Ahmed, Mushtaq; Mohamad Yazid Isa

Article

Role of macroeconomic factors, institutional quality and digitalization towards performance of Islamic microfinance institutions

Pakistan Journal of Commerce and Social Sciences (PJCSS)

Provided in Cooperation with:
Johar Education Society, Pakistan (JESPK)

Suggested Citation: Ahmed, Mushtaq; Mohamad Yazid Isa (2023) : Role of macroeconomic factors, institutional quality and digitalization towards performance of Islamic microfinance institutions, Pakistan Journal of Commerce and Social Sciences (PJCSS), ISSN 2309-8619, Johar Education Society, Pakistan (JESPK), Lahore, Vol. 17, Iss. 2, pp. 240-262

This Version is available at:
http://hdl.handle.net/10419/278051

Pakistan Journal of Commerce and Social Sciences
2023, Vol. 17 (2), 240-262
Pak J Commer Soc Sci

Role of Macroeconomic Factors, Institutional Quality and Digitalization Towards Performance of Islamic Microfinance Institutions

Mushtaq Ahmed (Corresponding author)
Islamic Business School, Universiti Utara Malaysia
Email: mushtaq_acca@yahoo.com

Mohamad Yazid Isa
Islamic Business School, Universiti Utara Malaysia
Email: yazid@uum.edu.my

Article History

Received: 27 Apr 2023 Revised: 26 June 2023 Accepted: 29 June 2023 Published: 30 June 2023

Abstract

Islamic microfinance is widely accepted in Muslim-majority countries as Islamic microfinance products are based on Islamic principles. However, despite the extreme need and widespread popularity of Islamic microfinance institutions (IMFI), this sector is lagging behind conventional microfinance institutions with scarce literature to exhibits its performance at country-levels. The success of microfinance institutions is uneven in achieving both objectives, some achieve one objective, either financial or social, while some fail to achieve any objective altogether. In this line, study uses panel data of 35 Islamic microfinance institutions of OIC countries to investigate the impact of macroeconomic, macro institutional factors and digitalization on the financial and social performance of microfinance institutions in OIC countries from 2008 to 2019. The results from Pooled-OLS and System-GMM by using STATA found that macroeconomics and country-level institutional variables have complementary and rivalrous effects in IMFIs. In addition, digitization has a significant impact on the performance of (IMFIs). The study recommends to consider country-level environment and adoption of digitalization in policy making to enhance the simultaneous development of IMFIs.

Keywords: Institutional quality, digitalization, social & financial performance, government efficiency, rule of law, Islamic microfinance institutions, OIC countries.

1. Introduction

Currently, 3114 MFIs from 103 countries are reported in a worldwide data-based microfinance network; MIX-Market Network. These microfinance providers are recognized as a growing and important niche within the market of financial services specifically for poor people. Regardless of the fact microfinance institution achieve

enormous growth of 20% all around the world and mainly in South and East Asia and Africa, the current outreach of microfinance institutions seems below par and insufficient mostly in the countryside/rural areas. Furthermore, some MFIs are incapable of surviving in this industry because of ineffectiveness in their operational activities. Islamic microfinance has approximately 20% of microfinance institutions in OIC countries and as more variety to achieve the social and financial objectives in the perspective of shariah. In addition, a large number of the Muslim population shows their concerned about the interest in Islamic microfinance products as these are based on Islamic principles (World Bank, 2017).

Islamic microfinance has approximately 20% of total microfinance institution OIC countries having dual institutions in a country. Pakistan is leading in this region followed by Bangladesh and Palestine. Pakistan, Bangladesh and Indonesia are leading in number of microfinance institution but stand at Yemen, Malaysia and Bahrain are embraced with only Islamic microfinance institution in their country. However, the market share of Islamic microfinance is relatively very small as compared to conventional microfinance and cover approximately only 1% globally. According to Karim et al. (2008), approximately 20 to 60 percent of Muslim population intent to get access in Islamic finance. This outreach is insufficient because there are millions of poor people are the resident of these Muslim's majority developing countries. Furthermore, Islamic microfinance is an important tool for economic growth in many Muslims community by facilitating access of financial services. According to (ISEFE, 2019) out of 7 billion of the world population, 20% are Muslims and 50% of global poorest people are lived in Islamic countries, even though these Muslim's countries hold 70% of world's natural resources.

Evidence shows that some microfinance institutions achieve both social and financial objectives. Some achieve one objective, either financial or social, while some fail to achieve any objective altogether. The performance of microfinance institutions has been a key focus of many studies. Baluku et al., (2019) define the financial performance of MFIs as the capability of the organization to work efficiently in the management of its resources and attain objectives such as profitably and stability. Similarly, the financial performance of MFIs has supreme importance in the microfinance sector as well as the countries in which they are located, Kereta (2007). The success of performance in microfinance institutions does not rather involve only the financial performance of MFIs then also includes social performance such as outreach, which means, reaching the poor in terms of depth and breadth within the country (Ledgerwood et al., 2013).

In this background, the existing literature to evaluate MFI's performance is fragmented into two categories. First, studies based on the evaluation of the significance and influence of microfinance assistance on the level of poverty of clientele, such studies are termed demand side or impact studies of microfinance as conducted by (Maîtrot and Niño-Zarazúa,

2017; Churchil, 2014; Van Rooyen et al., 2012; Bauchet and Morduch, 2010; Duvendack et al., 2011). Second, studies based on the evaluation of the financial and social performance of MFIs, these studies have been known as the supply side of microfinance. Studies in this field focus on both internal and external factors, including internal microfinance institution features (for example amount of total assets for size, number of years from commencement for age, and nature of organization), financial support resources, organizational governance features, profitability, and regularity standing together with external determinants such as cultural, traditional and spiritual diversity (Drake and Rhyne, 2002; Hartarska 2005; Hartarska and Nadolnyak, 2007; Churchill, 2017).

Furthermore, this second stream of the study describes the level of success of MFIs with external factors, such as GDP, unemployment, inflation, and percentage of domestic credit to know at what extent the performance of macroeconomic factors affects the MFI performance. In addition, the institutional quality such as corruption, voice and accountability, regulatory quality, rule of law, political stability, and government effectiveness are often used in the study of microfinance institutions at the country-level domain (Churchill et al, 2018; Janda and Zetek, 2013; Imai et al., 2011; Ahlin et al., 2011; Gonzalez, 2007; Weiss and Hearther Montgomery, 2005; Tucker & Miles, 2004; Patten & Johnston, 2001).

Microfinance institutions often face high operating costs, including administrative expenses, staff salaries, and loan loss provisions. These high costs can limit the ability of microfinance institutions to reach low-income individuals and communities and provide affordable financial services. Previous studies have shown that high operating costs can limit the sustainability of microfinance institutions and reduce their ability to provide affordable financial services to low-income individuals and communities (Armendariz & Morduch, 2010). The upholding of financial soundness without the help of donors with sizeable outreach is a big challenge for this sector. Evidence shows that ICT or digitalization has a noteworthy impact in cutting operational expenses, enhancing the marketing of microfinance products, expanding outreach and overall filling the lacunae of financial inclusion (Das and Laha, 2021; Yadav et al., 2022).

