

Environmental Sustainability in the Microfinance Sector in Pakistan: Challenges and Opportunities

Muhammad Mubashir¹, Muhammad Meraj², Maria Ijaz³,
Khurram Shahnawaz⁴ and Marium Asif⁵

<https://doi.org/10.62345/jads.2025.14.1.69>

Abstract

Integrating environmental sustainability into the microfinance sector is crucial to fostering long-term economic and ecological balance. Usually, microfinance institutions (MFIs) are focused mainly on social and financial performance for poverty alleviation, financial inclusion, and socioeconomic development from the grassroots level. This study investigates the relationship between social, financial, and environmental performance in microfinance institutions (MFIs) in Pakistan, emphasizing the role of financial and social performance in driving environmental sustainability. Panel data from 39 MFIs from 2018-2020 was analyzed using a Panel Fixed Effect (PFE) model. The results reveal that social performance, measured by the number of active borrowers and the gross loan portfolio, positively and significantly impacts environmental performance. Precisely, the number of active borrowers showed a positive coefficient of 4.72E-05 (p-value: 0.0568), and the gross loan portfolio (GLP) exhibited a significant positive relationship with environmental performance with a coefficient of 1.42E-06 (p-value: 0.0049). Financial performance indicators, including operational self-sufficiency (OSS), return on assets (ROA), and return on equity (ROE), also positively impacted environmental performance. OSS showed a coefficient of 32.03 (p-value: 0.0001), ROA had a coefficient of 77.93 (p-value: 0.0008), and ROE showed a coefficient of 11.40 (p-value: 0.0091), all statistically significant. These findings suggest that MFIs with higher social and financial performance are more likely to adopt environmentally friendly policies. However, the institution's age was found to have no significant effect on environmental performance. Overall, the results highlight the importance of social and financial performance in promoting environmental sustainability, although achieving a fully balanced triple bottom line remains an ongoing challenge.

Keywords: Environmental Sustainability, Microfinance, Pakistan, Social Performance.

Introduction

In the modern era of technological boom, the concept of economic or human development is incomplete without the inclusion of masses or poor people. The goal of poverty alleviation without the inclusion of poor will only be a myth. That is why, the microfinance has long been recognized as an essential tool for economic development especially in underprivileged and devastating communities (Yunus, 2003). The mainstream financial institutions usually exclude low-income people due to stringent collateral requirements and bureaucratic hurdles (Hermes

¹Alumni, SOAS University of London. Corresponding Author Email: 714272@alumni.soas.ac.uk

²Associate Professor, Alumni, Ritsumeikan Asia Pacific University, Japan: mairu22@hotmail.com

³Research Scholar, Applied Economics Research Centre, Karachi University. Email: mariyaijaz27@gmail.com

⁴Assistant Professor, Federal Urdu University of Arts Science and Technology, Karachi, Pakistan.
Email: khurram.shahnawaz@fuuast.edu.pk

⁵Content Editor, KarMuqabla.com, Karachi, Pakistan. Email: mariumasif28@gmail.com



& Lensink, 2007). The noble laureate Professor Muhammad Yunus in the 1970s provided the idea of development through microfinance through Grameen Bank Model. It demonstrated that small, accessible loans could transform impoverished communities by fostering entrepreneurship and self-reliance (Yunus & Jolis, 2003). This model has since been adopted worldwide and became a cornerstone in financial inclusion strategies (Cull et al., 2009). The role of microfinance is not just to provide small loans and financial services, it also serves as a mechanism for social uplifting (Banerjee & Duflo, 2011). The bull's eye focus on marginalized communities especially women, rural populations, and active poor, increases the MFIs contribution in socioeconomic development, financial stability, and poverty reduction (Morduch, 1999; Awan et al., 2021). A large cache of microfinance clients are women, and empirical evidence suggests that access to financial services enhances their economic participation and decision-making power (Pitt et al., 2006). Also, microfinance facilitates the establishment of microenterprises, generating employment opportunities, and fostering sustainable livelihoods (Khandker, 2005). A prime objective of financial sustainability of MFIs, it is essential to strike a balance between profitability and social objectives (Rhyne, 2001). MFIs are unique in their methodology as they extend small, collateral-free loans to high-risk borrowers (Gonzalez, 2010). While financial self-sufficiency is critical, there exists an inherent tension between profit-driven motives and the social mission of microfinance (Battilana & Dorado, 2010). Excessive commercialization may lead to the exploitation of vulnerable borrowers through high interest rates, while an overemphasis on social goals may compromise financial stability (Hudon & Sandberg, 2013). This paradox underscores the need for a balanced approach that harmonizes financial viability with social impact. The interplay between microfinance and environmental sustainability is gaining cognition as a viable strategy for sustainable development (Forcella & Hudon, 2016). The adverse effects of climate change, including resource depletion, extreme weather events, and environmental degradation, disproportionately affect low-income communities (IPCC, 2018). The growing concerns of environmental considerations into their operational frameworks, MFIs play a pivotal role in promoting ecological sustainability (Allet, 2013). The emergence of Green microfinance initiatives encompasses financial support for renewable energy projects, sustainable agriculture, and environmentally friendly business ventures (Paulet et al., 2015). The broader goal of environmental conservation can be achieved through MFIs by facilitating access to eco-friendly technologies and encouraging sustainable practices (Scholtens, 2006).

