Microfinance Sustainability in a Digitalised Economy

Adebiyi, M. A., Olusegun T. S., and Yakubu, J.*

Abstract

The study examines microfinance sustainability in a digitalised economy using a panel dataset of 1,314 microfinance banks in Nigeria spanning 2012 to 2020. The results show that digitalisation poses significant threats to microfinance sustainability in Nigeria. The industry presently faces strong competition from commercial banks and Fintech companies, and is characterised by a low capital base, product innovation and market penetration, high transaction costs, and some idiosyncratic risks. The study suggests that microfinance institutions should leverage their large customer base by utilising digital innovations. Regulatory agencies should ensure that Fintech services are adequately regulated, affordable, and easily accessible to microfinance institutions. This would allow the microfinance industry to operate at a reduced transaction cost, increase its outreach to the poor, minimise risks and enhance sustainability.

Keywords: Microfinance; Bank, Panel Data, Sustainability, Digitalisation
JEL Classification: C23, G21, E42

I. Introduction

Microfinance is considered one of the most effective tools of addressing poverty among vulnerable groups. Globally, poverty remains a challenge, especially in developing countries. Despite efforts by policymakers worldwide and the United Nations' declaration to eradicate extreme poverty in the world by 2030, the menace of poverty remains high. In Africa, about 460 million people live in extreme poverty, with a poverty threshold of US$1.90 a day. Also, despite several microfinance initiatives in Nigeria, the number of poor people was 89 million in 2020 (World Bank, 2022). The high poverty level in Nigeria was attributed, among other factors, to a high level of financial exclusion. The number of financially excluded adults in Nigeria increased to 38.1 million in 2020, from 36.6 million in 2018 as population growth outpaced financial inclusion growth (EFInA, 2021). Comparatively, Nigeria's 36.6 per cent of financially excluded adults in 2020 was higher than the exclusion rates in South Africa (7.0 per cent), Rwanda (7.0 per cent), and Kenya (11.0 per cent) for the same period (EFInA, 2021).

Access to credit remains one of the key constraints to economic prosperity in most developing and emerging market economies. This is true in Nigeria, as most households and small-scale businesses do not have adequate securities to pledge

**The authors are staff of the Research Department, Central Bank of Nigeria, Abuja. The usual disclaimer applies.*

as collateral for commercial bank loans. Most of them depend on personal and family savings, co-operative societies, Rotating Savings and Credit Associations (ROSCAs) and money lenders for their financing needs. The availability and cost of borrowing at some of these informal institutions can, sometimes, be very tight for the smooth operations of these businesses. Microfinance Banks expand the frontiers of intermediation, by providing credit access to these vulnerable groups unable to access credit through the formal banking institutions. By easing financing constraints, MFBs promote small-scale businesses and help them harness inherent market potentials, while generating sufficient returns on their investment.

Microfinance sustainability, therefore, holds the promise for poverty reduction and economic empowerment of poor households and their integration into the market economy. Most policymakers, especially in developing countries, recognised the potential of microfinance sustainability in improving outreach to the poor. Sustainable microfinance institutions can unlock the financial viability of the poor and enable the institutions to achieve both their long-term and short-term goals of good corporate governance and poverty reduction.

Despite microfinance's enormous potentials, the sector is bedevilled with several challenges, such as strong competition from commercial banks and Fintech companies, high transaction costs, high-interest rates, low capital base, low product innovation, low market penetration, and high exposure to credit risk. For example, the nominal average portfolio yield, a proxy widely used for interest rate, was about 34.0 per cent, 23.0 per cent, 39.0 per cent, and 31.0 per cent, in Asia, South Asia, East Asia, and Nigeria, respectively (Nwachukwu, 2014; Olusegun, 2017). High-interest rates arise from inherent risks associated with small loans to the poor, such as the cost of funds for on-lending and loan loss, lack of tangible assets to pledge as securities for bank loans, identifying and selecting potential clients, processing loan applications and disbursement, and cost of repayments and non-repayment (Helms & Reille, 2004). These factors adversely affect the profitability and scope of outreach of microfinance institutions.

