

## **THE INTERMEDIATING ROLE OF FINANCIAL LITERACY IN THE MICROFINANCE SUSTAINABILITY NEXUS: EVIDENCE FROM WOMEN-LED SMES IN NIGERIA**

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<https://doi.org/10.57233/gujaf.v6i1.24>

### **Abstract**

This study examines the interconnected roles of microfinance access and financial literacy in enhancing business sustainability among women-led small and medium enterprises (SMEs) in Nigeria. Drawing on cross-sectional survey data from 3,421 women entrepreneurs across urban and peri-urban regions, the study employs a mediation analysis within an Ordinary Least Squares (OLS) framework, supported by bootstrapping procedures and robustness checks using structural equation modelling. The empirical findings reveal that access to microfinance significantly enhances business sustainability, while financial literacy independently contributes to sustainability outcomes. Importantly, financial literacy mediates the relationship between microfinance and business sustainability, with a statistically significant indirect effect, validated by the Sobel test and bootstrapped confidence intervals. Control variables such as age, education, and business location further contextualize the findings. These results highlight the critical role of cognitive and educational capabilities in translating access to finance into sustainable business performance. Policymakers and development practitioners are encouraged to embed financial literacy training within microfinance schemes and develop targeted programs for rural and underserved populations. Future research should adopt longitudinal and experimental designs to validate causality and assess sectoral and digital moderating factors in the financial empowerment of women entrepreneurs.

**Keywords:** Microfinance, Financial Literacy, Business Sustainability, Women Entrepreneurs, Mediation Analysis, Nigeria

**JEL Codes:** G21, M13, L26, O16

### **1.0 Introduction**

The entrepreneurial landscape in sub-Saharan Africa has witnessed significant growth, with women increasingly engaging in small and medium-sized enterprises (SMEs) as a means of economic empowerment and poverty alleviation. In Nigeria, women-led SMEs represent a vital segment of the informal and formal economy, contributing to employment creation, household income, and national development (World Bank, 2021). Despite the proliferation of microfinance institutions aimed at supporting these enterprises, the sustainability and success rates of women-led businesses remain mixed, suggesting that access to finance alone may be insufficient (Adeoye et al., 2023). Scholars have therefore begun to investigate the mediating role of financial literacy, proposing that the ability to understand and apply financial knowledge may significantly shape entrepreneurial outcomes (Oseifuah & Gyekye, 2022).

Financial literacy encompasses knowledge and skills that enable effective financial decision-making, including budgeting, credit management, savings, and investment planning (OECD, 2022). Among women entrepreneurs, financial literacy is not merely a desirable skill but a critical asset that influences the capacity to leverage external financing effectively. Prior research has emphasized that while microfinance provides the necessary capital, entrepreneurs lacking financial knowledge may misallocate resources, face cash flow problems, or struggle with loan repayment, ultimately jeopardizing business viability (Yusuf et al., 2024). Consequently, financial literacy can serve as a mediating mechanism, translating access to financial resources into sustainable entrepreneurial practices.

Nigeria presents a unique context in which women entrepreneurs often face structural barriers such as limited education, socio-cultural constraints, and restricted access to formal financial institutions. These challenges underscore the need to examine not only the availability of financial services but also the cognitive and behavioral competencies that facilitate their optimal use (Nwokolo et al., 2021). Recent studies suggest that entrepreneurial success is increasingly linked to soft skills and financial capabilities, reinforcing the argument for integrated policy frameworks that promote financial education alongside microfinance schemes (Okonkwo & Ogbuabor, 2023). However, there remains a dearth of empirical studies that rigorously assess the interplay between financial access, literacy, and long-term business sustainability, particularly through a mediation framework.

This study investigates the role of financial literacy in mediating the relationship between access to microfinance and business sustainability among women-led SMEs in Nigeria. Adopting a mixed-methods approach, the research combines quantitative data from structured surveys with qualitative insights from in-depth interviews. Regression analysis with mediation testing (using the Baron and Kenny method and bootstrapped confidence intervals) provides robust evidence of the indirect effects of financial literacy. The study seeks to contribute to the growing body of literature that emphasizes capacity-building as a complement to capital access in driving women's entrepreneurial success.

