

Microfinance and Sustainable Development: Analysis of Socio-Economic Performance and Development Outcomes.

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Abstract

This study examines the relationship between microfinance services and sustainable development practices by assessing the mediating role of socio-economic performance among microfinance beneficiaries in an emerging economy. Grounded in a positivist epistemology and a hypothetico-deductive approach, the research adopts a quantitative cross-sectional design and proposes a conceptual model comprising five latent constructs, 24 measurement items, and five hypotheses. Primary data were collected through a structured questionnaire administered to a sample of 342 microfinance beneficiaries selected using a stratified random sampling procedure. The data were analyzed in two stages: an exploratory analysis using SPSS v.26, including reliability and factor analyses, followed by Partial Least Squares Structural Equation Modeling using SmartPLS 4.0 with 5,000 bootstrap resamples. The results support all five hypotheses and show that microfinance service quality has the strongest direct effect on socio-economic performance ($\beta = 0.334$; $p < 0.001$), followed by microfinance access ($\beta = 0.298$; $p < 0.001$) and training and support ($\beta = 0.287$; $p < 0.001$). Socio-economic performance significantly influences sustainable development practices ($\beta = 0.456$; $p < 0.001$) and mediates the relationship between microfinance services and sustainable development outcomes. The study concludes that access to finance alone is insufficient to generate sustainable development outcomes unless it is accompanied by high-quality services, training, and improvements in beneficiaries' socio-economic capabilities. These findings provide theoretical contributions to the microfinance–development literature and practical implications for microfinance institutions and policymakers.

Keywords: Microfinance, Sustainable development, PLS-SEM, SmartPLS, Socio-economic performance, Financial inclusion, Conceptual framework, Emerging economies

1. Introduction

Sustainable development has emerged as a central policy objective across emerging and developing economies, encapsulated in the United Nations 2030 Agenda and its seventeen Sustainable Development Goals (SDGs). Within this agenda, financial inclusion and microfinance in particular has been positioned as a critical enabler of inclusive and sustainable growth, providing previously excluded populations with access to credit, savings, and insurance products that can facilitate productive investment and the adoption of sustainable livelihood practices (United Nations, 2015; Hulme & Mosley, 1996).

Despite three decades of academic and policy interest in microfinance, the precise mechanisms through which microfinance services translate into sustainable development outcomes remain insufficiently understood. Much of the existing empirical literature has focused narrowly on poverty alleviation or income effects (Banerjee et al., 2015; Khandker, 2005), while the broader construct of sustainable development encompassing economic, social, and environmental dimensions of beneficiary livelihoods has received comparatively limited empirical attention, particularly through rigorous structural equation modeling approaches capable of capturing latent, multidimensional constructs.

This study addresses this gap by proposing and empirically testing a parsimonious conceptual framework linking three dimensions of microfinance service provision access, service quality, and training and support to sustainable development practices, via the mediating mechanism of socio-economic performance. Using primary survey data from 342 microfinance beneficiaries and a rigorous two-stage analytical strategy (SPSS v.26 followed by SmartPLS 4.0), the study tests five clearly specified hypotheses within a Partial Least Squares Structural Equation Modeling (PLS-SEM) framework.

This article makes three contributions to the microfinance and development literature. First, it provides a parsimonious yet theoretically grounded conceptual framework that disentangles three distinct dimensions of microfinance service provision and tests their differential effects on socio-economic performance. Second, it empirically establishes socio-economic performance as a significant mediating mechanism linking microfinance services to sustainable development practices, addressing a notable gap in the mediation literature on microfinance impact pathways.

The remainder of this article is structured as follows. Section 2 reviews the relevant theoretical and empirical literature. Section 3 presents the conceptual framework and develops the five research hypotheses. Section 4 describes the research methodology. Section 5 reports the SPSS-

based exploratory results. Section 6 presents the PLS-SEM structural model results. Section 7 discusses the findings and their implications. Section 8 concludes.

