively. Using Nassiuma's (2000) formula, a sample of 419 was derived. The sample was selected using multistage sampling. The research used proportionate sampling to

determine sample per every MFI per county. Turkana County had four (4) and Samburu County had nine (9) microfinance institutions; meaning that even among the targeted marginalised areas, Samburu was more financially inclusive than Turkana. To identify actual respondents, a simple random method using fish bowl technique. Out of the total sample customers in every MFI in every county, the research was able to draw actual respondents for interview using fish bowl method by subjecting every subject to equal chance of being picked. To collect primary data, self-constructed structured questionnaires and key informant interviews were used. The collected quantitative data was analysed using descriptive statistics, with the aid of Statistical Package for Social Sciences (SPSS), version 25. The study thus generated descriptive statistics such as frequencies and percentages. ANOVA was used to generate inferential statistics to determine the relationship between process innovation and financial inclusion in MFIs under study. Qualitative data was analysed thematically.

4. Results and Discussion

4.1 Descriptive Analysis for Process Innovation

MFIs process innovation entails new methods of transferring financial services to clients. The participants were asked to state if the MFIs used mobile phone and MPESA as forms of process innovations. A majority, 195(43.7%) and 122(27.4%), respectively, strongly agreed that mobile banking was in effect as shown in Table 1. This was similar to the findings of a study in Nigeria by Aderonke (2010) that revealed mobile banking as the highly used method of transferring money. However, in Ethiopia, Gardachew (2010) found that mobile banking was not highly appreciated hence making banking highly inefficient. According to Gant (2012), the major strength of branchless banking is not its capacity to reduce expenses, but rather its ability to bring banking to the people of the remote countryside, providing accessible touch points where before it was impossible, in other words, by expanding outreach. Srivastava and Sherry (2016) utilized a focus group approach to gather low-income people's opinions regarding mobile financial services. She found that people regard mobile banking positively, meaning it can be a conduit for reaching out to low-income populations.

On the statement that MFIs use PayPal for international transfers, most of the participants neither disagreed nor agreed, 88(19.7%). This meant that they did not know if PayPal was in use or not. The study further enquired if there was computerization of financial transactions and use of internet banking in MFIs. For the two statements, most of the participants strongly agreed that MFIs had computerized their financial transactions, 178(39.9%), and adopted internet banking services, 143(32.1%). The findings were similar with those of Rosenberg et al. (2013), which revealed that technology use is regularly recognized as one of the most significant difficulties encountered by MFIs throughout the world. It is commonly acknowledged that technology is vital for boosting productivity, accuracy, expanding reach, and lowering prices. However, many MFIs lack adequate finances to invest in appropriate backend technology or to operate in areas where key infrastructure, such as the Internet, is limited. Others, on the other hand, waste money on bad technological investments or just choose not to spend, restricting their capacity to develop and compete, which has a detrimental impact on their performance.

Table 1. Process Innovation

Statement	Strongly Disagree F(%)	Slightly Disagree F(%)	Disagree F(%)	Undecided F(%)	Agree F(%)	Slightly Agree F(%)	Strongly Agree F(%)	Mean	S.D
MFIs use mobile banking	39(8.7)	14(3.1)	10(2.2)	35(7.8)	102(22.9)	50(11.2)	195(43.7)	5.42	1.88
MFIs incorporated MPESA	39(8.7)	29(6.5)	33(7.4)	62(13.9)	88(19.7)	73(16.4)	122(27.4)	4.88	1.92
MFIs use PayPal for international transfers	83(18.6)	34(7.6)	37(8.3)	88(19.7)	68(15.2)	58(13)	78(17.5)	4.14	2.07
Financial transactions by MFIs are computerized	25(5.6)	15(3.4)	26(5.8)	45(10.1)	84(18.8)	73(16.4)	178(39.9)	5.42	1.77
MFIs have adopted internet banking services	67(15)	15(3.4)	21(4.7)	50(11.2)	75(16.8)	74(16.6)	143(32.1)	5.01	3.21

Source: Field Data (2019).

A quantitative study among 200 workers at bank headquarters in Malacca, Malaysia, revealed that internet banking has become an efficient and viable medium in the financial sector (Ling et al. 2016). Nevertheless, many banking customers in Malaysia were not comfortable with e-banking for reasons related to web design and content, convenience and speed. In Jordanian banks, internet banking was reported to have expanded market opportunities for banks besides being a communication tool with customers (Al-Weshah, 2013). E-banking equally minimised system errors and provided competitive edge for banks. In a study of small banks' performance in the United States, Hendrickson and Nichols (2011) also noted that banks performed better when they innovated through their branches.

Banking through mobile system has transformed the manner in which people move money. It has also offered more complex financial services that make significant impact on people's livelihoods. Mobile banking offers a wide range of services, including access to account information, updates and transactions. Short messages are sent to customers' phones notifying them of recent activities in their bank accounts. M-banking services also facilitate payment of utility bills, depositing, withdrawing, transferring, purchasing airtime and requesting of bank statements among other critical financial operations, all in real time over mobile phones (Mutua, 2013). Varga (2018) argues that MFIs have been pushed to embrace

mobile and internet financial services due to pressure of globalisation, technological innovation and digitization. Mobiles and internet have been disruptive but helped MFIs cut down transactional costs, speed up services and provide human centred services.

From the interview with key informants, however, it was revealed that internet banking had received lower uptake among clients than mobile banking. The key informants attributed this to the fact that low-income groups in Kenya also happen to be among the least literate demographic. Nevertheless, they reported that internet banking was highly used by those in the middle and upper class. The respondents also mentioned some of the challenges MFI customers encountered when using the new processes. These included poor network during transactions, little knowledge and skills to operate some of the media, and risks of insecurity as some customers had fallen prey to conmen during mobile and internet transactions.