However, the invention of new technologies is changing banking and financial services worldwide. Digital transformation has affected the payments system, loan disbursement, and collection services. Digital transformation in the financial sector involves using mobile phones, point-of-sale terminals (PoS), and other digital devices to collect savings, make payments and facilitate loan applications. Thus, digitised institutions enable financial service providers and their customers to access various benefits missing in traditional branches and paper-based banking. It also boosts customer engagement and product usage, promoting and expanding financial inclusion. Despite improvements in digitisation in Nigeria, microfinance institutions are yet to fully tap the potential and opportunities provided by new technologies.

Most microfinance institutions in Nigeria largely depend on traditional ways of reaching clients, processing loan applications and approvals, disbursement processing, and physical data storage. These factors, among others, heighten transaction costs and risks to microfinance institutions in Nigeria.

This study, therefore, examines microfinance sustainability in a digitalised economy, using a panel dataset of 1,314 microfinance banks in Nigeria from 2012 to 2020. Panel data analysis accounts for cross-sectional and time variations, which are taken for granted in cross-sectional and ordinary regression analyses. Thus, it solves the challenges of idiosyncratic errors and unobserved heterogeneity commonly associated with cross-sectional studies (Wooldridge, 2006).

Following this introduction, Section 2 reviews the theoretical and empirical literature. Section 3 presents the theoretical framework and empirical methodology. Section 4 analyses the results, while Section 5 summarises and concludes the study.

II. Review of Related Literature

This section reviews two basic microfinance service delivery strategies: the institutionalist and welfarist approaches. It also examines the theory of "Indifference-possibility curves" that explains the role of innovation or new technologies in microfinance's overall performance. Lastly, some relevant empirical studies are reviewed that show influence of digitisation on microfinance sustainability.

II.1 Theoretical Literature

II.1.1 The Institutionalist Approach vs the Welfarists Approach

Two schools of thought provide insight into how microfinance institutions could deliver financial services to vulnerable members of society (Bhatt & Tang, 2001; Brau & Woller, 2004; Woller & Woodworth, 2001). The institutionalist approach focuses on building sustainability through "financial deepening" to cater for those unattended to by traditional banks. The core aspect of this approach is realising financial self-sufficiency and increasing the number of clients. They maintain that targeting the very poor is expensive and could impede the goal of achieving financial self-sufficiency (Woller & Woodworth, 2001). Conversely, the Welfarist school argue that achieving the breadth and depth of outreach through poverty-focused services is possible. For welfare workers, the net social benefits of serving a few very poor clients outweigh the benefits of serving many less-poor clients (Schreiner, 2002).

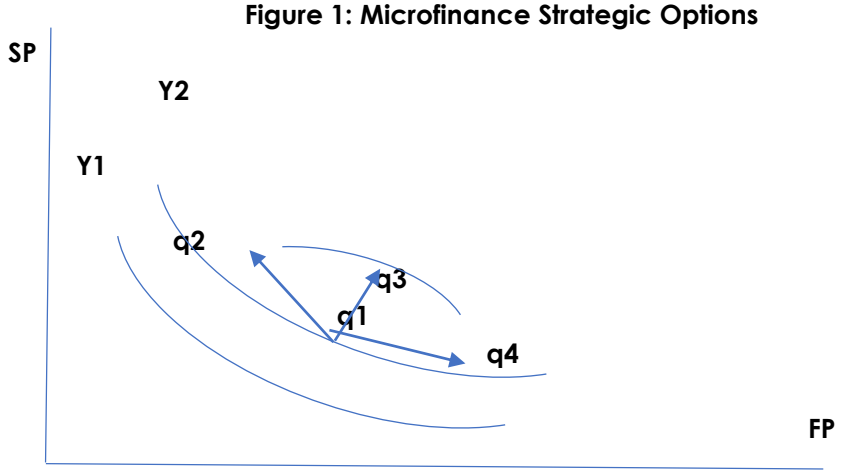
Despite the "microfinance schism," the two approaches have practical implications in terms of differences in the conception of service delivery strategies, institutional structures, and financing, as well as the seclusion of potential clients to be served (Woller & Woodworth, 2001). Their fundamental difference is that institutionalists focus on institutional sustainability, whereas welfarists focus on social benefits. The

institutionalists prioritise business, whereas the welfarists prioritise clients. The provision of financial and non-financial services with the help of subsidies, according to welfarists, would bring about a change in clients' lives (Bhatt & Tang, 2001c). According to institutionalists, subsidies are start-up fuels that finance innovations to increase efficiency and sustainability (Morduch, 1999; Schreiner, 2002). Welfarists argue that MFIs are pressured to abandon their mission of serving the poorest of the poor to achieve sustainability (Brau & Woller, 2004).