Despite the extreme need and widespread popularity of Islamic microfinance institutions (IMFIs), this sector is lagging behind conventional microfinance institutions (MFIs) across the world. There is a lack of theoretical understanding and empirical research on Islamic microfinance, particularly in terms of its principles, practices, and impact on low-income communities. This gap in knowledge limits the ability to develop effective policies and initiatives to support the growth and development of the sector.

Islamic microfinance, which focuses on providing financial services to low-income individuals and communities under the principles of Islamic finance, has been identified as a promising area for digitalization. The integration of technology in the Islamic finance sector has brought about innovative solutions that cater to the needs of the unbanked and

underbanked population. Despite the growth of Islamic finance and microfinance in recent years, the adoption of digitalization in the Islamic microfinance sector has been slow. This has resulted in limited access to financial services for many low-income individuals and communities, especially in rural areas. Furthermore, there is a lack of research that specifically addresses the digitalization of Islamic microfinance and its impact on the accessibility and sustainability of financial services. The use of digital technology in the Islamic finance sector is guided by the principles of Maqasid Al-Shariah, which seeks to promote the common good and prevent harm. This includes ensuring the availability of financial services to all, regardless of their income level or location. Digitalization can play a crucial role in facilitating access to financial services for low-income individuals and communities, as well as in promoting financial inclusion and stability. In addition to macroeconomic and macro-institutional factors, digitalization provides facilities with a stronger social as well as financial purpose. Digitalization can influence MFI's performance by reducing costs and improving its financial performance .

The objective of this study to evaluates the performance Islamic microfinance institutions of OIC member countries, where, majority of the population are Muslim and is critically inclined to Islamic microfinance products. Furthermore, despite these countries being Islamic sovereign, they are distinguished in their economic and political conditions and mostly rest at low levels of income with abject poverty. In this connection, the study evaluates the performance of Islamic microfinance institutions on the following important basis. First, high demand for Islamic microfinance products in these regions, second, a large number of poor people are lived in OIC members countries with an inclination towards Islamic principle-based products and third most of the residents in these countries use mobile phones as compared to the other part of the world, so digitalization may play an important role in achieving MFIs objectives. Furthermore, the results of this research may enhance the understanding of impact of macroeconomic environment and digitalization on the performance of Islamic microfinance in OIC countries The study will contribute the Islamic microfinance institution in policy making in macroeconomics environment.

2. Literature Review

2.1 Underpinning Theory

This study is based on two separate but interconnected theories to measure the performance of microfinance institutions. The opening underpinning theory is about the market failure theory, a concept that was developed in the 20th century, supported and contributed by many prominent macroeconomists and welfarist of Keynesian schools of thought, named, Arthur C. Pigou, Francis Bator, William Baumol, and Paul A. Samuelson. In unsophisticated words: market failure is the failure of a system or market to reach the optimal level of allocative efficiency. This market failure of allocative inefficiency is constituted by six main types, presented in many studies, namely, non-competitive markets,

externalities, public goods, asymmetric or uncertain information, incomplete or missing markets, and macroeconomic business cycles. But for this study point of view, the incomplete or missing markets hypothesis of market failure is most suitable for the study under consideration.

As affirmed by (Hermes & Lensink, 2007) that most poor people can establish their businesses for their livelihood but remain stopped from official financial services because of a deficiency of adequate surety and collaterals and thus, have no access to credit. In addition, these poor people are less attracted to the formal financial system because of the high cost attached to providing loan (Perera, 2010). Thus, these deprived people, to overcome financial constraints, turn to the informal sector such as moneylenders, and bear a high rate of interest for borrowing loans (Barr, 2004). That is why, this market failure created by the formal banking system, provides a ground where microfinance institutions perform their services to meet social and financial objectives by offering a different form of financial facilities to unbanked, deprived people (Vanroose & D'Espallier, 2009).

The second theory is known as the microfinance performance theory mostly followed in the assessment of performance in business organizations. This theory proposes that in order to know how much the microfinance institution is successful or failed in achieving their dual objectives, their performance must be scrutinized on some key indicators. These indicators are divided into two main groups concerning social and financial performance. Many authors define performance from a different perspective such as social performance or donation to a charity (Vanroose & D'Espallier, 2009), but (Vanroose, 2008) define it as company profit. The principal intention of all these studies is to enhance the performance of the organization by using different scope of evaluation.

In the line with this, microfinance success or failure is not experienced evenly across the world. Many economies and localities have sustainable microfinance institutions and big market shares whereas others are unsuccessful to meet operating expenses (Vanroose, 2008; Honohan, 2005). Also, some MFIs have reached and served a large number of clients while others served at a small scale and were unable to maintain their survival and shut down (Sainz-Fernandez et al., 2015). Several studies including (Vanroose, 2008) found that many factors are considered the major attributes of the success or failure of MFIs. Therefore, this study discusses the related studies concerning the impact of macroeconomics and macro-institutional factors and digitalization on the social and financial performance of microfinance institutions.

2.2 Inflation and Microfinance Performance

Inflation is defined as the continuous increase in the price of goods and services in the market during a period. Theoretically, inflation hinders the MFI lending mission. Unanticipated inflation lowers real rates of return for an MFI and increases the number of payments due to interest rates. Similarly, inflation also affects an MFI's expense to funds, the lender's incentives for the delay, and the rate of defaults. Scholars like Akerlof et al., (1996) and Rondan & Chavez (2004), Forkusam (2017) and Dholakia (2020) analyze the

effect of inflation in the same manner and explain that a low level of inflation increases the cost of investment and leads to the reallocation of resources. Because, high inflation rates aggravate the resistance on financial markets, by reducing the real yields to savings. Furthermore, restricts investment levels, lowering investment efficiency and hence lessening economic growth. Inflation has a consistently, significantly negative relationship with MFI performance (whether social or financial performance), the results are parallel to the formal banking sector as found by (Boyd et al., 2001). Huybens & Smith (1998) conducted the study, and the results posit that the fall in the inflation rates reduced microfinance institutions' revenues, reduced profitability, and then lead to MFI's bankruptcy. These studies examine that inflation hinders in the performance of microfinance institutions

Scholars including Hartarska & Nadolnyak (2007), Bibi et al., (2018) estimates the double-bottom performances of MIF with macroeconomics variable together with country-level regulatory factors by using data from 114 MFIs from 62 countries The study uses operation self-sufficiency to investigate the financial performance. The author found that the inflation coefficient has a positive and significant impact and justifies the estimation on the ground that during inflationary pressure, MFIs develop certain sufficient safeguards to overcome this pressure. The study results are supported by the study of (Demirguc-Kunt & Huizinga, 1999). However, Assefa et al. (2013) and (Hallett & Richter, 2003) found that there is no significant effect of inflation on all measures of outreach, however, a significant negative relationship between loan loss rate and positive relation with MFIs yields. Kar et al. (2014) results show that inflation has a significantly negative relationship with average loan size (depth of outreach) and is insignificant with the number of female borrowers (Breadth of outreach). However, financial performance, measured by FSS and ROA, inflation correlation is significantly positive.