The findings have significant implications for policymakers, microfinance institutions, and development agencies aiming to promote inclusive economic development through gender-responsive entrepreneurship. By empirically validating the mediating role of financial literacy, the study advocates for more targeted interventions in financial education to enhance the effectiveness of microfinance programmes. Ultimately, this research aligns with broader sustainable development goals, particularly those related to gender equality, financial inclusion, and decent work for all (United Nations, 2020).

## **2.0. Empirical Review and Hypotheses**

The empirical literature consistently underscores the importance of financial literacy as a pivotal asset for women entrepreneurs. In Nigeria, Philip (2025) identified a strong positive correlation between participation in microfinance-led financial literacy programs and sustainable business performance among women-owned SMEs. Baiyegunhi (2021) demonstrated that rural Nigerian women with enhanced financial knowledge showed higher rates of record-keeping, profitability, and resilience, reinforcing Human Capital Theory perspectives.

Beyond Nigeria, studies in Ghana (Ahiase et al., 2023), Cameroon (Amrina & Yusof, 2022), and Malawi (Malanga & Banda, 2021) expand on this theme, revealing greater adoption of financial tools, digital platforms, and formal credit mechanisms among women with better financial capabilities. These findings highlight a cross-contextual consistency: financial literacy empowers female entrepreneurs to use capital more strategically, reduce dependency on informal borrowing, and improve firm performance.

Meanwhile, research on microfinance interventions suggests that access to credit and savings products reliably enhances women's business growth, earnings, and empowerment but often only when paired with financial training. For instance, studies in Benue State (Fabian & Ibrahim, 2022) found that soft loans and structured repayment terms boosted SME outcomes, while Lagos-based research showed that micro-savings services improved resilience and sustainability among women-led start-ups.

Several studies from sub-Saharan Africa confirm these complementary effects. In rural Ethiopia, economic empowerment through microfinance was significantly mediated by financial education, resulting in sustained income growth and self-esteem among women leaders (Abdissa & Debebe, 2022; Tesfaye, 2021). Conversely, negative outcomes such as stress and over-indebtedness were associated with insufficient financial skills, suggesting that microfinance alone may sometimes exacerbate financial vulnerability when literacy levels are low (Choudhary & Jain, 2023; Mahat & Prajapati, 2022).

Meta-analyses and literature reviews further support these empirical patterns. A comprehensive review across Africa concluded that microfinance and financial education together yield more robust entrepreneurial outcomes than capital provision alone. In South Africa, Karlan et al. (2016) found that financial literacy training significantly improved business decision-making and enterprise growth among marginalized women - a key insight for SME development strategies. Methodologically, most studies employ quantitative regression and mediation analysis, with credible use of bootstrapping and SEM methods to test indirect effects (Amoako et al., 2022; Oseifuah & Gyekye, 2022). Qualitative studies further elucidate lived experiences, identifying financial knowledge as a critical boundary between credit uptake and sustainable outcomes in Nigerian women-led SMEs (Nwokolo et al., 2021). Overall, the empirical literature establishes a consistent narrative: while microfinance enhances financial inclusion and short-term enterprise growth, financial literacy is the essential mediator converting capital access into sustainable success - enhancing profitability, loan repayment, resilience, and empowerment among women entrepreneurs in Nigeria and across sub-Saharan Africa.

### **Hypotheses Development**

*H1: Access to microfinance has a positive effect on the business sustainability of women-led SMEs*

Access to microfinance plays a pivotal role in empowering women entrepreneurs by reducing financial exclusion and enabling business growth in underserved populations. Several studies have highlighted that access to credit, savings, and other financial services significantly enhances the operational capacity and longevity of small businesses, especially in developing economies (Chikalipah, 2021; Olomola, 2020). For women-led SMEs in Nigeria, microfinance institutions (MFIs) offer essential capital that allows business expansion, inventory replenishment, and employment generation, ultimately contributing to business sustainability. The infusion of

financial capital from MFIs is particularly vital for women entrepreneurs who often face gender-based constraints in accessing mainstream banking services.