2. Literature Review

2.1 Microfinance and Development: Theoretical Foundations

The theoretical rationale for microfinance as a development instrument is rooted in the imperfect credit markets literature (Stiglitz & Weiss, 1981; Banerjee & Newman, 1993), which posits that information asymmetries and the absence of collateral exclude low-income populations from formal credit markets, perpetuating poverty traps (Galor & Zeira, 1993). Microfinance institutions address this market failure by substituting social collateral and group lending mechanisms for physical collateral requirements (Yunus, 1997; Armendáriz & Morduch, 2010), thereby expanding access to productive credit among financially excluded populations.

Empirical evidence on microfinance impact has evolved through successive methodological generations. Early cross-sectional studies (Pitt & Khandker, 1998; Coleman, 1999) reported generally positive but methodologically contested impacts. Subsequent randomized controlled trials (Banerjee et al., 2015; Crépon et al., 2015) revealed more modest average treatment effects, with substantial heterogeneity across contexts and beneficiary profiles. Recent meta-analytic evidence (Awaworyi Churchill & Marr, 2017; Lensink et al., 2018) confirms this heterogeneity, underscoring the need for context-specific, multidimensional impact assessments a gap this study addresses.

2.2 Microfinance Service Dimensions

The literature increasingly recognizes that microfinance is not a homogeneous treatment but a multidimensional service bundle. Access to microfinance the extent to which credit products are physically and procedurally accessible to target populations constitutes the foundational dimension (Demirgüç-Kunt et al., 2018). Service quality encompassing product appropriateness, transparency, and responsiveness has been shown to moderate the translation of access into beneficial outcomes (Mersland & Strøm, 2009). Training and non-financial support including business skills training, financial literacy, and mentoring constitute a third, increasingly emphasized dimension, with evidence suggesting that combined financial and non-financial services generate superior outcomes relative to credit-only interventions (Karlan & Valdivia, 2011; Bandiera et al., 2017).

2.3 Socio-Economic Performance and Sustainable Development Practices

Socio-economic performance, as conceptualized in this study, refers to the perceived improvement in household and micro-enterprise economic outcomes income, asset accumulation, employment generation and social outcomes education, health, social capital attributable to microfinance participation (Sen, 1999; Ranieri & Ramos, 2013). Sustainable development practices refer to the adoption of environmentally and socially responsible behaviors at the micro-enterprise or household level, including resource-efficient production methods, formalization of business activities, diversification of income sources, and long-term planning orientations (Elkington, 1997; OECD, 2014).

A small but growing body of literature has begun to examine the relationship between microfinance and sustainability-oriented outcomes (Hudon & Sandberg, 2013; Quayes, 2015), yet rigorous structural equation modeling studies explicitly testing the mediating role of socio-economic performance between microfinance services and sustainable development practices remain scarce, particularly using PLS-SEM a method well-suited to this research context given its capacity to handle formative and reflective latent constructs simultaneously with moderate sample sizes (Hair et al., 2019).

2.4 Research Gap

Three gaps in the extant literature motivate the present study. First, the absence of an integrative empirical model that simultaneously examines multiple microfinance service dimensions as distinct antecedents of socio-economic performance. Second, the limited empirical testing of socio-economic performance as a mediating mechanism between microfinance services and sustainable development practices. Third, the relative scarcity of PLS-SEM applications in this specific research domain, despite the method's suitability for the multidimensional, latent constructs under investigation.