Ben Salem and Ben Abdelkader (2023) investigate the impact of income and geographic diversification on the double bottom line of microfinance institutions (MFIs) in Middle East and North Africa (MENA) countries where conventional and Islamic MFIs coexist. They want to know if diversification affects MFIs' financial performance and outreach differently for Islamic microfinance. According to the findings, Islamic MFIs profit from income diversification by improving their financial performance. The findings indicate a nonlinear relationship between income diversification and MFI financial success. Although traditional MFIs increase the depth of their outreach by diversifying their income, Islamic MFIs have a smaller breadth of outreach due to a greater degree of income diversification. The findings of the above studies are not even and in the perspective of IMFIs is very scare.

2.3 Private Credit to GDP and Microfinance Performance

The private credit to GDP is the ratio of domestic private credit to the GDP of a country. It is arguably the most common measure of financial development in the finance and growth literature, and it is used as a proxy of the overall financial depth of the country in which

the financial institutions operate. Private credit as a percentage of GDP is recognized as the main function of banks and MFIs because it signifies an important financial service provided in developing countries. Thus, a higher level of private credit to GDP shows a high level of financial inclusion. The arguments to maintain the relationship between financial sector development, measured by domestic private to GDP, and the performance of microfinance institutions are based on two theoretical concepts. According to the first concept, microfinance performance and financial development are substitutes for each other. This narrative is supported by market failure theory in which the formal sector is not able to solve the problem of the poor people and therefore allocation of resources is not at the optimal level, which means at the Pareto optimal level. Moreover, the need of microfinance innovations such as group lending in contract, etc., are required to solve the lending constraint to benefit deprived people and reaches more clients, which are believed very risky by banks (Hallett & Richter, 2003; Demirguc-Kunt, 2008; Holmstrom & Tirole, 1997; Armendariz de Aghion & Morduch, 2000; Hassan et al., 2011). The second concept supports the spillover effect of financial development on microfinance performance and therefore, exists a complementary relationship between them. In this situation, MFI funds will be resourced and reinforced from the formal banking system, and hence MFI can provide loans to deprived people (Isem & Porteous, 2005; Ferdousi, 2013). This aforesaid foundation was tested empirically by some scholars, like, Vanroose (2008) and Ahlin and Lin (2006) find that domestic credit has a negative relationship with both measures of microfinance performance. However, Imai et al. (2011) claim that macroeconomic and financial factors development measured by GDP per capita, and share of domestic credit to GDP respectively, have positive influences on profitability, operating expense, and portfolio quality of MFIs. The researcher has found a substantial relationship between financial sector development and microfinance performance. However, the nature of the relationship is unclear with respect to prior and needs further research with a new instrument and methodology to clarify this uncertainty. On this basis of above studies, this study develop hypothesis in relation with macroeconomics environment.

- H_1: Macroeconomic variables have a significant impact on the social and financial performance of MFIs.

2.4 Macro-Institutional Quality and Microfinance Performance

The quality of the country-level institution environment where microfinance institutions exist is a matter of evaluation (Chikalipah, 2017). A weak quality of the institutional environment, such as lack of customer protection, weak rule of law, corruption in government bureaucracy, an abundance of loan borrowing and loan delinquencies, enormous procedural administration difficulties, fraudulent crime, etc. altogether create an unfavorable business environment for the growth and performance of microfinance industry (Barry & Tacneng, 2014; Schicks 2013; Ayittey 2012; Giné & Karlan, 2014; Quintin, 2008). Fisman & Svensson (2007) it is imperative to see how both macroeconomic and country-level institutional factors impact the performance of microfinance. Therefore,

he suggests the notion that higher corruption hinders the process of growth of small and medium-sized enterprises throughout the world. Ahlin and Lin (2006) and Fisman & Svensson (2007) on the other hand, opine that corruption may affect lower wages and push more households towards self-employment, and may lead to fostering MFIs borrowers' growth. So, they suggested that an environment, characterized by high institutional quality is not conducive to microfinance institutions. However, Imai et al., 2011 results show that countries with better institutional quality such as control of corruption, rule of law, and political stability significantly promote efficiency and MFI leverage. Similarly, the measure of stability, accountability and government effectiveness all are significantly associated with the higher operating cost and interest rate components of self-sufficiency set off each other (Ahlin et al., 2011). Therefore, this study tries to find the relationship under the hypothesis.

- H_2: Macro-institutional variables have a significant impact on the social and financial performance of MFIs.

2.5 Digitalization and Microfinance Performance

MFI needs to decrease the cost of operation, expand outreach potential, improving transparency and efficiency. The pragmatic and feasible solution to achieving these objectives is the adaptation of innovative methods such as digitalization in their operation (Labie & Mersland, 2011). Mobile technology benefits MFIs and borrowers. In their survey-based study, Mora et al. (2018) note that digital solutions have helped MFIs in several business procedures. Digital technologies helped financial institutions improve their service delivery and reduce costs (Ivatury, 2009; Lee et al., 2011). Operating costs are a significant factor in the microfinance sector when determining an MFI's lending rate (Dorfleitner et al., 2013). Furthermore, the findings of Dorfleitner & Braun (2019) show that there is an inverse correlation between the adoption of mobile financial services and operational expenditures. In the empirical works of (Dorfleitner & Braun, 2019), the MFI's supply of mobile financial services is favorably correlated with social performance as shown by average loan size. This shows that social missions and digitization may work together. Furthermore, existing studies emphasize the beneficial connection between the use of digital technologies and the administrative skills of financial organizations (Moro Visconti & Quirici, 2014; Pytkowska & Korynski, 2017). Therefore, including digital solutions in the company model appears to be a potential approach to handle the challenges associated with costs, which therefore permits a better degree of profitability in addition to reduced interest rates.

- H_3: Digitalization has a significant impact on the social and financial performance of MFIs.

3. Research Methodology

MFI's performance depends on how well the two objectives are being achieved in terms of social objective and financial objectives. Thus, social objective refers to the inclusion of those people who were excluded in financial access to the formal banking system. While financial objective refers to the sustainability of microfinance institutions in providing financial services. Therefore, these objectives are vital for the success of MFIs (Vishwakarma, 2015).

3.1 Conceptual Framework

With the help of the above theoretical foundation, this study built the following conceptual frameworks.