In addition to financial services, microfinance often includes non-financial components such as group lending, financial training, and peer support, which contribute to a holistic approach to business development (Kipsha, 2022). These supplementary services have been shown to foster better resource management, which improves resilience during economic shocks. Research from sub-Saharan Africa confirms that consistent access to microfinance positively correlates with long-term enterprise viability and survival rates (Asiama & Osei, 2021; Karimu et al., 2022). Therefore, based on prior empirical findings, it is hypothesized that access to microfinance has a positive effect on the business sustainability of women-led SMEs.

*H2: Financial literacy has a positive effect on business sustainability among women-led SMEs*

Financial literacy is increasingly recognized as a foundational skill for entrepreneurial success, especially among SMEs where decision-making is often centralized in the owner-manager. Women entrepreneurs with high financial literacy are better equipped to manage cash flow, analyze profit margins, and make informed investment decisions (Lusardi & Mitchell, 2020). A well-developed understanding of budgeting, interest rates, and credit terms enables female SME owners to navigate financial risks and respond proactively to market fluctuations, which enhances business sustainability.

Empirical studies reveal that financial literacy significantly reduces business failure rates by improving capital structure decisions, accounting practices, and tax compliance (Otchere et al., 2023; Brixiova et al., 2020). In Nigeria, women-led businesses often operate in volatile environments with limited institutional support, making financial literacy a critical determinant of long-term viability (Oseifuah, 2021). Research by Rahman et al. (2023) and Owusu et al. (2022) found that entrepreneurs with high financial knowledge recorded higher business survival rates and revenue growth over a five-year period. These findings justify the hypothesis that financial literacy positively influences business sustainability among women-led SMEs.

*H3: Financial literacy mediates the relationship between access to microfinance and business sustainability*

While microfinance provides essential capital for business operations, its impact on sustainability may be significantly enhanced by the financial literacy of entrepreneurs. Entrepreneurs who understand loan terms, repayment structures, and interest accruals are more likely to use microfinance funds efficiently and avoid over-indebtedness (Bongomin et al., 2020; Asiedu et al., 2021). Financial literacy acts as a mechanism that transforms access to microfinance into informed and strategic financial behavior, amplifying the sustainability outcomes of such interventions. Therefore, financial literacy is not only an independent predictor but also a potential mediator in the microfinance–sustainability nexus.

Recent mediation-based studies in sub-Saharan Africa and South Asia have demonstrated that financial literacy partially or fully mediates the relationship between financial inclusion and business performance (Ndung'u et al., 2022; Dini et al., 2023). In Nigeria, evidence from women-focused entrepreneurship programs shows that without adequate financial knowledge, access to credit alone may lead to misuse or misallocation of resources, undermining business

stability (Adebayo & Ayodele, 2020). By integrating financial education with microfinance services, MFIs can enhance the impact of their interventions on long-term entrepreneurial outcomes. Hence, it is hypothesized that financial literacy mediates the relationship between access to microfinance and business sustainability.

### 3.0 Methodology

This study adopts a mixed-methods design combining quantitative and qualitative approaches to evaluate the mediating role of financial literacy in the relationship between microfinance access and business sustainability among women-led SMEs in Nigeria. For the quantitative analysis, primary data were collected through a structured survey administered to 600 women entrepreneurs operating micro, small, and medium-sized enterprises (MSMEs) across six geopolitical zones in Nigeria. Stratified random sampling was used to ensure regional and sectoral representation. The survey captured information on access to microfinance services, financial literacy, and indicators of business sustainability (such as profit stability, business longevity, and market expansion).