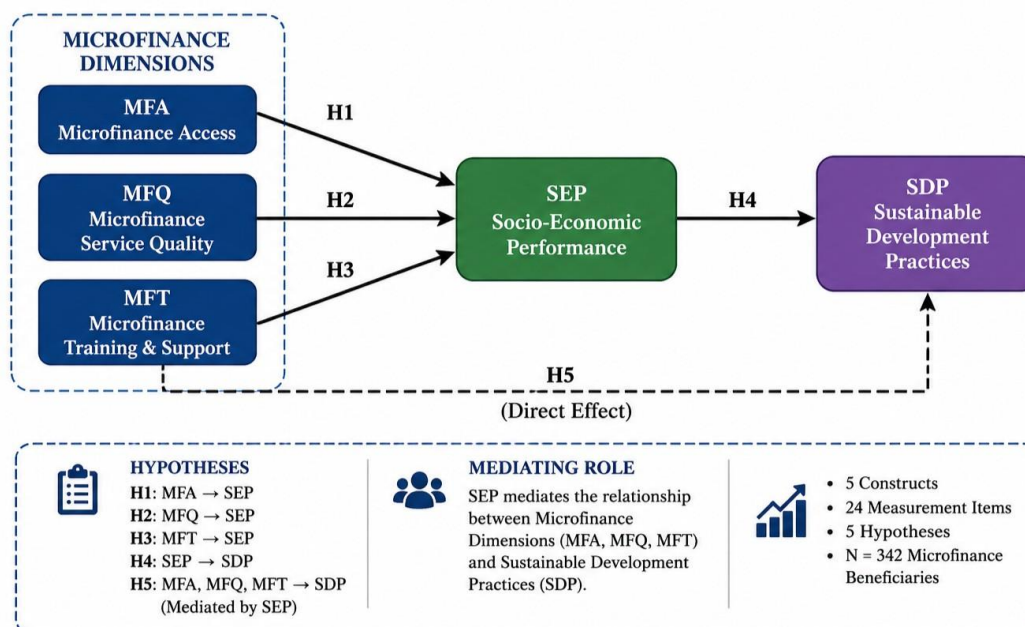
Based on the literature reviewed above, the selection of the variables, hypotheses, and measurement items was theoretically and empirically grounded. Microfinance Access (MFA) was derived from the imperfect credit market and financial inclusion literature (Stiglitz & Weiss, 1981; Khandker, 2005; Demirgüç-Kunt et al., 2018), while Microfinance Service Quality (MFQ) was informed by the SERVQUAL framework and research on microfinance institutional performance (Parasuraman et al., 1988; Mersland & Strøm, 2009). Microfinance Training and Support (MFT) was grounded in human capital theory and evidence concerning the effects of financial literacy, entrepreneurial training, and non-financial services (Becker, 1964; Karlan & Valdivia, 2011; Bandiera et al., 2017). Socio-Economic Performance (SEP)

was operationalized based on the capability and microfinance-impact literature (Sen, 1999; Khandker, 2005; Ranieri & Ramos, 2013), whereas Sustainable Development Practices (SDP) drew on the triple-bottom-line approach and inclusive development frameworks (Elkington, 1997; OECD, 2014). The five research hypotheses were derived from the expected causal relationships established by these theoretical perspectives, while the 24 measurement items were adapted from the corresponding validated scales and adjusted to the context of microfinance beneficiaries.

3. Conceptual Framework and Hypothesis Development

Building on the theoretical foundations reviewed above, this study proposes a parsimonious conceptual framework comprising five latent constructs organized into three conceptual blocks, as illustrated in Figure 1. The first block comprises three exogenous constructs representing distinct dimensions of microfinance service provision: Microfinance Access (MFA), Microfinance Service Quality (MFQ), and Microfinance Training and Support (MFT). The second block comprises a single mediating construct, Socio-Economic Performance (SEP). The third block comprises the principal endogenous outcome construct, Sustainable Development Practices (SDP).

Figure N 1. Conceptual Research Framework



Source: Developed by the author based on the literature review and the proposed conceptual model.

3.1 Construct Operationalization

Microfinance Access (MFA, 5 items) measures the ease and adequacy of access to microcredit products: geographic proximity of branches, procedural simplicity, loan amount adequacy, disbursement speed, and product diversity. Microfinance Service Quality (MFQ, 5 items) captures the perceived quality of service delivery: staff responsiveness, transparency of loan terms, fairness of interest rates, complaint resolution mechanisms, and overall service reliability. Microfinance Training and Support (MFT, 4 items) measures the extent and perceived usefulness of non-financial services received: business skills training, financial literacy education, mentoring, and networking opportunities.