II.1.2 Theory of Indifference-possibility Curves

Copestake (2007) used a set of indifference curves, Y1 and Y2, to explain the microfinance sustainability process. The graph's vertical axis represents MFI social performance (SP), while the horizontal axis represents MFI financial performance (FP). SP and FP have an inverse relationship implying that the more MFIs focus on social objectives, the less achievable their financial goal of making a profit, while the opposite is true when they focus on financial performance.

Figure 1: Microfinance Strategic Options



Source: Adapted from Copestake (2007).

The framework assumes a trade-off between microfinance institutions' social and financial performance, as displayed in the above graph. The indifference curves, Y1 and Y2 in Figure 1, represent various combinations of financial and social performances with MFIs' utilities assumed to be the same. Moving to a higher indifference curve implies a higher overall performance of MFIs. This could be through research and development or through innovations such as using digital financial services through the utilisation of digital devices. The optimal MFI strategy is symbolised by the arrow pointing to q3, showing the point where the possibility curve intersects the indifference curve (Y2).

II.2 Empirical Review

The empirical review of microfinance sustainability and the digital economy provides various outcomes. Studies such as Kulik and Molinari (2004), Agrawal and Sen (2017), Ghani et al. (2018), Sakti (2021), Dorfleitner et al. (2021), and Ali et al. (2021) emphasise the strong role of technology in enhancing microfinance sustainability. However, findings from Rozzani et al. (2013), Pytkowska and Korynsk (2017), Bari and Aquib (2021), and Siwale and Godfroid (2021) identify a lack of organisational capacity, regulatory gaps, small-scale operations of MFIs, lack of financial resource, high cost of new technology, lack of client participation and danger of losing the traditional human face, as some of the hesitant factors to implementation of digitilisation of microfinance operations.

Kulik and Molinari (2004) examine the role of technology on microfinance financial sustainability, and the study discovered that technology was one of the factors influencing MFI sustainability and impact. This argument is supported by the industry trends, risks, opportunities, and evidence from selected examples. Ghani et al. (2018) investigate the impact of technology on the global growth of microfinance. The study finds that strong technology platforms were responsible for most microfinance growth over the last decade. With technological advancement, financial institutions and MFIs have found it easier to reduce operating costs while increasing outreach and penetration. Sakti (2021) investigates how financial technology (Fintech) has infiltrated Islamic finance, including Islamic microfinance, in Indonesia. The study aims at identifying the characteristics of Fintech that are required and appropriate for Islamic microfinance and then propose new Islamic microfinance models, among others, that could ensure the long-term viability of Islamic microfinance institution (IMFI) and Baitul Maal wat Tamwil (BMT) in Indonesia. The findings indicate that IMFI/BMT requires micro- Fintech such as crowdfunding P2P financing, crowdfunding P2P social, payment, and digital banking.

Similarly, Ali et al. (2021) find a positive impact of technology on microfinancing. Investment in technologies allows managers to reduce operational errors, increase task performance, reduce operating costs, and increase the likelihood of higher financial profits. Dorfleitner et al. (2021) investigate the factors that influence the use of digital support solutions in the microfinance sector using a global sample of MFIs derived from a YAPU Solutions survey on rural lending and IT solutions. Furthermore, their findings show that MFIs' use of these tools is consistent with their social performance and indicate that greater digital support solutions are associated with increased institutional profitability. Macroeconomic factors and development of the country in which the institution is located, influence MFIs' decisions to integrate digital solutions into their services and internal operational processes.

However, studies such as Bari and Aquib (2021), Rozzani et al. (2013), Pytkowska and Korynski (2017) acknowledge the positive influence of technology on microfinance sustainability. These studies also explain why most microfinance institutions do not fully utilise the impacts. For example, Bari and Aquib (2021) analyse data from both primary and secondary sources of Microfinance Institutions (MFIs) in Bangladesh. The study uses Roger's Diffusion of Innovations and found that a lack of organisational capacity, stakeholder challenges, and regulatory gaps are among the primary barriers for MFIs, discouraging MFIs from pursuing advanced digital transformation despite a greater willingness to contribute to digital financial inclusion. Also, Rozzani et al. (2013) identify and analyse the issues surrounding microfinance operations. The findings show that concerns about Islamic microfinance operations can be addressed through technological advancement. However, many microfinance institutions are hesitant to implement technology due to its high cost and low adoption rates, which affects market demand and supply.