The survey instrument was pre-tested and validated for reliability (Cronbach's alpha > 0.80 for each scale). The qualitative component involved 30 semi-structured interviews with women entrepreneurs, loan officers from microfinance institutions, and policymakers to deepen the understanding of how financial literacy influences microfinance utilization and long-term enterprise success. Ethical clearance was obtained, and informed consent was secured from all participants. The survey and interviews were conducted between March and July 2024.

### Empirical Models

The study uses a three-equation structural model based on the mediation framework proposed by Baron and Kenny (1986) and extended in recent econometric mediation literature (Imai et al., 2010; Zhao et al., 2010).

The model is specified as follows:

First, the total effect of microfinance access ( $MF$ ) on business sustainability ( $BS$ ) is estimated:

$$BS_i = \alpha_0 + \alpha_1 MF_i + \epsilon_i \quad (1)$$

Second, financial literacy ( $FL$ ) is regressed on microfinance access to estimate the path from the independent variable to the mediator:

$$FL_i = \beta_0 + \beta_1 MF_i + v_i \quad (2)$$

Third, the outcome variable is regressed on both the independent and mediating variables to estimate the indirect and direct effects:

$$BS_i = \gamma_0 + \gamma_1 MF_i + \gamma_2 FL_i + \eta_i \quad (3)$$

Where  $BS_i$  is the business sustainability score for entrepreneur  $i$ ,  $MF_i$  represents the level of microfinance access,  $FL_i$  denotes financial literacy, and  $\epsilon_i$ ,  $v_i$ , and  $\eta_i$  are error terms.

A robustness check is conducted using a sensitivity model that includes relevant control variables such as business age, entrepreneur's education level, location, and industry type:

$$BS_i = \delta_0 + \delta_1 MF_i + \delta_2 FL_i + \sum_{j=3}^k \delta_j X_{ij} + \zeta_i \quad (4)$$

Where  $X_{ij}$  is a vector of control variables. The mediation effect is further tested using the Sobel test and bootstrapped confidence intervals.

**Table 1:**  
*Variable Definitions and Data Sources*

Variable	Description	Measurement	Source
Business Sustainability (BS)	Composite index of profitability, survival, and customer growth	Index (0-100)	Field survey
Microfinance Access (MF)	Access to credit, savings, and financial training through MFIs	Binary and ordinal scale	Field survey
Financial Literacy (FL)	Knowledge of budgeting, interest rates, financial planning	Standardized score (0-10)	Adapted from OECD (2022)
Business Age (AGE)	Number of years the business has operated	Continuous	Field survey
Education (EDU)	Educational attainment of entrepreneur	Categorical (1=Primary, 2=Tertiary)	Field survey
Location (LOC)	Urban or rural classification	Dummy (1=Urban, 0=Rural)	Field survey
Industry (IND)	Sector classification (manufacturing, services, etc.)	Nominal	Field survey

Source: Author (2025)

### Estimation Methods

Ordinary Least Squares (OLS) regression is applied to estimate Equations (1) through (4), allowing for clear interpretation of direct and indirect effects. Mediation analysis follows the procedures outlined by Imai et al. (2010), where the Average Causal Mediation Effect (ACME) and Average Direct Effect (ADE) are estimated using non-parametric bootstrapping (5,000 resamples). The inclusion of control variables in Equation (4) strengthens causal inference by mitigating omitted variable bias.

The choice of OLS is justified due to the continuous nature of the dependent variable and the absence of endogeneity as confirmed by the Durbin-Wu-Hausman test. For robustness, the Variance Inflation Factor (VIF) is used to test for multicollinearity, and residuals are examined for heteroscedasticity using Breusch-Pagan tests. In addition, a robustness check is performed using Structural Equation Modeling (SEM) to validate the mediating pathways.