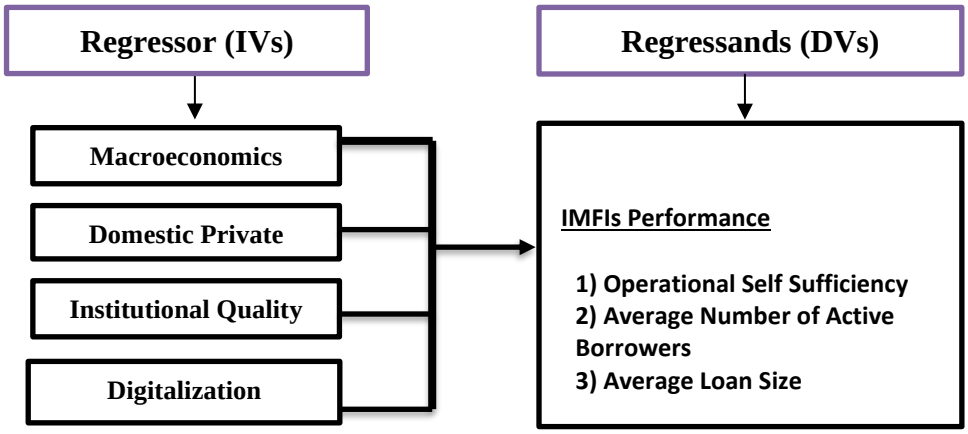

Figure 1: Conceptual Framework

3.2 Model Specification

The objective of the study is to look at how macroeconomic, macro-institutional factors and digitalization affect the performance of Islamic and conventional microfinance institutions. Based on the work of Ahlin et al., (2011) and Churchill et al. (2018) the study uses the pooled OLS method for baseline estimation and two-step system GMM to overcome the problem of endogeneity associated with the OLS method.

$$PERFORMANCEIT = \beta_0 + \beta_1 MACROECONOMIC + \beta_2 MACROINSTITUTIONAL + \beta_3 DIGITALIZATION + \beta_4 SIZE + \varepsilon it$$

Where PERFORMANCE shows the social and financial performance of Islamic and conventional microfinance institutes in OIC member countries. Furthermore, social performance is measured by the average number of active borrowers and average gross loan size. While the financial performance is measured by operational self-sufficiency and loan loss rate. MACROECONOMIC is a set of explanatory variables that includes some dimensions of macroeconomic indicators, MACROINSTITUTIONAL is a set of

explanatory variables including six country-level institutional quality indicators, DIGITALIZATION shows the number of mobile phone users and SIZE is the institutional-specific controllable variable measured by log value of total assets of each microfinance institution.

3.2.1 Description of Variables

This study focuses on two dimensions of MFI performance: financial sustainability-or profitability and outreach. The data of these dependent variables derive from MIX Market (2020). Financial sustainability is measured by operational self-sufficiency and is calculated as the total financial revenue divided by financial expense plus net loan loss expense plus operating expense. Whereas outreach is measured as 1) the number of borrowers or the number of active borrowers to measure the breadth of outreach. 2)Average gross loan size measures the outreach depth calculated as the ratio of AGLS to the number of active borrowers. Macroeconomic variables consist, of inflation and domestic private credit to GDP. The macro-institutional variable consists of two dimensions from WGI developed six dimensions to measure external governance scoring from -2.5 to +2.5, a higher positive value shows better external governance.

3.2.2 Sources of Data

The study obtained a final and balanced panel sampling that had 420 observations from MIX Market (2020). These observations represented 35 Islamic microfinance institutions annually for the period from 2008 to 2019.

4. Estimation of Results

For empirical analysis, the study uses Pooled OLS and a two-step system GMM for robustness to investigate the impacts of macroeconomic, macro-institution quality, and digitalization on the performance of Islamic microfinance institutions in OIC member countries. Furthermore, statistical assessments with a theoretical and conceptual discussion of the results are adopted to answer the research hypothesis. In addition to the empirical outcomes, the study incorporated the descriptive statistics of the variables used in the study as well as a diagnostic test for best-fit models.

Table 1: Descriptive Statistics

Variable	Description	Obs	Mean	Std. Dev.	Min	Max
Company	Islamic Microfinance Institutions in OIC countries	420	18	10.112	1	35
OSS	Financial Revenue / (Financial expense + Loan loss provision expense + Operating expense)	420	115.962	70.027	-198.907	434.43
CPI	Consumer Price Inflation	420	138.578	110.308	77.91	1344.19
DCPS	Domestic Credit to Private Sector (% GDP)	420	25.144	21.078	2.682	109.71
GE	Index: Government Efficiency (−2.5 to 2.5; WGI)	420	-0.807	0.55	-2.279	0.236
RoL	Index: Rule of Law (−2.5 to 2.5; WGI)	420	-0.871	0.561	-2.092	0.464
ITU	Number of Mobile users in 1000 individuals.	420	28.575	24.944	1	100.17
Log TA	Log (Total Assets)	420	16.121	1.879	10.774	19.733
LogANAB	Log (in year-end Number of Active Borrowers)	420	9.5	1.806	4.956	13.784
LogAGLS	Log (Average gross loan portfolio / Average number of active borrowers	420	6.28	1.116	3.765	8.862

Note: AGLS = Average Gross Loan Size; ANAB = Average Number of Active Borrowers; OSS (%) = Operational Self-Sufficiency (%); LTA = Log Value of Total Assets; CPI = Consumer Price Index; DCPS= Rate of Domestic Credit to Private; GE = Government Efficiency (Index); RoL = Rule of Law; ITU = Number of Mobile users out of hundred Individual

The consumer price index (CPI) is a measure of a country's inflation, ranging from a minimum of 77.91 to a maximum of 1344.19 with a mean of 138.57 and a standard deviation of 110.30. The domestic credit to the private sector (DCPS) has a mean value of 25.143 % of GDP and its standard deviation is 21.07 % for all the countries. The maximum value of DCPS of 109.71 % and the minimum value of 2.682%. The government efficiency (GE) has a mean value of -0.81 points and its standard deviation is 0.55 points for all the countries. The maximum value of GE 0.24 points is reported whereas, the minimum value is -2.27 points. The value of rules of law (RoL) ranges from a minimum of -2.092 points to a maximum of 0.464 points with a mean of -0.871 and a standard deviation of 0.561. The internet user per hundred people (ITU) has a mean value of 28.57 per person for all the samples and its standard deviation is 24.94. The maximum value of the internet is 100 users while the minimum value of 1 user per hundred people. The log value of total assets (TA) ranges from a minimum of 10.774 to a maximum of 19.733 with a mean of 16.121 million and a standard deviation of 1.879. The log value of the number of active borrowers (ANAB) has a mean value is 9.5 and a standard deviation is 1.806. The maximum value is

13.784, however, the minimum value is 4.956. The log average gross loan size (LAGLS) has a mean value of 6.28 its standard deviation is 1.116. The maximum value of the LAGLS of 8.862 while, the minimum value of 3.765 million.