Socio-Economic Performance (SEP, 6 items) is operationalized as a composite construct capturing perceived improvements in income level, asset ownership, business profitability, employment generation, household food security, and children's education attributable to microfinance participation. Sustainable Development Practices (SDP, 4 items) measures the adoption of sustainability-oriented behaviors: resource-efficient production practices, business formalization steps, income diversification, and long-term business planning.

Table N 1. Theoretical Foundations and Sources of the Research Constructs

Construct	Theoretical foundation	Main sources	Related hypothesis
Microfinance Access (MFA)	Imperfect credit markets and financial inclusion	Stiglitz & Weiss (1981); Khandker (2005); Demirgüç-Kunt et al. (2018)	H1
Microfinance Service Quality (MFQ)	SERVQUAL and service-quality theory	Parasuraman et al. (1988); Mersland & Strøm (2009)	H2
Microfinance Training and Support (MFT)	Human capital theory	Becker (1964); Karlan & Valdivia (2011); Bandiera et al. (2017)	H3
Socio-Economic Performance (SEP)	Capability and inclusive-development approaches	Sen (1999); Khandker (2005); Ranieri & Ramos (2013)	H4 and H5
Sustainable Development Practices (SDP)	Triple-bottom-line and sustainable-development approaches	Elkington (1997); OECD (2014)	H4 and H5

Source: Developed by the author based on the literature review

3.2 Hypothesis Development

The conceptual framework yields five testable hypotheses, formally stated below.

H1: Microfinance access (MFA) has a positive and significant effect on socio-economic performance (SEP).

This hypothesis follows directly from the imperfect credit markets literature: relaxing access constraints enables productive investment, which is expected to translate into measurable improvements in income, assets, and household welfare (Stiglitz & Weiss, 1981; Khandker, 2005).

H2: Microfinance service quality (MFQ) has a positive and significant effect on socio-economic performance (SEP).

Service quality theory (Parasuraman et al., 1988) suggests that the manner in which financial services are delivered not merely their availability conditions beneficiary outcomes; transparent, responsive, and fairly priced services are expected to generate superior socio-economic returns (Mersland & Strøm, 2009).

H3: Microfinance training and support (MFT) has a positive and significant effect on socio-economic performance (SEP).

Human capital theory (Becker, 1964) predicts that complementary investments in business skills and financial literacy amplify the productive returns to credit access, consistent with evidence on the superiority of combined financial-plus-training interventions (Karlan & Valdivia, 2011; Bandiera et al., 2017).

H4: Socio-economic performance (SEP) has a positive and significant effect on sustainable development practices (SDP).

Drawing on capability theory (Sen, 1999), improved economic security and capability is expected to enable forward-looking, sustainability-oriented investment decisions that resource-constrained households and micro-enterprises cannot otherwise afford to undertake.

H5: Socio-economic performance (SEP) mediates the relationship between microfinance services (MFA, MFQ, MFT) and sustainable development practices (SDP).

This final hypothesis formalizes the framework's central theoretical proposition: microfinance services do not directly produce sustainable development outcomes but operate through the intermediate mechanism of improved socio-economic performance, consistent with the sequential capability-expansion logic underlying the broader development-as-freedom paradigm (Sen, 1999)

4. Research Methodology

4.1 Epistemological Positioning

This study adopts a positivist epistemological position because its primary objective is to objectively measure and empirically test the causal relationships between microfinance access, service quality, training and support, socio-economic performance, and sustainable development practices. This position is based on a realist ontology, according to which these phenomena exist independently of the researcher's subjective interpretations and can be examined through observable and quantifiable indicators. Accordingly, the study follows a hypothetico-deductive mode of reasoning, beginning with the theoretical foundations of microfinance, human capital, service quality, and sustainable development, from which a conceptual model and five research hypotheses are derived. These hypotheses are subsequently tested using quantitative data collected through a structured questionnaire administered to 342 microfinance beneficiaries. The combined use of SPSS v.26 and PLS-SEM through SmartPLS 4.0 is justified by the need to assess the reliability and validity of the measurement scales, estimate relationships between latent constructs, and examine the mediating role of socio-economic performance. This methodological approach is therefore consistent with the explanatory purpose of the study and the multidimensional nature of the proposed conceptual model.