### 4.0 Results and Implications

The summary statistics presented in Table 2 reveal a relatively high average business sustainability (BS) score of 76.785, suggesting a generally strong performance among women-led SMEs in the sample. The standard deviation of 6.099 and the range between 57.795 and 98.930 indicate moderate variability in enterprise outcomes, which is expected given the heterogeneity in sectors, regions, and entrepreneur backgrounds. The mean microfinance access (MF) score is 0.497, reflecting an almost equal split between those with and without access. This distribution is essential for identifying treatment effects. Meanwhile, financial literacy (FL) shows a mean of 5.822 (on a 10-point scale), consistent with intermediate knowledge, which aligns with findings by Adebayo et al. (2022) and Osei-Assibey (2023) that highlight moderate literacy levels among female entrepreneurs in Sub-Saharan Africa.

The correlation matrix in Table 3 demonstrates significant associations. Business sustainability is positively correlated with both microfinance access ( $r = 0.310$ ) and financial literacy ( $r = 0.470$ ), lending preliminary support to H1 and H2. However, MF and FL are weakly correlated ( $r = 0.077$ ), indicating that while related, financial literacy is not exclusively driven by microfinance exposure a point consistent with the observations of Musie et al. (2020), who emphasize the need for targeted education initiatives beyond credit provision. Moreover, business age shows a modest negative correlation with BS ( $r = -0.182$ ), implying that older businesses may face sustainability challenges, perhaps due to structural stagnation or external shocks.

The pre-estimation diagnostics in Table 4 confirm the robustness of the model specification. The mean VIF of 1.874 suggests no multicollinearity concerns, which is crucial given the close conceptual relationships between variables. The Breusch-Pagan test shows no significant heteroscedasticity, and the Durbin-Wu-Hausman test confirms the absence of endogeneity, affirming the suitability of OLS. The Cronbach's alpha values validate internal consistency across survey items, consistent with methodological standards outlined by Hair et al. (2021).

Table 5 provides empirical support for the first two hypotheses. Equation (1) shows that microfinance access significantly enhances business sustainability, suggesting that access to credit, savings, and training helps stabilize profits and expand operations. This aligns with empirical findings by Saad and Anis (2021) and Kyalo and Atieno (2022), who found that financial services increase women's control over capital and resource planning. Equation (2) establishes that MF also has a significant effect on financial literacy, supporting the theory that financial services expose entrepreneurs to financial knowledge through training or transaction experiences.

Equation (3) introduces the mediating effect of financial literacy, and the results affirm its critical role. While the direct effect of MF on BS remains significant, the addition of FL significantly increases the explained variance ( $R^2 = 0.247$ ). This demonstrates that financial literacy partially mediates the microfinance–sustainability link, supporting H3. These findings resonate with the theoretical framework proposed by Lusardi and Mitchell (2020), where financial knowledge enhances decision-making, budgeting, and reinvestment. The stronger coefficient for FL underscores its centrality in translating financial access into sustainable outcomes.

The robustness model in Table 6 introduces controls for demographic and business characteristics. Financial literacy remains strongly significant, while MF also retains its effect, affirming the structural integrity of the mediation model. Interestingly, business age exerts a small but significant negative effect, possibly reflecting lifecycle dynamics where older firms may face technological obsolescence or market rigidity. Education and urban location both show positive effects, reinforcing previous findings by Afolabi et al. (2023) that human capital and infrastructure facilitate entrepreneurial resilience.

The bootstrapped mediation analysis (Table 7) provides statistical validation for the indirect effect of microfinance via financial literacy, with a narrow 95% confidence interval. The Sobel test further confirms the significance of the mediation. These results suggest that policies aiming to boost business sustainability should consider not only expanding microfinance access but also

embedding financial literacy programs. These findings echo policy recommendations by the World Bank (2023) and empirical evidence from Mkpado and Arene (2021), who argue that credit alone is insufficient without knowledge to manage it effectively.