Moreover, Pytkowska and Korynski (2017) present the findings of a survey on the use of Fintech solutions and the digitalisation of customer relations and lending processes among European MFIs. Despite widespread recognition of the need to use digital solutions to a greater extent, MFIs' ability and willingness to do so varies. The main challenge for small institutions in implementing technology is a lack of financial resources. The small scale of operations of most European MFIs is a barrier to adopting Fintech solutions.

Furthermore, MFIs are wary of losing their competitive advantage of personal client relationships. Fintech and digitalisation solutions should be applied based on costs and benefits in tandem with the organisation's mission and the clients' requirements and competencies. Siwale and Godfroid (2021) examine the role of Digitising microfinance in Zambia. Their findings indicate that despite many notable successes of digitisation, there is still a strong case for a 'human touch' model, given the heterogeneous country contexts within which MFIs operate in Zambia.

Few studies exist in Nigeria, and these include Oladejo and Adereti (2010), Etim (2011), Ogunleye (2015), and Adewoye and Adesokan (2016). Oladejo (2010) employs non-parametric statistics (Chi-square) to investigate the impact of information technology on the development of microfinance banks in Ogun State. The study attributes the upsurge in the effectiveness and efficiency of microfinance banking to high investment in information technology. Also, Nwabueze (2013) discovers that modern communication channels, such as social media, could contribute positively towards achieving microfinance banking goals in Nigeria. Adewoye and Adesokan (2016) suggest that short messaging service (SMS) helped microfinance bank operations in Oyo State. A more comprehensive study was conducted by Ogunleye (2015), using panel data analysis of 752 microfinance

banks and a survey to investigate the effects of microfinance scaling up or sustainability of outreach in Nigeria. The findings show that yield, labor cost, orientation, efficiency, gender, and loan size determined the sustainability of microfinance banks at the national level; and orientation and loan size at the state level. In a study focusing on Ghana, Nigeria, and other SSA countries, Etim (2011) finds that the adoption and use of mobile telephony and informal social networks alleviate women's credit problems.

The reviewed literature shows that there are few studies on microfinance sustainability and digitalisation, especially in Nigeria. Aside from Ogunleye (2015), most existing studies use qualitative and descriptive analysis from structured questionnaires and semi-structured interviews. These approaches limit in-depth analysis of the issue. Though comprehensive, the study by Ogunleye (2015) only covers a four-year period and did not account for the role of digitalisation in the sustainability in microfinance institutions. Given these weaknesses, this study employs a more comprehensive panel dataset of 1,314 microfinance institutions covering a period of nine years, to examine role of digitisation in microfinance sustainability in Nigeria.

III. Theoretical Framework and Empirical Methodology

III.1 The Model

A Pooled Ordinary Least Squares (POLS), Fixed and Random Effect models were employed, using unbalanced panel data to estimate the determinants of sustainability of microfinance banks in a digitalised economy. The choice of panel data methodology was informed by its ability to address associated problems with static cross-sectional and ordinary regression analysis by accounting for changes in the data (Wooldridge, 2006). In addition, panel data analysis uses large sample and allows for higher degrees of freedom (Hsiao et al., 1995).

The simple linear regression model in its general form is presented below:

$$P_{it} = C + \sum_{b=1}^{B} \beta_b X_{it}^b + \sum_{m=1}^{M} \beta_m X_{it}^m + \varepsilon_{it} \quad (1)$$

Where: C is a constant term, X_{it}^b are the institution specific explanatory variables per time, and X_{it}^m are the control variables. In line with the portfolio theory, we specify our empirical model based on standard measures of sustainability to reflect banks' internal factors as follows:

$$ROA_{it} = \beta_o + \beta_1 LCOST_{it} + \beta_2 CREDR_{it} + \beta_3 FRISK_{it} + \beta_4 LLOAN_{it} + \beta_5 ESCALE_{it} + \beta_6 FEMALE_{it} + \beta_7 LDIGITAL_{it} + \varepsilon_{it} \quad (2)$$