Table 2: Matrix of Correlations and Variance Inflationary Factor

Variables	VIF	CPI	DCPS	GE	RoL	ITU	LTA
CPI	1.163	1					
DCPS	2.321	-0.148	1				
GE	6.491	-0.281	0.674	1			
RoL	6.169	-0.139	0.684	0.883	1		
ITU	1.55	-0.007	0.456	0.211	0.396	1	
LTA	1.078	0.104	0.127	-0.048	0.041	0.178	1

Note: CPI = Consumer Price Index; DCPS= Rate of Domestic Credit to Private Sectors (%); GE = Government Efficiency (Index); RoL = Rule of Law; ITU = Number of Mobile users out of hundred Individual; LTA = Log Value of Total Assets

The table 2 shows that each explained variable follows the benchmark of less than 0.8% correlation as well as all VIF values are within the threshold level of 10.

Table 3: Estimation of Results - Pooled OLS

LAGLS			LANAB			OSS		
	Coef.	p-value		Coef.	p-value		Coef.	p-value
CPI	-0.001	0.025	CPI	0.001	0.008	CPI	0.102	0.002
DCPS	-0.015	0.000	DCPS	0.018	0.000	DCPS	0.326	0.172
GE	0.262	0.185	GE	-0.129	0.543	GE	49.066	0.001
RoL	0.054	0.774	RoL	-0.034	0.865	RoL	-61.831	0.000
ITU	0.027	0.000	ITU	-0.027	0.000	ITU	0.32	0.054
LTA	0.152	0.000	LTA	0.791	0.000	LTA	4.376	0.017
Constant	3.844	0.000	Constant	-3.23	0.000	Constant	0.148	0.996
R-squared	0.397	418	R-squared	0.737	418	R-squared	0.073	418
F-test	45.06	0.000	F-test	191.748	0.000	F-test	5.423	0.000
*** $p<.01$, ** $p<.05$, * $p<.1$								

Note: CPI = Consumer Price Index; DCPS= Rate of Domestic Credit to Private Sectors (%); GE = Government Efficiency (Index); RoL = Rule of Law; ITU = Number of Mobile users out of hundred Individual; LTA = Log Value of Total Assets

Table 3 shows the estimation results of three models which are used to answer the research hypothesis of the study. The coefficient of the CPI is negatively significant with LAGLS while positively significant with LANAB and OSS with mostly similar magnitude and degree of significance of the coefficient. The significant negative magnitude with LAGLS indicates high inflation hampers the outreach of microfinance institutions to the poorest of the poor. Loan size growth responds slower with higher inflation which predicts slower overall portfolio growth because lenders respond conservatively in inflation as a result of weak demand for MIFs products. This result is supported by Ahlin et al. (2011) as well as Kauffman & Riggins, (2012) conventions that inflation has a bad impact on the lending objective of MIFs for social performance. The result of LANAB indicates that as inflation increase the supply of microcredit also increase and the services of microfinance institution reach many poor applicants during high inflation. In the line with this statement, Vanroose & D'Espallier, (2009) advocate that MFIs are more lucrative and have higher outreach levels in countries that do not hurt by high inflation rates. In addition, Vishwakarman, (2015); Cull, Demirgüç-Kunt and Morduch, (2018) found that inflation was associated with a higher percentage of outreach. The significant positive magnitude of OSS indicates that in high inflation the revenue over cost increases as most of the unbanked people can get financial assistance from IMFIs during high as a lender of last resort. The coefficient of DCPS as a proxy of financial sector development shows a negatively significant correlation with LAGLS, positively significant with LANAB and insignificant with OSS. Studies related to financial sector development indicate both positive and negative impacts of financial sector development on the performance of microfinance institutions. The arguments to maintain the relationship between financial sector development, measured by domestic private to GDP, and the performance of microfinance institutions are based on two theoretical concepts. According to the first concept, microfinance performance and financial development are substitutes for each other. Though, the second concept supports the spillover effect of financial development on microfinance performance and therefore, exists a complementary relationship between them. Here, the result of this study supports both rivalry and the positive spillover effect of formal financial sector development as reported in the studies of (Hassan et al. 2011). The result of CPI and DCPS justify the first hypothesis that macroeconomic variables, the CPI and DCPS have a significant impact on both the social and financial performance of IMFIs. The coefficient of GE shows a positively significant correlation with OSS. The result poses boosting effect of GE on operational self-sufficiency. This result is justified by the finding of Imai et al. (2011) as a country with better institutional quality promotes efficiency and MFI leverage. The coefficient of RoL shows a negatively significant relationship with OSS. The negative magnitude indicates that a higher level of RoL by the government produce a negative impact on the operational performance of microfinance institution especially in Islamic institution this is due to the informal nature of the financial institution. It has been observed that microfinance institution is an informal organization by nature, therefore, increase in RoL hinders the way of doing operation of microfinance institutions. Ahlin et al. (2011)

derive an interesting conclusion from the estimation that control of corruption act as a barrier to MFI endeavors. The coefficient ITU shows a positively significant relationship with AGLS. The positive magnitude of the coefficient indicates that an increase in the use of digitalization increases the average gross loan size implying that the size of the loan reduces from a larger amount to a smaller amount which leads to greater penetration of loans in society. In addition, a greater number of poor people are benefitted from the smaller size of the loan and hence it helps in achieving the social objective of microfinance. This result supports the statement of the UNDP (2016) that financial inclusion is a sustainable provision that brings the poor into the formal economy with the help of affordable financial services and also with Kipesha & Zhang. (2013) that with the help of digital finance small size of the loan is provided to the excluded and underserved population. However, the coefficient is negatively significant with the average number of active borrowers, a measure of the outreach breadth of microfinance institutions. The result may be explained by the argument that Islamic microfinance customers are less aware of mobile services provided by institutions. Furthermore, there is an insignificant relationship between digitalization with OSS. The coefficient of LTA shows a positively significant relationship in all three models of the data sets. These results are consistent with Chandler (1962), Kipesha & Zhang. (2013) and Ahlin et al. (2011) that firm size has a significant impact on the performance of microfinance institutions pertinent to its efficiency, outreach, sustainability as well earning capacity of the institution.

Table 4: Estimation Results - System GMM

LAGLS			**LANAB**			**OSS**		
	Coef.	p-value		Coef.	p-value		Coef.	p-value
Lag AGLS	0.023	0.772	Lag ANAB	-0.04	0.063	Lag OSS	-0.199	0.238
CPI	0.003	0.799	CPI	-0.001	0.088	CPI	0.122	0.009
DCPS	-0.012	0.000	DCPS	0.014	0.000	DCPS	-0.224	0.668
GE	0.401	0.313	GE	-0.839	0.000	GE	30.942	0.61
RoL	-0.547	0.105	RoL	0.902	0.000	RoL	-12.849	0.851
ITU	0.036	0.000	ITU	-0.036	0.000	ITU	0.094	0.691
LTA	0.265	0.000	LTA	0.669	0.000	LTA	6.445	0.044
Sargan-test			**Sargan-test**			**Sargan-test**		
Chi2(360) = 11.2699	Prob > chi2 =1.0000		chi2(360) = 11.95656	Prob > chi2 = 1.0000		chi2(360) = 9.09888	Prob > chi2 = 1.0000	
Arellano-Bond-test			**Arellano-Bond-test**			**Arellano-Bond-test**		
	z	Prob		z	Prob		z	Prob
AR(1)	-3.049	0.002	AR(1)	-3.381	0.001	AR(1)	-1.705	0.088
AR(2)	-0.105	0.917	AR(2)	-1.561	0.118	AR(2)	0.076	0.939
Number of Obs.		406	Number of Obs		406	Number of obs		406
**** p<.01, ** p<.05, * p<.1*								