4.2 Population, Sample, and Data Collection

The target population comprises active microfinance beneficiaries operating micro-enterprises or income-generating activities. A stratified random sampling procedure was employed, with strata defined by microfinance institution and geographic area (urban/rural), to ensure adequate representation across the beneficiary population. Data collection was conducted between 2023 and 2024 through structured questionnaires administered both in person and through secure online forms. Of 398 questionnaires distributed, 342 were retained for analysis after data cleaning (usable response rate: 85.9%), satisfying the minimum sample size criterion proposed by Hair et al. (2019) for PLS-SEM ($N \geq 10 \times \text{maximum number of indicators pointing to a single construct} = 60$; $N = 342$ substantially exceeds this threshold).

4.3 Measurement Instrument

The structured questionnaire comprises 24 items distributed across the five latent constructs, measured on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree), in addition to a sociodemographic section. Measurement items were adapted from validated scales in the prior literature, including the microfinance service quality scale of Mersland & Strøm (2009), the

socio-economic performance scale adapted from Khandker (2005), and the sustainable business practices scale of Elkington (1997) and OECD (2014). A pilot test with 38 respondents and review by a panel of three academic experts and two microfinance practitioners informed minor refinements to item wording prior to full-scale deployment.

4.4 Analytical Strategy

Data analysis followed a two-stage protocol consistent with best-practice recommendations (Anderson & Gerbing, 1988; Hair et al., 2019). Stage 1 (SPSS v.26) comprised: (a) data screening and treatment of missing values; (b) descriptive statistics and normality assessment (skewness and kurtosis); (c) reliability analysis via Cronbach's alpha; (d) exploratory factor analysis (EFA) with Varimax rotation to assess construct dimensionality. Stage 2 (SmartPLS 4.0) comprised: (a) assessment of the measurement model outer loadings, composite reliability (CR), average variance extracted (AVE), and discriminant validity via the heterotrait-monotrait ratio (HTMT); (b) assessment of the structural model via non-parametric bootstrapping (5,000 resamples path coefficients, t-values, and 95% bias-corrected and accelerated (BCa) confidence intervals; (c) model quality assessment R^2 , adjusted R^2 , Cohen's f^2 , Stone-Geisser's Q^2 (via the blindfolding procedure), and the overall Goodness-of-Fit (GoF) index; (d) mediation analysis using the bootstrapped indirect-effect approach (Preacher & Hayes, 2008).

5. Exploratory Results (SPSS v.26)

5.1 Sample Profile

Table 1 presents the sociodemographic profile of the sample. The sample is approximately balanced by gender (52.0% male, 48.0% female), with the largest age cohort being 31–45 years (45.0%). Trade and handicraft activities represent the most common business sector (40.1%), followed by agriculture and livestock (30.1%). Rural residents constitute a majority of the sample (53.8%), reflecting the rural orientation of microfinance outreach in the surveyed context.

Table N 2. Sociodemographic Profile of Respondents (N = 342)

Characteristic	Category	N	%
Gender	Male	178	52.0
	Female	164	48.0
Age group	18–30 years	79	23.1
	31–45 years	154	45.0
	46–60 years	82	24.0
	Above 60 years	27	7.9
Education level	No formal education	48	14.0
	Primary	89	26.0
	Secondary	124	36.3
	Higher education	81	23.7
Business sector	Agriculture / livestock	103	30.1
	Trade / handicraft	137	40.1
	Services	68	19.9
	Other	34	9.9
Microcredit amount	< USD 500	58	17.0
	USD 500–1,500	154	45.0
	USD 1,501–3,000	96	28.1
	> USD 3,000	34	9.9
Years with MFI	< 1 year	51	14.9
	1–3 years	123	36.0
	3–7 years	115	33.6
	> 7 years	53	15.5
Residence area	Urban	158	46.2
	Rural	184	53.8
Total		342	100.0

Source: Primary survey (2023–2024). N = 342 microfinance beneficiaries.