The microfinance sector in Pakistan has witnessed significant growth since its inception in the 1980s, with various community welfare programs laying the foundation for financial inclusion (Zulfiqar, 2017). The government's initiatives for the inclusion of poor people in growth-driven strategies have further strengthened the sector, enabling both banking and non-banking microfinance institutions to operate within a structured framework (State Bank of Pakistan, 2020). Nevertheless, many challenges are still unaddressed and needs to be resolved such as high operational costs, regulatory compliance burdens, and the need for enhanced financial transparency (Bibi, 2015). A delicate balance is required for the microfinance institutions to remain both financially viable and socially responsible (Gohar & Batool, 2015; ul Mustafa, Abro, & Awan, 2021). The beginning of Green microfinance in Pakistan presents both challenges and opportunities (Forcella, 2013). There is a huge potential for MFIs to contribute in environmental sustainability but significant gaps remain in terms of policy implementation, financial incentives, and institutional capacity (Hall et al., 2016). The dilemma of achieving triple bottom line objectives reflects a broader philosophical discourse on the reconciliation of economic development with ecological preservation (Bansal & DesJardine, 2014).

Philosophically speaking, the concept of sustainable development embodies an ethical commitment to intergenerational equity i.e. the responsibility to meet present needs without compromising the well-being of future generations (Brundtland, 1987). From the

environmental ethics point of view, the goals of microfinance must be aligned with ecological ethics, which advocate for responsible stewardship of natural resources (Norton, 2005). Therefore, the pursuit of green financial practices is not merely an economic strategy but also a moral imperative (Goodpaster, 1991). In order to make business entities more responsible towards environmental sustainability, the emphasis must be on corporate social responsibility (Carroll & Shabana, 2010). A deeper philosophical reflection on the role of microfinance institutions in shaping sustainable societies invites consideration of alternative economic paradigms (Sen, 1999). The profit maximization is the key element in capitalist societies but often at the expense of social and environmental degradation (Freeman, 2010). However, emerging models such as stakeholder capitalism advocate for a more inclusive approach, wherein financial institutions serve not only shareholders but also broader societal and ecological interests (Donaldson & Preston, 1995; Crane et al., 2014). To address the issues discussed above, this study elaborates the following research questions and aligned with research hypotheses:

Research Questions

1. How does financial performance influence the environmental sustainability initiatives of microfinance institutions in Pakistan?
2. What is the relationship between social performance and environmental engagement among Pakistani MFIs?
3. To what extent do regulatory frameworks impact the adoption of green microfinance practices in Pakistan?

Research Hypotheses

- *Ho1*: Financially stable microfinance institutions are more likely to adopt environmentally sustainable practices.
- *Ho2*: Socially responsible microfinance institutions are positively associated with greater environmental sustainability efforts.
- *Ho3*: Regulatory policies significantly influence the implementation of green microfinance initiatives in Pakistan.

Significance of the Study

This timely study is quite important in a way that it provides a benchmark for the enhancement of green microfinance to achieve three important goals of the Sustainable Development Goals (SDGs), provided by United Nations program (UNDP) i.e. SDG-goal-1 (No Poverty), SDG-goal-12 (Responsible Consumption and Production), and SDG-goal-13 (Climate Action). These goals provide a framework for development agendas for the developing and developed nations (Rashid et al, 2018; Weber, 2017). The Green microfinance (formally adopted in 2010) is practiced in two different ways in-house eco-friendly microfinance activities and for financial provision to businesses. In house activities include maintaining clean and healthy hygienic atmosphere, plantation and reforestation, eco-friendly buildings, generation of energy through solar and wind power and installing solar panels on roofs of the buildings and houses, use of hybrid automobiles, use of internet connectivity for communication rather than physical meetings to avoid pollution, solid waste management, and minimizing sound pollution. Investment on biogas plants is highly encouraged, energy production through renewable sources like plants, plastic waste, wind also gaining popularity (Julia et al, 2018). The Green Microfinance Institutions (GMFIs) promotes bright measures to save the environment and commences reforestation, solar energy plants, green buildings, and adoption of renewable sources (Shahidullah & Haque, 2015). Main initiative behind green microfinance institutions is the protection of atmosphere before issuing finances to any project. GMFIs deeply examine

the nature of the project whether it is eco-friendly or not? before providing grant or funding. If the project fulfills all the requirements of the environmental protection standards, the finances will be issued to the company (Forcella & Hudon, 2016).

This paper is organized in a way that section 2 presents literature review, section 3 describes methodology, section 4 exhibits empirical findings, and section 5 presents the conclusions.

Literature Review

Microfinance plays a critical role in both developing and developed nations by providing financial services to low-income communities, promoting financial inclusion, and contributing to economic and social development (Ahmed & Khan, 2016; Roy & Mohanty, 2020). Microfinance institutions (MFIs) aim to uplift the economic and social well-being of underserved populations by offering services such as savings, credit, insurance, and money transfers. Recent trends highlight a shift towards integrating environmental sustainability into financial inclusion efforts. Green microfinance has emerged as means to support sustainable economic activities by financing environmentally friendly businesses, promoting clean energy solutions, and mitigating ecological degradation (Allet & Hudon, 2013; Hye et al., 2010). The World Bank (2014) defines financial inclusion as the accessibility of financial services to households and businesses. Hudon (2010), and Armendáriz and Morduch (2010) assert that microfinance was initially focused on providing small loans to excluded populations, but it has since evolved to include a broader range of financial products such as savings accounts, insurance, and remittances. It is observed that the performance of MFIs varies globally, it is much better in countries where poverty levels are high. In some studies, it is elaborated that financial sustainability can overpower the social mission of MFIs, as institutions' priority of profit maximization may reduce services to the most vulnerable populations (Hermes & Lensink, 2011; Christen, 2001; Gibbons & Meehan, 2000). In contrast, for some researchers, financial sustainability enhances outreach and long-term service provision which enables MFIs to reach more borrowers over time (Schreiner, 2002; Rehman et al., 2021; Navin & Sinha, 2021).