4.2 Processes Innovation and Financial Inclusion

The study sought to establish the effect of processes innovation on financial inclusion of selected MFI customers in North Rift, Kenya. The study hypothesised that processes innovation had no significant statistical effect on financial inclusion. A simple regression model was used to determine the relationship between processes innovation and financial inclusion. The hypothesis was tested using the following model:

$$Y = \beta o + \beta_3 X_3 + \varepsilon \ldots\ldots\ldots iii$$

Where: Y= Financial inclusion, X_3 = Processes innovation, βo= Constant (coefficient of intercept), β_2 = change in Financial Inclusion for each 1 increment change in X_2, that is, Processes Innovation, ε=error term. Table 2 shows the results of the model summary.

Table 2. Model Summary of Process Innovation and Financial Inclusion

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.183[a]	.033	.031	.28046
a. Predictors: (Constant), PROC_INNO				

Source: Field Data (2019).

The above results show low value of $R^2 =$ .03, meaning that the model captured 3.1% of the variations. The rest (96.9%) of the change was explained by other factors outside the model. Next was analysis of variance using ANOVA test. The analysis of variance showed if survey results were insignificant. Table 3 illustrates the findings.

Table 3. ANOVA of Processes Innovation

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.131	1	1.131	14.381	.000[b]
	Residual	32.800	417	.079		
	Total	33.932	418			

a. Dependent Variable: Financial inclusion.

b. Predictors: (Constant), PROC_INNO.

Source: Field Data (2019).

According to the results in Table 3, the ANOVA showed that the effect of MFI process innovation was significant on financial inclusion in MFI sector F (1,418) =14.38, P<.05. After the ANOVA test, the researchers did a regression analysis as shown in Table 4.

Table 4. Coefficients Process Innovation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.471	.048		9.835	.000
	PROC_INNO	.245	.065	.183	3.792	.000

a. Dependent Variable: Financial inclusion

Source: Field Data (2019)

The variables are labelled as Y (financial inclusion) and X_3 (process innovation). According to the regression model, MFI innovations predicted financial inclusion, R^2 = .03, F (1,418) = 14.38, P=.00. Further the researchers fitted the coefficients in the model as shown below.

$$Y = 0.47 + .18X_3 + \boldsymbol{\varepsilon}$$

This was interpreted as follows: all other factors held at constant, for every one (1) unit change in process innovation, there was positive 0.18 change in financial inclusion. Using the confidence level of 95%, the regression output revealed that process innovation had significant effect on financial inclusion, t (418) = 3.79, P < .05. Since the calculated p value is less than 0.05 threshold, the null hypothesis was dropped and alternative hypothesis

adopted, meaning that there was significant evidence found to support the hypothesis that process innovations significantly influenced financial inclusion of customers of MFIs. Because of wide diffusion of mobile technologies in Kenya, banking online and mobile has not only become possible but significantly used and appreciated by customers.

Nevertheless, in-depth inquiry on challenges, the customers identified: "high rates during exchange of money," "delays due to system problems," "serious internet delays," and "not easy to access machine." In addition, the MFI managers identified challenges as: "it doesn't reach all," difficult for uneducated people," "delay in loan payments," "low outreach" and "high cost of setting up the system." These findings were in disagreement with those by Gardachew (2010) in Ethiopia where mobile baking was not significantly appreciated. However, the findings reiterated the view by Aderonke (2010) who found mobile platform as the highest innovation used to transact money in Nigeria. In addition, Ling et al. (2016) observed that e-banking did not significantly improve financial inclusion in selected parts of Malaysia. Yet, other evidence from New York and Malacca in Malaysia approved internet banking as a commendable process of widening and deepening financial inclusion in hard-to-reach areas because the transaction costs were lowest (Farooqui & Rajani, 2017; Sullivan & Wang, 2014).

5. Conclusion

Majority of the MFIs in Kenya's marginalized areas have embraced process innovations, such as mobile and internet platforms. Mobile networks are the most preferred means of transferring money. However, although MFIs in marginalised areas use internet banking, few customers prefer this option. Based on customer experiences, mobile cash wallets not only provide a broad coverage of usage but also reduce frequent risks associated with money loss. Traditional risks associated with utilizing physical currency include the potential for theft and the possibility that money sent by traditional channels – such as friends, family, or public transportation providers – will not reach its intended receivers. These haphazard approaches to money transfer and exchange are marked by lengthy delivery times and issues that result in expenses from wasted possibilities and time.

6. Recommendations

The government of Kenya should develop and implement policies that promote mobile banking in MFIs. The policies should motivate more innovations around mobile banking and reducing tax on mobile phone and their applications to promote ownership of the phones among the North Rift people. Moreover, the government and mobile service providers should invest in mobile infrastructure and networks. Microfinance Institutions should also enlighten people on the use of mobile and internet banking to improve uptake of the services. The MFIs should equally invest more in mobile phone apps rather than internet banking if they are to deepen and widen financial service delivery in Turkana and Samburu. This study did not consider financial inclusion by mainstream banks and informal MFIs. Therefore, further studies could be done to establish the effect of mobile and internet banking on financial inclusion among mainstream bank customers in North Rift Kenya. Further research is also suggested to uncover the effect of mobile banking on financial inclusion among informal MFIs.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

Florence Chemtai conducted the research, reviewed the literature, collected and analyzed the data, made interpretations and finalized the report. Dr. Francis Okumu Omillo and Dr. Geoffrey Kiptum Kimutai supervised the research project and provided the necessary advice during the study. The article manuscript was drafted and reviewed by all authors.

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Data availability

The data that support the findings of the study are available upon reasonable request from the corresponding author, Florence Chemtai.

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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