Note: CPI = Consumer Price Index; DCPS= Rate of Domestic Credit to Private Sectors (%); GE = Government Efficiency (Index); RoL = Rule of Law; ITU = Number of Mobile users out of hundred Individual; LTA = Log Value of Total Assets

Reverse causation is unlikely problem in this study because, intuitively, the success of performance MFI variables are unlikely to affect the country-level variables used in this study. As a result, reverse causation does not generate worries about endogeneity. However, if unobservable factors are correlated with dimensions of MFI performance and macroeconomic variables, endogeneity may be a problem. As a consequence, the study used generalized method of moments (GMM) approach to guarantee that our findings are robust to endogeneity. The technique is based on data heteroscedasticity and has been extensively used in the papers for robustness checks (Churchill et al., 2019; Emran & Shilpi, 2012; Mishra & Smyth, 2015). The study follows Arellano & Bond. (1991) and use the lagged levels of the explanatory factors as tools to handle endogeneity. We adopted the GMM-SYS and conducted regressions using the two-step estimator consistent with Arellano & Bond. (1991), Roodman (2006) based on reasoning pointing to the efficacy of system GMM (GMM-SYS) over first difference GMM (GMM-DIFF). Table 4 shows that the coefficient of the lag dependent variable is only negatively significant in LANAB

indicates this variable is also influenced with own previous values while the lag dependent variable of LAGLS and OSS is insignificant. CPI is negatively significant with LANAB, this result is otherwise as shown in Pooled OLS and insignificant with LAGLS and OSS. The coefficient of DCPS as a proxy of financial sector development shows similar correlation as in Pooled OLS. The coefficient of GE shows a negatively significant correlation with LANAB and insignificant with LAGLS and OSS. The coefficient RoL shows a positively significant correlation with LANAB and insignificant with LAGLS and OSS. These results of institutional quality are similar in direction with the Pooled OLS estimation together with some deviation in degree of significance. The coefficient ITU shows a similar result as comes out in Pooled OLS indicate the importance of digitalization in IMFIS activities. The coefficient of LTA shows a positively significant relationship in all three models of the data sets and is justified by previous estimation.

5. Conclusion

The results show that the coefficient of the consumer price index (CPI) is positively significant with average number of active borrowers, the increase in inflation does not impede the expansion of microfinance outreach because the need for the fund is more in high inflation in developing countries, and monetary return becomes lucrative to lending institutions. It is concluded that the rise in inflation is not hinder the expansion of outreach of microfinance institutions. That is why many microfinance institutions are found in developing economies. In addition, the results show that (DCPS) as a proxy of financial sector development is negatively significant with LAGLS and positively significant with LANAB in Islamic microfinance institutions. The result concludes that financial sector development helps reach microfinance services to the poorest of the community. Financial sector development creates a spillover effect on microfinance institutions, enhancing the breadth and depth of outreach and, therefore, the poor benefit from microfinance services. These macroeconomic factors justify the first hypothesis of the study.

The GE shows negatively significant relationship with the average number of active borrowers and positively significant with OSS. The coefficient of RoL has a significant positive association with an average number of active borrowers. From this external governance perspective, GE and RoL and promote the breadth of outreach and OSS, which means microfinance performance flourishes in good external governance.

For LAGLS, the results show that the coefficient of digitalization has a positively correlation with a measure of outreach of microfinance institutions. The results conclude that the magnitude and high significance level indicate the importance of digitalization for expanding microfinance services for poor and unbanked people of a country. Furthermore, the inclusion of digitalization in microfinance leads to help in the achievement of MDGs of the United Nations goals. However, with LANAB result shows a negatively significant relation. In relation OSS, the result shows that digitalization (ITU) has a positively

significant relationship with operational self-sufficiency which helps in reducing the cost of IMFIs of operation.

5.1. Policy Implication

The result concludes that the consumer price index (CPI) significantly positively impacts the average number of active borrowers of the data set's Islamic, conventional microfinance, and combined microfinance institutions. This implies that policymakers of both microfinance institutions can advertise products in their country to attract more borrowers for microfinance services. However, the consumer price index significantly negatively affects average gross loan size due to the decline in the customer's purchasing power. To overcome high inflation pressure, the policy maker of Islamic microfinance institutions should adopt the strict and conservative method of providing loans to borrowers to prevent the institution from bad debt provisions. The result of domestic credit to the private sector is significantly positive, with LANAB in Islamic microfinance. This result implies that with the development of the formal banking sector, the growth in conventional microfinance institution is also taken place, as both are supposed to be supportive of each other due to the spillover effect of the formal banking sector. In this line, the policymaker can receive additional funds from the banks. It is potentially insightful into the workings of microfinance to see how institutional outcomes affect an MFI's operation. The governance indicator such as GE positively affects OSS which implies that improvement in the efficiency the operational self-sufficiency of Islamic microfinance institutions. The result of RoL has a significant favorable effect on the average number of active borrowers, a measure of outreach breadth. Microfinance performances flourish where the country is embraced with political stability. Digitalization has a positively significant relationship with the with average gross loan size. These results omen a good sign for policy maker to promote financial performance to meet some of the millennium development goals (MDGs). It also controls or prevents the mission drift phenomenon from the social objective of the microfinance institutions as well. Furthermore, digitalization has a positive relationship with operational self-sufficiency indicate a healthy sign for operational activities.

5.2. Limitations and Future Research

This study covers 2008-2019 years of data and focusing on two dimensions of social performance, breadth, and depth of outreach, measured traditionally, such as the average number of active borrowers and average loan portfolio size. In addition to social performance, financial performance is measured by operational self-sufficiency for Islamic microfinance institutions in OIC member countries. Some other variables can be used instead of this study. But this limitation may provide a new dimension that may be used in the future to evaluate the performance of the Islamic microfinance institution more robustly. Focusing further on performing comparison studies, comparing the performances of IMFIs in various locations is another intriguing area for future research or countries with different income levels as prescribed by the World Bank. This enables comparisons

between the performance of IMFIs in regions with robust and effective microfinance sectors and those with underperforming microfinance sectors. Through these comparisons, poor performers of IMFIs may learn from successful IMFIs' experiences at both the IMFI and regional levels, as well as make conclusions about how to enhance and improve their performance by using some of the tactics used by successful IMFIs and regions. Future research on the determinant of saving mobilization may conducted on Islamic microfinance institution in order to enhance the stability of microfinance institution and reducing the dependencies on donation and charity. Finally, it is advised that rather than eradicating these IMFI types, future research should look into the possibility of a trade-off between MFI profitability and other outreach factors, such as the scope of outreach and cost to clients.