The emergence of Green microfinance has changed the conventional way of thinking as it integrates environmental concerns into traditional microfinance by funding ecofriendly businesses, promoting green technologies, and reducing environmental risks associated with financial activities (van-Elteren, 2007; Rippey, 2011). Green Microfinance has gained popularity climate change disproportionately affects low-income populations especially in developing nations such as Afghanistan, Zimbabwe, and India (Global Climate Index, 2019). On the other side, developing countries face challenges in adopting green microfinance due to limited financial resources, inadequate infrastructure, and low levels of environmental awareness (Allet & Hudon, 2013). Some of the pioneer studies highlighted that environmentally sustainable MFIs tend to be financially stronger as they can invest in energy-efficient solutions and green loan products (Copestake et al., 2005; Ambec & Lanoie, 2008). Nonetheless, the high cost of eco-friendly initiatives can deter smaller institutions from fully integrating green finance practices (Carney et al., 2019; Postigo et al., 2019).

The concept of green microfinance is relatively new in Pakistan and it can be considered in infancy stage. The State Bank of Pakistan introduced Green Banking Guidelines in 2017 to encourage financial institutions to adopt sustainable practices (State Bank of Pakistan, 2017), while following the prudential regulations of the State Bank of Pakistan (SBP), some commercial banks have incorporated energy-efficient financing models but widespread adoption remains limited due to policy gaps and economic constraints. MFIs must balance profitability with their mission to serve the poorest segments of society. Evidence suggests that institutions prioritizing financial sustainability may limit lending to high-risk, low-income borrowers (Cull et al., 2009; Annim, 2012). Many MFIs lack the resources and expertise to

implement environmentally sustainable financial products (Allet & Hudon, 2013). Weak regulatory frameworks and inadequate infrastructure pose significant barriers to green microfinance, particularly in developing nations. Borrowers and financial institutions often lack awareness regarding eco-friendly financing options, limiting demand for green financial products (Iqbal et al., 2019; Tunisian, 2015). Despite these challenges, integrating green finance with microfinance can enhance economic and environmental resilience. Policymakers should prioritize supportive regulations, capacity-building programs, and incentives for MFIs to adopt sustainable lending models.

Methodology

Theoretical Framework

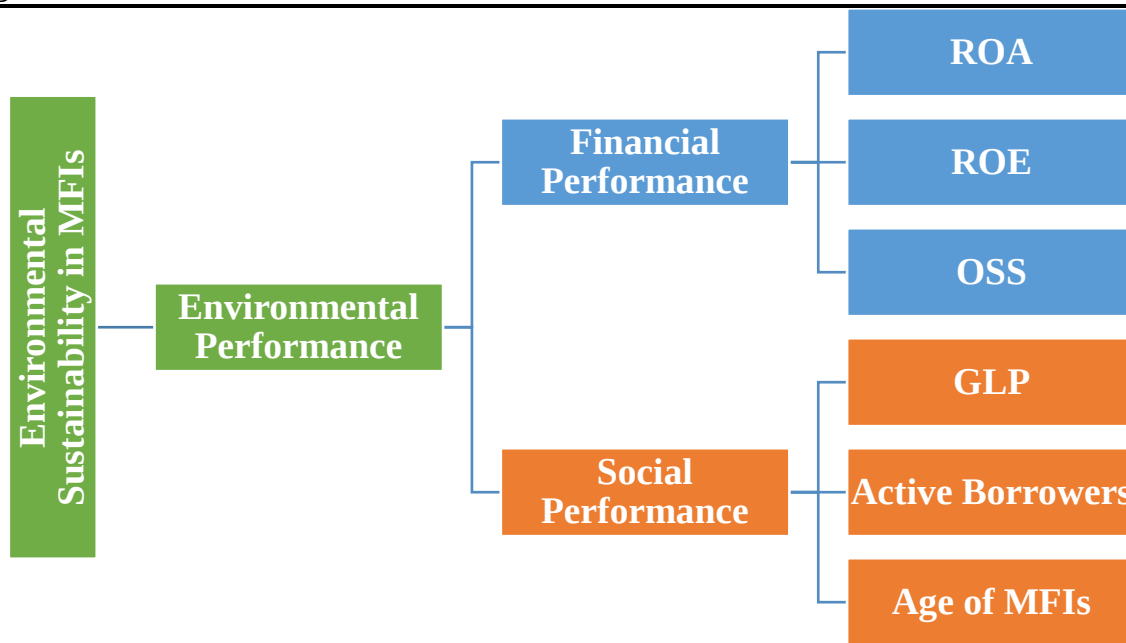
The financial performance of MFIs is usually measured through financial indicators such as Return on Assets (ROA). It represents their core functions, including loan issuance, profitability, and overall operational efficiency. A high ROA indicates improved financial stability (Abdulai & Tewari, 2016) but it can go otherwise as Sriram (2011) asserts that ROA has a negative correlation with financial efficiency due to the high operational costs associated with larger institutions. Debt-to-equity ratio also influences financial efficiency, with a higher ratio contributing to increased profitability (Abrar & Javaid, 2016). The economic health of a country significantly impacts the performance and efficiency of MFIs. A positive correlation exists between Gross Domestic Product (GDP) growth and the overall success of microfinance institutions. Developed and developing nations generally experience a healthier microfinance sector, while low-income economies face limited financial profitability. Since MFIs primarily serve low-income communities with limited access to financial services, they often operate in poor economies with low real GDP. Economic prosperity enhances the operational productivity of MFIs, while economic downturns increase default risks among borrowers. Inflation can also play a critical role in determining MFIs performance. Higher inflation reduces the real value of non-performing loans, making them less burdensome for financial institutions. However, inflation increases poverty levels, reducing the repayment capacity of low-income clients and increasing loan default rates. Financial leverage and ease of doing business influence financial efficiency as increased monetary freedom can hinder financial efficiency (Barry & Tacneng, 2014). On the other hand, 'free entry free exit' characteristic fosters competition and innovation but may also challenge existing institutions by lowering entry barriers for new firms (Chortareas et al., 2013). In modern era, global warming and environmental degradation have become significant concerns for financial and non-financial institutions. Developing nations are particularly vulnerable to extreme weather conditions such as storms, floods, droughts, and rising temperatures, leading to food shortages and resource depletion (Kreft et al., 2014). While these nations contribute minimally to global emissions, they suffer the most from climate change effects (Stern, 2007; Ahmed et al., 2009). Environmental challenges affect both MFIs and their clients. Many MFI clients are involved in agriculture or related sectors that are highly sensitive to climatic changes. Extreme weather events can reduce agricultural productivity, leading to financial instability among borrowers and an increase in non-performing loans for MFIs (Dowla, 2018). Climate-related risks such as water scarcity, drought, and crop failure further jeopardize clients' economic well-being. Without sound climate policies, rising default rates threaten the financial sustainability of MFIs.