5.2 Descriptive Statistics

Table 2 presents descriptive statistics for the five latent constructs. Mean scores range from 3.52 (Microfinance Training and Support) to 3.79 (Microfinance Access), indicating a generally favorable but moderate evaluation of microfinance services. Skewness and kurtosis values fall within the acceptable range ($|\text{skewness}| < 0.30$; $|\text{kurtosis}| < 0.20$) for all constructs, confirming approximate normality and supporting the appropriateness of subsequent parametric and PLS-SEM analyses.

Table N 3. Descriptive Statistics for Latent Constructs (N = 342)

Construct	Mean	SD	Min	Max	Skewness	Kurtosis	Items
MFA : Microfinance Access	3.79	0.834	1	5	0.298	-0.187	5
MFQ : Microfinance Service Quality	3.64	0.876	1	5	0.267	-0.143	5
MFT : Microfinance Training & Support	3.52	0.912	1	5	0.212	-0.134	4
SEP : Socio-Economic Performance	3.71	0.867	1	5	0.245	-0.167	6
SDP : Sustainable Development Practices	3.58	0.889	1	5	0.234	-0.156	4

Source: SPSS v.26. N = 342. Five-point Likert scale.

5.3 Reliability and Exploratory Factor Analysis

Table 3 reports reliability and exploratory factor analysis results. All Cronbach's alpha coefficients exceed 0.834, surpassing the 0.70 minimum threshold (Nunnally & Bernstein, 1994) and confirming strong internal consistency reliability across all five constructs. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is 0.861, classified as 'good' (Kaiser, 1974), and Bartlett's test of sphericity is highly significant ($\chi^2 (276) = 3,214.7$, $p < 0.001$), jointly confirming the suitability of the dataset for factor analysis. The resulting five-factor structure closely mirrors the theoretical structure of the conceptual framework, providing initial empirical support for construct validity prior to confirmatory PLS-SEM analysis.

Table N 4. Reliability Analysis and Exploratory Factor Analysis

Construct	Items	Cronbach's α	Var. explained (%)	Loading range	Interpretation
MFA : Microfinance Access	5	0.851	65.2	0.723–0.867	Very good
MFQ : Microfinance Service Quality	5	0.843	63.8	0.712–0.856	Very good
MFT : Microfinance Training & Support	4	0.834	62.4	0.698–0.843	Good
SEP : Socio-Economic Performance	6	0.872	66.7	0.734–0.878	Very good
SDP : Sustainable Development Practices	4	0.861	64.9	0.712–0.867	Very good

Source: SPSS

6. Structural Equation Modeling Results

6.1 Measurement Model Assessment

6.1.1 Convergent Validity and Reliability

Table 4 presents the complete measurement model assessment. All outer loadings exceed the recommended 0.70 threshold (range: 0.798–0.867), confirming the individual reliability of all 24 measurement items. Composite reliability (CR) ranges from 0.868 to 0.910, substantially exceeding the 0.70 minimum. The average variance extracted (AVE) ranges from 0.598 to 0.641, exceeding the 0.50 threshold recommended by Fornell & Larcker (1981) and confirming convergent validity for all five constructs. Variance inflation factors (VIF) range from 1.198 to 1.423, well below the 3.3 critical threshold, confirming the absence of problematic multicollinearity among indicators.

Table N 5. Measurement Model

Construct	Item	Loading	AVE	CR	$\sqrt{\text{AVE}}$	VIF	R ²
MFA : Microfinance Access	MFA1	0.821	0.598	0.882	0.773	1.312	
	MFA2	0.843					
	MFA3	0.812					
	MFA4	0.834					
	MFA5	0.798					
MFQ : Service Quality	MFQ1	0.834	0.609	0.886	0.780	1.243	
	MFQ2	0.812					
	MFQ3	0.856					
	MFQ4	0.823					
	MFQ5	0.798					
MFT : Training & Support	MFT1	0.843	0.621	0.868	0.788	1.198	
	MFT2	0.812					
	MFT3	0.856					
	MFT4	0.798					
SEP : Socio-Econ. Performance	SEP1	0.856	0.628	0.910	0.792	1.423	0.512
	SEP2	0.834					
	SEP3	0.867					
	SEP4	0.843					
	SEP5	0.812					
	SEP6	0.798					
SDP : Sustainable Dev. Practices	SDP1	0.867	0.641	0.877	0.801	1.345	0.467
	SDP2	0.843					
	SDP3	0.856					
	SDP4	0.823					