Research Funding

The authors received no research grant or funds for this research study.

REFERENCES

Ahlin, C., & Lin, J. (2006). *Luck or skill? MFI performance in macroeconomic context*. BREAD working paper No. 132, Bureau for Research and Economic Analysis of Development.

Ahlin, C., Lin, J., & Maio, M. (2011). Where does microfinance flourish? Microfinance institution performance in macroeconomic context. *Journal of Development economics*, *95*(2), 105-120.

Akerlof, G. A., Dickens, W. T., Perry, G. L., Gordon, R. J., & Mankiw, N. G. (1996). The macroeconomics of low inflation. *Brookings papers on economic activity*, *1996*(1), 1-76.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, *58*(2), 277-297.

Armendáriz de Aghion, B., & Morduch, J. (2000). Microfinance beyond group lending. *Economics of transition*, *8*(2), 401-420.

Armendáriz, B., & Morduch, J. (2010). *The economics of microfinance*. MIT press.

Assefa, E., Hermes, N., & Meesters, A. (2013). Competition and the performance of microfinance institutions. *Applied Financial Economics*, *23*(9), 767-782.

Ayittey, G. (2012). Promoting Economic Freedom in Africa. *Journal of Private Enterprise*, *27*(2), 1-18.

Baluku, W., Arthur, N., & Anthony, A. (2019). *The relationship between loan assessment and financial performance of SACCOs: Evidence from Uganda*. Faculty of Business,

Economics & Governance, Department of Public Administration and Governance, Bishop Stuart University Collection.

Barr, M. S. (2004). Microfinance and financial development. Law & Economics Working Papers, University of Michigan Law School, *2*71-296.

Barry, T. A., & Tacneng, R. (2014). The impact of governance and institutional quality on MFI outreach and financial performance in Sub-Saharan Africa. *World Development*, *58*, 1-20.

Bauchet, J., & Morduch, J. (2010). An introduction to impact evaluations with randomized designs. Financial Access Initiative Framing Note, 1-21.

Ben Salem, A., & Ben Abdelkader, I. (2023). Diversification and performance of microfinance institutions: does Islamic microfinance model matter? *International Journal of Islamic and Middle Eastern Finance and Management*, 16(5), 975-995.

Bibi, U., Balli, H. O., Matthews, C. D., & Tripe, D. W. (2018). New approaches to measure the social performance of microfinance institutions (MFIs). *International Review of Economics & Finance*, *53*, 88-97.

Boyd, J. H., Levine, R., & Smith, B. D. (2001). The impact of inflation on financial sector performance. *Journal of monetary Economics*, *47*(2), 221-248.

Chandler, A. D. (1962). Strategy and structure: Chapters in the history of the industrial empire. *MIT Press, Cambridge, MA*.

Chikalipah, S. (2017). Institutional environment and microfinance performance in Sub-Saharan Africa. *African Development Review*, *29*(1), 16-27.

Churchill, A.S., Korankye Danso, J., & Nyatefe, E. (2018). Microfinance institution performance: does the macroeconomy matter?. *Economic Papers: A journal of applied economics and policy*, *37*(4), 429-442.

Churchill, A.S., Appau, S., & Farrell, L. (2019). Religiosity, income and wellbeing in developing countries. *Empirical Economics*, *56*, 959-985.

Churchill, A.S. (2017). Microfinance and ethnic diversity. *Economic Record*, *93*(300), 112-141.

Churchill, A.S. (2014). Impact of microfinance interventions: a meta-analysis. Business and Economics, 4(1), 3-14.

Cull, R., Demirgüç-Kunt, A., & Morduch, J. (2018). The microfinance business model: Enduring subsidy and modest profit. *The World Bank Economic Review*, 32(2), 221-244.

Das, A. N., & Laha, A. (2021). Determinants of the sustainability of microfinance institutions: Delineating the role of digitization of micro finance services. In *The Digital Disruption of Financial Services* (pp. 75-92). Routledge.

Demirgüç-Kunt, A., & Huizinga, H. (1999). Determinants of commercial bank interest margins and profitability: some international evidence. *The World Bank Economic Review*, *13*(2), 379-408.

Demirguc-Kunt, A. (2008). *Finance, financial sector policies, and long-run growth*. Policy Research Working Paper 4469. The World Bank.

Dholakia, R. H. (2020). A Theory of Growth and Threshold Inflation with Estimates. *Journal of Quantitative Economics*, *18*, 471-493.

Dorfleitner, G., & Braun, D. (2019). Fintech, digitalization and blockchain: possible applications for green finance. *The rise of green finance in Europe: opportunities and challenges for issuers, investors and marketplaces*, 207-237.

Dorfleitner, G., Leidl, M., Priberny, C., & von Mosch, J. (2013). What determines microcredit interest rates?. *Applied Financial Economics*, *23*(20), 1579-1597.

Drake, D., & Rhyne, E. (2002). The commercialization of microfinance: Balancing business and development. Vol. 320. Bloomfield, CT: Kumarian Press.

Duvendack, M., Palmer-Jones, R., Copestake, J. G., Hooper, L., Loke, Y., & Rao, N. (2011). *What is the evidence of the impact of microfinance on the well-being of poor people?* EPPI-Centre, Social Science Research Unit, Institute of Education, University of London, London.

Emran, M. S., & Shilpi, F. (2012). The extent of the market and stages of agricultural specialization. *Canadian Journal of Economics/Revue canadienne d'économique*, *45*(3), 1125-1153.

Ferdousi, F. (2013). Determinants of performance of microfinance institutions: cross country analysis. *International Journal of Financial Economics*, *1*(4), 143-151.

Fisman, R., & Svensson, J. (2007). Are corruption and taxation really harmful to growth? Firm level evidence. *Journal of development economics*, *83*(1), 63-75.

Forkusam, A.N. (2017) Transnational microfinance and mission drift: evidence from Sub Saharan Africa. [Doctoral Dissertation], Universität Oldenburg.

Giné, X., & Karlan, D. S. (2014). Group versus individual liability: Short and long term evidence from Philippine microcredit lending groups. *Journal of development Economics*, *107*, 65-83.

Gonzalez, A. (2007). Resilience of microfinance institutions to national macroeconomic events: An econometric analysis of MFI asset quality. MIX Discussion Paper No. 1. Microfinance Information Exchange, Inc.

Hallett, A. H., & Richter, C. R. (2003). Learning and monetary policy in a spectral analysis representation. In *Computational intelligence in economics and finance* (pp. 420-435). Berlin, Heidelberg: Springer Berlin Heidelberg.

Hartarska, V., & Nadolnyak, D. (2007). Do regulated microfinance institutions achieve better sustainability and outreach? Cross-country evidence. *Applied economics*, *39*(10), 1207-1222.

Hartarska, V. (2005). Governance and performance of microfinance institutions in Central and Eastern Europe and the newly independent states. *World development, 33(10),* 1627-1643.