This study focuses on identifying key challenges faced by MFIs in launching green financial products and services, offering insights into Pakistan's experience with sustainable microfinance. Social performance is closely tied to financial stability; as financially sustainable MFIs are better equipped to fulfill their social mandates. Likewise, environmental sustainability depends on financial strength, as financially stable institutions can invest in green initiatives. Additionally, offering environmentally friendly products and services can improve

the social conditions of clients by reducing costs and enhancing their quality of life. Hence, financial, social, and environmental performance indicators are deeply interrelated, reinforcing one another to create a sustainable microfinance ecosystem.

The figure 1 below illustrates the theoretical framework of this study which is interconnectedness of social, financial, and environmental performance among Pakistani MFIs

Figure 1: Theoretical Framework



Research Design

This study employs a quantitative research approach which estimates the association between explanatory variables and the dependent variable in the model. The data is collected from secondary sources and analyzed using various econometric techniques.

Variables

This section explains the variables used to assess the impact of financial and social performance of microfinance institutions (MFIs) on their environmental performance. The study includes dependent, independent, and control variables, as outlined below:

Table 1: Variables and their types

Description	Variable	Type
Environmental Performance	EP	Dependent Variable
Return on Assets	ROA	Independent Variable
Return on Equity	ROE	Independent Variable
Operational Self-Sufficiency	OSS	Independent Variable
Number of Active Borrowers	Active Borrowers	Independent Variable
Age of MFIs	Age	Control Variable
Gross Loan Portfolio	GLP	Control Variable
Number of Employees	SD	Control Variable (Dummy)

Source: Author's own compilation

Dependent Variable {(Environmental Performance (EP))}

To measure the Environmental Performance (EP), a relatively new index i.e. Microfinance Environmental Performance Index (MEPI), developed by Allet and Hudon (2013) is used. This index is based on factors such as green loans for eco-friendly products, ecological footprints, risk assessment practices, and non-financial services a relatively new dimension in the microfinance sector. This study utilizes MEPI factors collectively to measure MFIs' green performance.

Independent Variables**Social Performance**

The social performance of MFIs is assessed through outreach indicators which include the number of active borrowers, and the gross loan portfolio. Outreach can be further divided into depth of outreach as extent to which MFIs serve poor clients, and breadth of outreach as number of clients served (Schreiner, 2002; Paxton & Cuevas, 2002). The depth of outreach is often assessed by the size of distributed loans, as smaller loan sizes generally indicate a focus on poorer clients (Mersland & Strom, 2010). Another indicator is the age of MFIs, as older MFIs tend to have more experience, financial sustainability, and a greater ability to implement environmentally sustainable policies (Wintoki et al., 2012).

Financial Performance

Financial performance is critical for MFIs to sustain their operations. Profitability indicators such as Return on Assets (ROA) and Return on Equity (ROE) are commonly used to assess financial performance. ROA measures how efficiently assets generate returns, while ROE assesses profitability relative to shareholders' equity (Hermes & Lensink, 2007; Quayes, 2012). Another indicator is Operational Self-Sufficiency (OSS), which measures the extent to which an MFI can cover its operating costs through its revenue (Navin & Sinha, 2021).