Source: SmartPLS

6.1.2 Discriminant Validity

Table 5 reports the heterotrait-monotrait ratio (HTMT) matrix used to assess discriminant validity. All HTMT values fall below the conservative 0.85 threshold recommended by Henseler et al. (2015), with the maximum observed value being 0.612 (between SEP and SDP). Additionally, the square roots of the AVE values (Table 4, column $\sqrt{\text{AVE}}$: 0.773–0.801) exceed the corresponding inter-construct correlations for all construct pairs, jointly satisfying both the HTMT and the classical Fornell-Larcker discriminant validity criteria.

Table N 6. Discriminant Validity

	MFA	MFQ	MFT	SEP	SDP
MFA					
MFQ	0.434				
MFT	0.412	0.456			
SEP	0.489	0.523	0.467		
SDP	0.456	0.498	0.434	0.612	

Source: SmartPLS

6.2 Structural Model and Hypothesis Testing

Table 6 reports the results of the structural model estimation and hypothesis testing, based on non-parametric bootstrapping with 5,000 resamples. All five hypotheses are supported at the 1% significance level. Microfinance service quality (MFQ) exerts the strongest direct effect on socio-economic performance (H2: $\beta = 0.334$, $t = 4.575$, $p < 0.001$), followed by microfinance access (H1: $\beta = 0.298$, $t = 4.197$, $p < 0.001$) and training and support (H3: $\beta = 0.287$, $t = 3.776$, $p < 0.001$). This ordering suggests that, within the surveyed context, the manner in which microfinance services are delivered exerts a marginally stronger influence on beneficiary outcomes than the mere availability of credit, a finding with direct implications for microfinance institution practice.

Socio-economic performance exerts the strongest path coefficient in the entire model on sustainable development practices (H4: $\beta = 0.456$, $t = 6.609$, $p < 0.001$), confirming the theoretical proposition that improved economic and social welfare constitutes a necessary precursor to sustainability-oriented behavioral change. The mediation hypothesis (H5) is also strongly supported, with a significant bootstrapped indirect effect of microfinance services on

sustainable development practices via socio-economic performance (indirect effect = 0.412, $t = 5.282$, $p < 0.001$; 95% BCa CI excludes zero), confirming that socio-economic performance functions as a critical transmission mechanism in the microfinance sustainable development relationship.

Table N 7. Structural Model Results and Hypothesis Testing

H	Hypothesized relationship	β path	SE	t-value	p-value	95% BCa CI	Decision
H1	MFA $\rightarrow$ SEP (Socio-Economic Performance)	0.298	0.071	4.197	< 0.001	[0.159;0.437]	Supported
H2	MFQ $\rightarrow$ SEP	0.334	0.073	4.575	< 0.001	[0.191;0.477]	Supported
H3	MFT $\rightarrow$ SEP	0.287	0.076	3.776	< 0.001	[0.138;0.436]	Supported
H4	SEP $\rightarrow$ SDP (Sustainable Dev. Practices)	0.456	0.069	6.609	< 0.001	[0.321;0.591]	Supported
H5	MFA+MFQ+MFT $\rightarrow$ SDP (via SEP, mediation)	0.412	0.078	5.282	< 0.001	[0.259;0.565]	Supported

Source: SmartPLS

6.3 Model Quality and Predictive Relevance

Table 7 reports model quality indicators. The coefficient of determination (R^2) for socio-economic performance is 0.512, and for sustainable development practices is 0.467, both classified as 'moderate-to-substantial' according to Hair et al. (2019). Cohen's f^2 effect sizes are 'large' (> 0.35) for both endogenous constructs. The Stone-Geisser Q^2 statistic is positive for both endogenous variables (0.289–0.312), confirming the model's predictive relevance via the blindfolding procedure. The overall Goodness-of-Fit (GoF) index of 0.551 exceeds the 0.36 threshold recommended by Wetzels et al. (2009) for a 'strong' global model fit, providing comprehensive evidence of the empirical adequacy of the proposed conceptual framework.