Where: β_o is a scalar and $\beta_{(1-7)}$ is a matrix of (Kx1) dimension. Where ROA_{it} represents the return on assets (ROA), which is used as a proxy for MFB sustainability at time t and $\beta_o$is a constant. The independent variables used in the model are: $LCOST_{it}$ which represents cost of management of each institution; $CRISK_{it}$ is the credit risk of institutions; $FRISK_{it}$ is the financial risk; $LLOAN_{it}$ stands for the natural log of loans and advances of MFBs; $LSCALE_{it}$ is the log of total assets, representing scale efficiency of the MFI; $FEMALE_{it}$ is the percentage of women borrowers, $LDIGITAL_{it}$ represents the natural log of sum of volume of ATM, POS, Web transaction and NIP, which collectively stands for digital transactions. Finally, $\varepsilon_{it}$is the error term, including the unobserved effect, which is expected to be independently and identically distributed (i.i.d). A detailed description of the variables in the model is presented in Table 1.

III.2 Data

To determine the role of digital transformation in the sustainability of microfinance banks (MFBs) in Nigeria, the study applied MFB-specific data from annual returns of all MFBs (National, State, and tiered Units) submitted to the CBN and digital payments data involving, ATM, POS, Mobile pay, web-based payment, and NIP. The data on internal variables of the MFBs were collected from two platforms namely e-FASS and FinA. A total of six (6) bank-specific variables and one (1) digital variable were used for the study. The sample is an unbalanced panel dataset covering 2012 to 2020, consisting of 9 National MFBs, 110 State MFBs, and 1,195 Unit MFBs.

Measurement and descriptions of data employed for the study are summarised in the Table 1.

Table1: Variables, Variable Measurement and A priori Expectation

Variables	*Description of Variables*	*A priori Expectation*
Dependent Variables		
Operating Self-Sufficiency Ratio (OSS)	Measured by total financial revenues divide by sum of financial expenses, loan loss provision and operating expenses).	
Return on Assets (ROA)	Net Adjusted Income/Revenue x Revenue/Assets.	
Independent Variables		
LCOST	LCOST is the log of operating expenses.	A negative relationship between cost of management of the MFB and MFB Sustainability. It is expected that $\beta < 0$.
CRISK	CRISK is the credit risk, measured by the ratio of non-performing loans to outstanding total loans and advances.	On a priori, credit risk and MFB sustainability is expected to have $\beta < 0$.
FRISK	FRISK is the financial risk, measured by the ratio of institutions equity to assets.	On a priori, it is expected to have a negative relationship between financial risk and MFBs Sustainability, $\beta < 0$.
LLOAN	LLOAN is the log of the total amount of loans outstanding.	A positive relationship between Total deposit and MFB Sustainability $\beta > 0$.
LSCALE	LSCALE is the log of total assets.	A positive relationship between Size of the MFB and MFB Sustainability $\beta > 0$.
Female	Percentage of women borrowers.	A positive relationship between lending to female clients and MFB Sustainability $\beta > 0$.
LDIGITAL	LDIGITAL is the log of the sum of the volume of ATM, POS, WEBT, MPAY and NIP.	On a priori, it is expected to have either a negative or positive relationship between digitalisation and MFB Sustainability. When MFB fails to leverage new technology, $\beta < 0$, otherwise, $\beta > 0$.

Source: Authors' compilation.

IV. Empirical Analysis of Results

The results in Table 2 show microfinance sustainability measures as dependent variables: return on assets ratio (ROA) and operating self-sufficiency ratio (OSS). Based on the result of the Hausman test, we choose the random effect model in

Panels (2) and (4). The results show that digitalisation poses a significant threat to microfinance sustainability in Nigeria, this is evident in the negative coefficient of LDIGIT (-0.01) in panel (2) and (-0.05) in panel (4). This is not surprising, as the industry faces strong competition from Fintech and other well-technologically developed banks, who are the major users of digital technology in providing financial services to customers. In addition, MFBs are characterised by a low: capital base, product innovation, market penetration; and high transactional costs, and credit risks. These factors pose a threat to the sustainability of microfinance and the scope of outreach if the industry fails to transform by leveraging innovations provided by the growth of Fintech and new technologies. The negative coefficients of other variables in the model, such as labour cost (-0.01), credit risk (-0.12), and financial risk (-0.19), further alluded to these realities. The result corroborates those of Cull et al. (2007) and Olusegun (2017), which showed a negative coefficient of labour cost on operational self-sufficiency.