Control Variables

The control variables used in this study include type of MFI depending on its regulatory authority, Age of MFI, and size of the MFI. The size of the MFIs reflects its triple bottom line agenda. Performance of an organization can be analyzed by examining its size as larger the size better the performance will be (Forcella & Hudon, 2016). Size is used as a control variable because larger MFIs opt more resources (financial and non-financial), opportunities to expand their market and transform their structure and funds for the expansion of loan portfolio. The Gross Loan Portfolio of MFI in a year are taken as proxy of its size.

The Data

This study employs panel data, which combines cross-sectional and time-series data, offering advantages such as more observations, reduced collinearity, and higher degrees of freedom (Gujarati, 2009). Balanced panel data from 39 MFIs for the period 2018-2020 is used to analyze the association between environmental, social, and financial performance. The data is sourced from Pakistan Microfinance Network (PMN), which includes Microfinance Banks, Non-Bank Microfinance Companies, and Rural Support Programs.

Econometric Model

Several econometric techniques are used to examine the relationship between environmental performance and financial and social performance. Given the limitations of static models, this study employs the Panel Least Squares as the primary estimation technique.

Panel Least Squares Method

The following panel model is used to estimate the relationship among the dependent and the independent variables:

$$EP_{it} = \alpha + \beta_1 FP_{it} + \beta_2 SP_{it} + \delta_i Control_{it} + \varepsilon_{it}$$

Where;

EP denotes the environmental sustainability performance of MFIs

FP indicates the Financial Performance

SP indicates the social performance

Age, type, and size are the control variables

α is the intercept

β refers to the estimated coefficients

δ is the vector of control variables

ε indicates the error or residual term

Subscript i stands for MFI

Subscript t stands for the year

Random Effect Model (REM)

Since the pooled OLS does not take into account the unobserved heterogeneity, the Random Effect Model (REM) seems more appropriate. As, the REM assumed that the intercept of an individual unit is a random with a constant mean value. The individual intercept is shown as the deviation from the constant mean value. It assumes that the unobserved time in-variant heterogeneity is not correlated with explanatory variables and then estimates error variances randomly distributed across individuals and times. This model can be used if μ_i , Pooled OLS Equation is treated as random rather than fixed effects. Thus, the model is expressed as follows:

$$EP_{it} = \alpha + \beta_1 SP_{it} + \beta_2 FP_{it} + \delta_i Control_{it} + \omega_{it}$$

where

$$\omega_{it} = \varepsilon_i + v_{it}$$

The ω_{it} is the composite error term of two components: ε_i , which is the individual MFI or cross section error term, and v_{it} , which is the combined time-series and cross-section error component and is also called as the idiosyncratic error term because it varies over cross section as well as time. The another advantage of Random Effect Model is that we can introduce the dummy variables (Gujarati, 2009; Meraj, 2021). Nevertheless, this model is restrictive since it relies on a strong assumption of zero correlation between predictors and unobserved MFI heterogeneity, which may not be the actual case in the current study dataset. Therefore, REM may yield biased and inconsistent estimates if it fails to hold this standard assumption.

Fixed Effect Model (FEM)

To deal with the short comings of the Panel Random Effect Model, the Fixed Effect Model (FEM) is an appropriate approach for the regression analysis of panel data. The model is written as:

$$EP_{it} = (\alpha + \mu_i) + \beta_1 SP_{it} + \beta_2 FP_{it} + \delta_i Control_{it} + v_{it}$$

Where the μ_{it} indicates the unobserved time in-variant heterogeneity and v_{it} indicates the residual. It may be noted that the FEM may not be able to identify the impact time in-variant variables (Gujarati, 2009; Meraj, 2021). In other words, the FEM could not identify the impact of dummy variables, because they are time constant. In particular, our data has one explanatory dummy variable which is time constant and their impact would not be identified by the FEM and However, only the control variable is estimated as dummy variable.

Empirical Results

Descriptive Statistics

Descriptive statistics provide a summarized view of the dataset, including key measures such as mean, median, and standard deviation. Table 2 below provides an overview of these statistics:

Table 2: Descriptive Statistics

Description	Variable	Mean	Median	Std. Dev.
Environmental Performance	EP	36.8832	28.5714	26.9793
Return on Assets	ROA	0.0093	0.0161	0.1269
Return on Equity	ROE	-0.0042	0.0746	0.4728
Operational Self-Sufficiency	OSS	1.1616	1.1250	0.3968
Number of Active Borrowers	Active Borrowers	183,677	64,417	256,706
Age of MFIs	Age	14.1909	13	7.3027
Gross Loan Portfolio (PKR, 000)	GLP	7,715,062	1,488,098	12,307,943
Number of Employees (Dummy)	SD	0.60000	1.0000	0.4921

Source: Author's own compilation

Data Diagnostics

Test for Multicollinearity

The multicollinearity occurs when independent variables are highly correlated, leading to unreliable statistical inferences due to inflated standard errors. A correlation coefficient of 1 indicates perfect collinearity, while values below 0.9 are generally considered acceptable.