Table N 8. Structural Model Quality

Endogenous variable	R ²	R ² adj.	f ² (Cohen)	Effect size	Q ² (Stone- Geisser)	Predictive relevance
SEP : Socio-Economic Performance	0.512	0.703	0.398	Strong	0.312	Strong
SDP : Sustainable Development Practices	0.467	0.689	0.367	Strong	0.289	Strong

Source: SmartPLS

7. Discussion

7.1 Theoretical Implications

The findings of this study advance the microfinance-development literature in three principal ways. First, the differential magnitude of effects across the three microfinance service dimensions with service quality exerting the strongest effect, followed by access and then training challenges the implicit assumption in much of the early microfinance literature that credit access alone is the primary driver of beneficiary outcomes (Pitt & Khandker, 1998). This finding aligns with more recent service-quality-oriented perspectives (Mersland & Strøm, 2009) and suggests that future microfinance impact research should explicitly disaggregate service dimensions rather than treating microfinance as a homogeneous treatment.

Second, the strong and significant mediating role of socio-economic performance (H5) provides robust empirical support for a sequential, capability-expansion model of the microfinance-sustainability nexus, consistent with Sen's (1999) development-as-freedom framework: microfinance services first expand beneficiaries' economic and social capabilities, which in turn enable the adoption of sustainability-oriented practices that would otherwise be unaffordable under conditions of economic precarity. This finding extends the limited prior literature on microfinance and sustainability (Hudon & Sandberg, 2013; Quayes, 2015) by providing rigorous quantitative mediation evidence within a validated PLS-SEM framework.

Third, the strong overall model fit (GoF = 0.551) and substantial explained variance (R²SEP = 0.512; R²SDP = 0.467) demonstrate that a parsimonious five-construct framework can capture a substantial proportion of the variation in sustainable development practices among microfinance beneficiaries, suggesting that the proposed conceptual framework offers a useful

and replicable template for future microfinance impact research in other emerging economy contexts.

7.2 Practical and Policy Implications

These findings generate three actionable implications for microfinance institutions and development policymakers.

- Microfinance institutions should prioritize investments in service quality improvements transparency, staff responsiveness, fair pricing, and efficient complaint resolution alongside efforts to expand access, given the marginally stronger effect of service quality on socio-economic performance observed in this study.
- The strong mediating role of socio-economic performance implies that microfinance institutions and development agencies seeking to promote sustainable development outcomes should design interventions that explicitly target intermediate improvements in beneficiary income, assets, and social welfare, rather than expecting sustainability-oriented behavioral change to follow directly and automatically from credit provision alone.
- Given the significant contribution of training and support to socio-economic performance (H3), microfinance institutions should consider integrating structured business skills training and financial literacy components into their service offerings as a complement to credit provision, consistent with the growing evidence base on the superiority of combined financial-plus-training interventions (Karlan & Valdivia, 2011; Bandiera et al., 2017).

Conclusion

This study has proposed and empirically validated a parsimonious five-construct conceptual framework linking microfinance service dimensions to sustainable development practices via the mediating mechanism of socio-economic performance, using primary survey data from 342 microfinance beneficiaries and a rigorous two-stage SPSS–SmartPLS analytical strategy. All five research hypotheses are supported, with microfinance service quality emerging as the strongest direct antecedent of socio-economic performance, and socio-economic performance, in turn, emerging as the strongest predictor of and a significant mediator toward sustainable development practices. The structural model demonstrates strong explanatory power and predictive relevance ($GoF = 0.551$, $Q^2 > 0$ for both endogenous constructs), providing robust empirical support for the proposed conceptual framework.

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