Hassan, M. K., Sanchez, B., & Yu, J. S. (2011). Financial development and economic growth: New evidence from panel data. *The Quarterly Review of economics and finance*, *51*(1), 88-104.

Hermes, N., & Lensink, R. (2007). Impact of microfinance: a critical survey. *Economic and political weekly*, 462-465.

Holmstrom, B., & Tirole, J. (1997). Financial intermediation, loanable funds, and the real sector. *the Quarterly Journal of economics*, *112*(3), 663-691.

Honohan, P. (2005). Measuring microfinance access: Building on existing cross-country data. World Bank Policy Research Working Paper 3606.

Huybens, E., & Smith, B. D. (1998). Financial market frictions, monetary policy, and capital accumulation in a small open economy. *Journal of economic theory*, *81*(2), 353-400.

Imai, K., Gaiha, R., Thapa, G., Annim, S. K., & Gupta, A. (2011). *Performance of microfinance institutions: A macroeconomic and institutional perspective*. School of Social Sciences, University of Manchester. Economics, Discussion Paper Series, EDP-1116.

ISEFE (2019). International Symposium on Economics, Finance and Econometrics (ISEFE), 2019.

Isem, J., & Porteous, D. (2005). Commercial banks and microfinance: Evolving models of success. Focus Note No. 28, Consultative Group to Assist the Poor (CGAP), Washington, DC

Ivatury, G. (2009). Using technology to build inclusive financial systems. In *New partnerships for innovation in microfinance* (pp. 140-164). Berlin, Heidelberg: Springer Berlin Heidelberg.

Janda, K., & Zetek, P. (2013). Opportunities in microfinance risk management. MPRA Paper No. 43960. Available at: https://mpra.ub.uni-muenchen.de/43960/

Kar, A. K., & Swain, R. B. (2014). Interest rates and financial performance of microfinance institutions: Recent global evidence. *The European Journal of Development Research*, *26*, 87-106.

Karim, N., Tarazi, M., & Reille, X. (2008). Islam micro finance: an emerging market niche. In Focus note. Consultative Group to Assist the Poor (CGAP). Washington, DC

Kauffman, R. J., & Riggins, F. J. (2012). Information and communication technology and the sustainability of microfinance. *Electronic Commerce Research and Applications*, *11*(5), 450-468.

Kereta, B. B. (2007). Outreach and financial performance analysis of microfinance institutions in Ethiopia. Paper presented in African Economic Conference, Addis Ababa. 15-17 November, 2007.

Kipesha, E. F., & Zhang, X. (2013). Sustainability, profitability and outreach tradeoffs: evidences from microfinance institutions in East Africa. *European Journal of Business and Management*, *5*(8), 136-148.

Labie, M., & Mersland, R. (2011). Corporate governance challenges in microfinance. *The handbook of microfinance*, 283-300.

Ledgerwood, J., Earne, J., & Nelson, C. (Eds.). (2013). The new microfinance handbook: A financial market system perspective. World Bank Publications.

Lee, Y. C., Chu, P. Y., & Tseng, H. L. (2011). Corporate performance of ICT-enabled business process re-engineering. *Industrial Management & Data Systems*, *111*(5), 735-754.

Maîtrot, M., & Niño-Zarazúa, M. (2017). Poverty and wellbeing impacts of microfinance: What do we know? WIDER Working Paper 190/2017. World Institute for Development Economics Research (WIDER).

Mishra, V., & Smyth, R. (2015). Estimating returns to schooling in urban China using conventional and heteroskedasticity-based instruments. *Economic modelling*, *47*, 166-173.

MIX Market. (2020). Data Bank - World Bank Group. Available at: https://databank.worldbank.org/source/mix-market

Mora, T., & Prior, F. (2018). The impact of mobile financial services' usage on microfinance delinquency. *Applied Economics*, *50*(50), 5354-5365.

Moro Visconti, R., & Quirici, M. (2014). The impact of innovation and technology on microfinance sustainable governance. *Corporate Ownership & Control*, *11*, 420-428.

UNDP. (2016). *The Sustainable Development Goals*. Available at: https://www.undp.org/sustainable-development-goals

Patten, R. H., & Johnston, D. E. (2001). Microfinance success amidst macroeconomic failure: The experience of Bank Rakyat Indonesia during the East Asian crisis. *World Development*, *29*(6), 1057-1069.

Perera, D. (2010). Commercial microfinance: A strategy to reach the poor?. *Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1537530* [unpublished paper].

Pytkowska, J., & Korynski, P. (2017). Digitalizing microfinance in Europe. *Microfinance Centre*, 1-12. Available at: https://www.european-microfinance.org/sites/default/files/document/file/Digitalization-research-paper.pdf

Quintin, E. (2008). Contract enforcement and the size of the informal economy. *Economic Theory*, *37*(3), 395-416.

Rondan, N. R. R., & Chavez, J. C. A. (2004). High inflation, volatility and total factor productivity. *Banco Central De Reserva Del Peru*, *5*, 1-18.

Roodman, D. (2006). How to Do xtabond2. In *North American Stata Users' Group Meetings 2006*, No. 8. Stata Users Group, 2006.

Sainz-Fernandez, I., Torre-Olmo, B., López-Gutiérrez, C., & Sanfilippo-Azofra, S. (2015). Crisis in microfinance institutions: Identifying problems. *Journal of International Development*, *27*(7), 1058-1073.

Schicks, J. (2013). The sacrifices of micro-borrowers in Ghana–A customer-protection perspective on measuring over-indebtedness. *The Journal of Development Studies*, *49*(9), 1238-1255.

Tucker, M., & Miles, G. (2004). Financial performance of microfinance institutions: a comparison to performance of regional commercial banks by geographic regions. *Journal of Microfinance/ESR Review*, *6*(1), 41-54.

Van Rooyen, C., Stewart, R., & De Wet, T. (2012). The impact of microfinance in sub-Saharan Africa: a systematic review of the evidence. World development, 40(11), 2249-2262.

Vanroose, A., & D'Espallier, B. (2009). Microfinance and financial sector development. *Centre Emile Bernheim (CEB). Research Institute in Management Sciences: CEB Working Paper*, *9*, 040.

Vanroose, A. (2008). What macro factors make microfinance institutions reach out?. *Savings and Development*, 32(3), 153-174.

Vishwakarma, R. (2015). Effect of governance on the performance of selected Indian microfinance institutions: An empirical study. *European Journal of Business and Management*, *7*(4), 172-179.

Weiss, J., & Montgomery, H. (2005). Great expectations: microfinance and poverty reduction in Asia and Latin America. *Oxford Development Studies*, *33*(3-4), 391-416.

World Bank (2017) *Doing business 2017: Equal Opportunity for all*. The World Bank. https://doi.org/10.1596/978-1-4648-0948-4

Yadav, A., Kanojia, V., & Jain, M. (2022). Financial Inclusion Through Microfinance: Is It Possible?. In *Microfinance to Combat Global Recession and Social Exclusion: An Empirical Investigation* (pp. 161-175). Singapore: Springer Nature Singapore.