Table 3: Coefficient Correlation Matrix

Variables	EP	A_B	AGE	OSS	SD	ROA	GLP	ROE
EP	1	-	-	-	-	-	-	-
A_B	0.166	1	-	-	-	-	-	-
AGE	0.146	0.254	1	-	-	-	-	-
OSS	-0.044	0.139	0.086	1	-	-	-	-
SD	0.213	0.542	0.134	-0.022	1	-	-	-
ROA	0.102	0.010	0.004	0.768	0.044	1	-	-
GLP	0.187	0.825	0.138	0.053	0.494	0.013	1	-
ROE	0.243	-0.024	-0.106	-0.138	0.141	0.295	0.063	1

Source: Author's own compilation

Since all correlation values are below 0.9, multicollinearity is not a concern in this dataset

Test for Heteroscedasticity

Heteroscedasticity occurs when the variance of errors in a regression model is not constant, potentially leading to biased estimates. The Breusch-Pagan test was conducted to assess heteroscedasticity in the panel data. Table 4 below shows the results of Breusch-Pagan Test:

Table 4: Results of Breusch-Pagan Test for Heteroscedasticity

H0: Constant Variance	P-value	Chi2(1)	Results
Accepted	0.7459	0.1100	Homoscedasticity

Source: Author's calculations

(Since the p-value is greater than 0.05, the null hypothesis of homoscedasticity is accepted, indicating no heteroscedasticity issues).

Regression Analysis

Three different models are used to estimate the Social, Environmental and Financial performance of microfinance providers with different variables. Panel Fixed Effect (PFE) estimation is used for estimation. The selection of PFE Estimation is due to rejection of the null hypothesis by the Hausmann Test that the Panel Random Effect (PRE) estimation is consistent and efficient. The summary of the empirical results obtained from fixed effect panel estimation are reported in Table 5 below:

Table 5: Regression Results

Dependent Variable:	Coefficient	Std. Error	t-Statistic	Prob.
Environmental Performance				
INTERCEPT	82.84505	12.71761	6.514201	0.0000*
ACTIVE_BORROWERS	4.72E-05	2.43E-05	1.939570	0.0568***
GLP	1.42E-06	4.88E-07	2.917299	0.0049*
AGE	-0.006661	0.385334	-0.017286	0.9863
OSS	32.02920	7.792427	4.110298	0.0001*
ROA	77.93480	22.06699	3.531736	0.0008*
ROE	11.40053	4.240277	2.688627	0.0091*
SD	-19.90748	7.234584	-2.751710	0.0077*
R-squared	0.907143	F-statistic		13.89403
Adjusted R-squared	0.841853	Prob. (F-statistic)		0.000000

Source: Author's own compilation

*, **, *** denotes significance level at 1%, 5% and 10% respectively.

Discussion on Empirical Results

Social Performance

The empirical results show that the active borrowers and gross loan portfolio, a proxy of social performance, have positive and significant relation with the environmental performance, whereas, the age of the institution, the other proxy of social performance has negative and insignificant relation with the environmental performance. Two out of three social performance proxies have significant relation with the environmental performance. It implies that there is a positive relationship among the social and environmental performance of the microfinance institutions. The positive and significant relation between active borrowers and environmental performance explains that the increase in active borrowers would have positive impact on the environmental performance of an institutions, similarly, the increase in gross loan portfolio of the institution has positive impact on environmental performance. It implies that the institution having greater outreach would have an improved environmental performance.

Financial Performance

The regression results show the significant and positive impact of financial performance on the environmental performance of the microfinance institutions. As the operational self-sufficiency (OSS), return on assets (ROA) and return on equity (ROE) have significant and positive relation with the environmental performance. The positive and significant relation of OSS, ROA and ROE with the environmental performance explains that the increase in OSS, ROA and ROE would have positive impact on the environmental performance of an institutions. It

implies that the better allocation of assets would have an improved environmental performance. The high value of F-stats (13.89403) and small probability value (0.0000) implies that the results of the regression are significant. The high value of R-square (0.907143) implies that the model is good-fit.

Conclusion

The empirical findings of this study indicate a positive association between social performance and environmental performance. A higher gross loan portfolio and increased number of active borrowers correlate with improved environmental performance, suggesting that institutions with broader outreach tend to be more environmentally responsible. However, the age of an institution does not significantly influence its environmental performance. In addition, the study examines the relationship between financial performance and environmental sustainability. The results reveal a positive and significant impact of financial efficiency and stability on environmental performance. Key financial indicators, including operational self-sufficiency (OSS), return on assets (ROA), and return on equity (ROE), show a strong positive correlation with environmental performance. Increased OSS, ROA, and ROE enhance financial sustainability, enabling MFIs to implement environmentally friendly policies. Strengthened financial performance encourages MFIs to integrate eco-friendly practices, ultimately promoting environmental sustainability. Moreover, improved financial stability allows institutions to allocate resources effectively, fostering better environmental conditions for current and future generations.