Table 2: Microfinance Sustainability Panel Regression Results

	Return on Assets (ROA)		**Operating Self-Sufficiency (OSS)**	
	Fixed Effect	Random Effect	Fixed Effect	Random Effect
	(1)	(2)	(3)	(4)
CRISK	-0.12***	-0.12***	-0.33	-0.31**
	(-3.89)	(-5.64)	(-1.6)	(-2.46)
FRISK	-0.15***	-0.19***	-0.12	-0.08
	(-7.58)	(-15.46)	(0.88)	(-1.21)
LSCALE	0.02	0.01	0.42***	0.28***
	(1.16)	(1.06)	(3.20)	(5.71)
LLOAN	0.04***	0.03***	0.11	0.02
	(3.15)	(3.53)	(1.32)	(0.51)
LCOST	-0.01***	0.01***	0.01	-0.02
	(-4.01)	(-5.39)	(0.59)	(-1.27)
FEMALE	0.001	0.003	-0.01	-0.02
	(0.20)	(0.83)	(-0.20)	(-0.74)
LDIGIT	-0.02***	0.01***	0.12***	0.05**
	(-3.36)	(-3.08)	(-3.46)	(-1.91)
CONSTANT	0.28*	0.18**	2.47**	1.06*
	(-1.62)	(-1.77)	(-2.18)	(-1.74)

Source: Authors' compilation.

Note: z-statistics, *** significant at 1%, ** significant at 5%, * significant at 10%.

Hausman test: When Prob>chi2 is larger than 0.05, a random effect is chosen, but when it is not significant, a fixed effect is chosen.

The coefficient of total loans (LLOAN) is positive as expected; an increase in microfinance loans and advances elicits a 0.03 per cent improvement in the industry's sustainability. This also corroborates Cull et al. (2007) and Olusegun (2017) findings. The coefficients of the scale (LSCALE) and lending to women (FEMALE) conform to the a priori expectations but are insignificant. This might support the recent call by the regulatory authority in Nigeria to increase the capital base of microfinance banks and the need to increase lending to women for more outreach.

V. Summary and Conclusion

Nigeria's microfinance institutions still face enormous issues, usually due to strong competition from commercial banks, Fintech, low capital base, product innovation, market penetration, and credit and financial risks. These factors adversely affect their sustainability, profitability, and scope of outreach. Moreover, the small-scale nature of MFBs operations, in turn, affects their turnover due to high transaction and operational costs. Microfinance institutions can turn these challenges into opportunities through digital transformation. Microfinance institutions can take advantage of what Fintech offers by providing Fintech needs, such as its customer base. This partnership could help the MFIs leap from traditional business models to digital ones. MFIs still enjoy the underwriting capabilities that help them ensure repayments from their customers using peer pressure, personal contacts, and continued access to credit. The Fintech companies lacked these motivational aspects of loan repayments, leading to high default rates.

Microfinance institutions are also confronted with the challenges such as access to customer behavioural data, data analytics capacity, and the ability to reach customers digitally, making it difficult for MFIs to effectively engage in digital-based lending. This process may be difficult for MFIs without an effective partnership with Fintech companies. MFIs should leverage the analytical capabilities of big digital payments' platforms for better insights needed to offer credit. The availability of this data will greatly assist microfinance institutions in making well-informed credit decisions.

The study examined microfinance sustainability in a digitalised economy, using Nigerian data. A dataset of 1,314 microfinance banks from 2012 to 2020 was used in a panel data framework. The results from the study showed that digitalisation poses a significant threat to microfinance sustainability in Nigeria due to strong competition from commercial banks and Fintech companies. The study recommends that microfinance institutions leverage their large customer base by utilising digital innovations by Fintech companies. The regulatory agencies should ensure Fintech services are affordable and easily accessible for microfinance institutions. This would allow the industry to reduce transactional costs, increase outreach to the poor, and minimise risks.

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