References

- Abdulai, A., & Tewari, D. D. (2016). Determinants of microfinance outreach in Sub-Saharan Africa: A panel approach. *Acta Commercii*, 17(1), 1-10. <https://doi.org/10.4102/ac.v17i1.265>.
- Abrar, A., & Javaid, A. Y. (2016). The impact of capital structure on the profitability of microfinance institutions. *South Asian Journal of Management Sciences*, 10(1), 21-37.
- Ahmed, K., & Khan, R. (2016). Disclosure practices and governance quality: evidence from microfinance institutions. *Journal of Accounting & Organizational Change*.
- Ahmed, S. A., Diffenbaugh, N. S., & Hertel, T. W. (2009). Climate volatility deepens poverty vulnerability in developing countries. *Environmental Research Letters*, 4(3), 034004. <https://doi.org/10.1088/1748-9326/4/3/034004>
- Allet, M., & Hudon, M. (2013). Green Microfinance: Characteristics of Microfinance Institutions Involved in Environmental Management. *Journal of Business Ethics*, 126(3), 395–414. <https://doi.org/10.1007/s10551-013-1767-2>
- Annim, S. (2012). Targeting the poor versus financial sustainability and external funding: Evidence of microfinance institutions in Ghana. *Journal of Developmental Entrepreneurship*, 17(3), 1-19.
- Banerjee, A. V., & Duflo, E. (2011). *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*. Public Affairs.
- Bansal, P., & DesJardine, M. R. (2014). Business sustainability: It is about time. *Strategic Organization*, 12(1), 70-78. <https://doi.org/10.1177/1476127013520265>
- 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. <https://doi.org/10.1016/j.worlddev.2014.01.003>
- Battilana, J., & Dorado, S. (2010). Building sustainable hybrid organizations: The case of commercial microfinance organizations. *Academy of Management Journal*, 53(6), 1419-1440.
- Brundtland, G. H. (1987). *Our Common Future*. Oxford University Press.
- Carroll, A. B., & Shabana, K. M. (2010). The business case for corporate social responsibility: A review of concepts, research, and practice. *International Journal of Management Reviews*, 12(1), 85-105.
- Chortareas, G. E., Girardone, C., & Ventouri, A. (2013). Financial freedom and bank efficiency: Evidence from the European Union. *Journal of Banking & Finance*, 37(4), 1223-1231. <https://doi.org/10.1016/j.jbankfin.2012.11.019>

- Christen, R. (2001). *Commercialization and Mission Drift: The Transformation of Microfinance in Latin America*. Washington, DC: CGAP.
- Crane, A., Palazzo, G., Spence, L. J., & Matten, D. (2014). Contesting the value of “creating shared value” for CSR. *California Management Review*, 56(2), 130-153. <https://doi.org/10.1525/cmr.2014.56.2.130>
- Cull, R., Demirgüç-Kunt, A., & Morduch, J. (2009). Microfinance meets the market. *Journal of Economic Perspectives*, 23(1), 167-192. <https://doi.org/10.1257/jep.23.1.167>
- Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of Management Review*, 20(1), 65-91.
- Forcella, D. (2013). Green microfinance: A new strategy for climate change mitigation. *Enterprise Development and Microfinance*, 24(1), 58-72. <https://doi.org/10.3362/1755-1986.2013.006>
- Forcella, D., & Hudon, M. (2016). Green microfinance: Characteristics of microfinance institutions involved in environmental management. *Journal of Business Ethics*, 135(4), 661-676. <https://doi.org/10.1007/s10551-014-2481-3>
- Gibbons, D. S., & Meehan, J. W. (2000). *The Microcredit Summit's Challenge: Working Towards Institutional Financial Self-Sufficiency Maintaining a Commitment to Serving the Poorest Families*.
- Gohar, R., & Batool, I. (2015). The effectiveness of microfinance in Pakistan. *Pakistan Journal of Social Sciences*, 35(1), 23-34.
- Gonzalez, A. (2010). Is microfinance growing too fast? *Microfinance Information Exchange (MIX) Report*.
- Goodpaster, K. E. (1991). Business ethics and stakeholder analysis. *Business Ethics Quarterly*, 1(1), 53-73.
- Gujarati, D. N. (2009). *Basic Econometrics*. New York: McGraw-Hill.
- Hall, J. K., Daneke, G. A., & Lenox, M. J. (2016). Sustainable development and entrepreneurship: Past contributions and future directions. *Journal of Business Venturing*, 25(5), 439-448.
- Hermes, N., & Lensink, R. (2007). The empirics of microfinance: What do we know? *The Economic Journal*, 117(517), F1-F10. <https://doi.org/10.1111/j.1468-0327.2007.02016.x>
- Hermes, N., & Lensink, R. (2011). Microfinance: Its impact, outreach, and sustainability. *World Development*, 39(6), 875-881. <https://doi.org/10.1016/j.worlddev.2010.09.015>
- Hudon, M. (2010). Management of microfinance institutions: Do subsidies matter? *Journal of International Development*, 22(7), 890-905. <https://doi.org/10.1002/jid.1677>
- Hudon, M., & Sandberg, J. (2013). The ethical crisis in microfinance: Issues, findings, and implications. *Business Ethics Quarterly*, 23(4), 561-589.
- Hye, Q. M. A., ul Mustafa, A. R., & Mahmood, K. (2010). Causality between exports and imports of agricultural sector in the case of Pakistan. *Indian Journal of Agricultural Research*, 44(3), 201-205.
- Iqbal, S., Nawaz, A., & Ehsan, S. (2019). Financial performance and corporate governance in microfinance: Evidence from Asia. *Journal of Asian Economics*, 60, 1-13. <https://doi.org/10.1016/j.asieco.2019.01.002>
- Julia, T., Kassim, S., & Adawiah, E. R. (2018). Green business sustainability and Shariah compliance in Bangladesh context. *17th Kuala Lumpur International Business, Economics and Law Conference*, (October), 308-326.
- Khandker, S. R. (2005). Microfinance and poverty: Evidence using panel data from Bangladesh. *The World Bank Economic Review*, 19(2), 263-286. <https://doi.org/10.1093/wber/lhi021>
- Kreft, H., Stein, A., & Gerstner, K. (2014). Environmental heterogeneity as a universal driver of species richness across taxa, biomes and spatial scales. *Ecology Letters*, 17(7), 866-880. <https://doi.org/10.1111/ele.12268>
- Meraj, M. (2021). The relationship between competition and borrowers' indebtedness: Empirical evidence from South Asia. *The Journal of Asian Finance, Economics and Business*, 8(12), 39-50. <https://doi.org/10.13106/jafeb.2021.vol8.no12.39>
- Mersland, R., & Strom, R. O. (2010). Microfinance mission drift? *World Development*, 38(1), 28-36. <https://doi.org/10.1016/j.worlddev.2009.03.004>
- Morduch, J. (1999). The microfinance promise. *Journal of Economic Literature*, 37(4), 1569-1614.
- Navin, N., & Sinha, P. (2021). Social and financial performance of MFIs: Complementary or compromise? *Vilakshan – XIMB Journal of Management*, 18(1), 42-61.
- Norton, B. G. (2005). *Sustainability: A Philosophy of Adaptive Ecosystem Management*. University of Chicago Press.

- Paulet, E., Paradi, J. C., & Tovstiga, G. (2015). The importance of environmental concerns for responsible banking: A survey. *Journal of Business Ethics*, 131(1), 199-207. <https://doi.org/10.1007/s10551-014-2285-7>
- Paxton, J., & Cuevas, C. E. (2002). Outreach and sustainability of member-based rural financial intermediaries. In *The Triangle of Microfinance: Financial Sustainability, Outreach, and Impact* (pp. 135-151).
- Pitt, M. M., Khandker, S. R., & Cartwright, J. (2006). Empowering women with microfinance: Evidence from Bangladesh. *Economic Development and Cultural Change*, 54(4), 791-831.
- Postigo, A., Schuler, C., & Harris, S. (2019). The impact of environmental, social and governance risks on bank ratings. *Moody's Investors Service*.
- Quayes, S. (2012). Depth of outreach and financial sustainability of microfinance institutions. *Applied Economics*, 44(26), 3421-3433. <https://doi.org/10.1080/00036846.2011.588276>
- Rashid, M., Ur, H., Uddin, M. J., & Zobair, S. A. M. (2018). Islamic microfinance and sustainable development goals in Bangladesh. *International Journal of Islamic Business & Management*, 2(1), 67-80. <https://doi.org/10.1108/IJIBM-02-2018-0034>.
- Rehman, S., Abro, A. A., Mustafa, A. R. U., Ullah, N., & Khattak, S. W. (2021). An analysis of stock market integration in the Asian developed and emerging markets. *Humanities & Social Sciences Reviews*, 9(3), 1175-1190.
- Rhyne, E. (2001). *Mainstreaming Microfinance: How Lending to the Poor Began, Grew, and Came of Age in Bolivia*. Kumarian Press.
- Rippey, P. (2011). Microfinance and climate change: Threats and opportunities. In D. Köhn (Ed.), *Greening the Financial Sector: How to Mainstream Environmental Finance in Developing Countries* (pp. 215-239). Springer.
- Roy, S., & Mohanty, R. P. (2020). Microfinance models in improving 'quality of life': Empirical analysis on Indian perspective. *International Journal of Business Innovation and Research*, 21(1), 23-55. <https://doi.org/10.1504/IJBIR.2020.107994>
- Schreiner, M. (2002). Aspects of outreach: A framework for discussion of the social benefits of microfinance. *Journal of International Development*, 14(5), 591-603. <https://doi.org/10.1002/jid.882>
- Scholtens, B. (2006). Finance as a driver of corporate social responsibility. *Journal of Business Ethics*, 68(1), 19-33. <https://doi.org/10.1007/s10551-006-9035-2>
- Sen, A. (1999). *Development as Freedom*. Oxford University Press.
- Shahidullah, A. K. M., & Haque, C. E. (2015). Green microfinance strategy for entrepreneurial transformation: Validating a pattern towards sustainability. *Enterprise Development & Microfinance*, 26(4), 325-342. <https://doi.org/10.3362/1755-1986.2015.006>
- Sriram, M. (2011). *Profit or Purpose: The Dilemma of Social Enterprises*. Ahmedabad: Indian Institute of Management.
- State Bank of Pakistan. (2017). *Green Banking Guidelines*.
- State Bank of Pakistan. (2020). *Microfinance Industry Review*.
- Stern, N. (2007). The economics of climate change. *American Economic Review*, 98(2), 1-37. <https://doi.org/10.1257/aer.98.2.1>
- ul Mustafa, A. R., Abro, A. A., & Awan, N. W. (2021). Social Protection and Economic Growth: An Empirical Analysis for Emerging Economies. *Elementary Education Online*, 20(5), 6932-6942.
- Weber, H. (2017). Politics of 'leaving no one behind': Contesting the 2030 Sustainable Development Goals agenda. *Globalizations*, 14(3), 399-414. <https://doi.org/10.1080/14747731.2016.1271786>
- Wintoki, M. B., Linck, J. S., & Netter, J. M. (2012). Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics*, 105(3), 581-606. <https://doi.org/10.1016/j.jfineco.2012.03.006>
- World Bank Group. (2014). *Global Financial Development Report 2014: Financial Inclusion* (Vol. 2). World Bank Publications. <https://doi.org/10.1596/978-1-4648-0151-3>
- Yunus, M., & Jolis, A. (2003). *Banker to the Poor: Micro-lending and the Battle Against World Poverty*. Public Affairs.
- Zulfiqar, G. (2017). Does microfinance enhance gender equity in access to finance? Evidence from Pakistan. *Feminist Economics*, 23(1), 160-185. <https://doi.org/10.1080/13545701.2016.1189243>