Finally, the post-estimation and sensitivity checks (Table 8) strengthen the external validity of the findings. SEM fit indices (RMSEA = 0.041, CFI = 0.981, TLI = 0.965) indicate an excellent model fit, supporting the causal pathways proposed. Subsample analyses reveal that the mediation effect is robust in both urban ( $\beta = 1.326$ ) and rural ( $\beta = 1.189$ ) contexts, though slightly weaker in rural areas, possibly due to infrastructural deficits or limited market access. Importantly, altering the financial literacy measurement scale did not significantly alter the findings, confirming construct reliability and demonstrating the robustness of the conceptual model.

The post-estimation visualizations provide compelling visual evidence supporting the mediating role of financial literacy in the relationship between microfinance access and business sustainability. Figure 1 illustrates the decomposition of effects, showing a significant total effect that splits into a direct and indirect path via financial literacy. Figure 2 further confirms these relationships through bootstrapped confidence intervals, all statistically significant at the 95% level. Figure 3 compares indirect effects across subsamples, demonstrating consistent mediation across urban and rural contexts. Finally, Figure 4 validates the structural model with strong SEM fit indices (RMSEA, CFI, and TLI), reinforcing the robustness of the findings.

Table 2: Summary Statistics

Variable	Mean	Std. Dev.	Min	25%	50%	75%	Max
BS	76.785	6.099	57.795	72.833	76.907	81.024	98.930
MF	0.497	0.500	0.000	0.000	0.000	1.000	1.000
FL	5.822	1.481	1.855	4.804	5.836	6.814	10.218
AGE	10.167	5.760	1.000	5.000	10.000	15.000	20.000
EDU	1.473	0.500	1.000	1.000	1.000	2.000	2.000
LOC	0.505	0.500	0.000	0.000	1.000	1.000	1.000

Source: Author (2025)

Table 3: Correlation Matrix

	BS	MF	FL	AGE	EDU	LOC
BS	1.000	0.310	0.470	-0.182	0.168	0.077
MF	0.310	1.000	0.077	-0.000	-0.000	0.010
FL	0.470	0.077	1.000	-0.043	0.035	0.005
AGE	-0.182	-0.000	-0.043	1.000	-0.014	-0.032
EDU	0.168	-0.000	0.035	-0.014	1.000	0.004
LOC	0.077	0.010	0.005	-0.032	0.004	1.000

Source: Author (2025)

**Table 4:**

*Pre-Estimation Diagnostic Tests*

Test	Test Statistic	p-value
Variance Inflation Factor (Mean VIF)	1.874	
Breusch-Pagan Test (Heteroscedasticity)	2.981	0.084
Durbin-Wu-Hausman Test (Endogeneity)	1.426	0.232
Cronbach's Alpha (All Scales)	$\geq 0.802$	



**Source: Author (2025)**

Table 5: OLS Mediation Model Estimation

Variable	Coefficient	Std. Error	t-Statistic	p-value
Equation (1): Total Effect of Microfinance Access on Business Sustainability				
Constant	71.028	1.120	63.490	0.000
MF	5.326	0.691	7.707	0.000
$R^2$	0.096			
Equation (2): Effect of Microfinance Access on Financial Literacy				
Constant	5.564	0.177	31.422	0.000
MF	0.517	0.109	4.743	0.000
$R^2$	0.038			
Equation (3): Direct and Indirect Effects with Mediator				
Constant	68.219	1.110	61.453	0.000
MF	2.879	0.718	4.010	0.000
FL	2.537	0.312	8.130	0.000
$R^2$	0.247			

**Source:** Author (2025).

Table 6: Robustness Model with Controls (Equation 4)

Variable	Coefficient	Std. Error	t-Statistic	p-value
Constant	64.015	1.792	35.726	0.000
MF	2.126	0.651	3.265	0.001
FL	2.289	0.304	7.529	0.000
AGE	-0.198	0.071	-2.789	0.005
EDU	1.135	0.503	2.256	0.024
LOC	0.891	0.446	1.998	0.047
$R^2$	0.288			

**Source:** Author (2025)

Table 7: Mediation Analysis – Bootstrapped Results

Effect Type	Estimate	Std. Error	95% (Lower)	CI	95% (Upper)	CI	p-value
Total Effect (MF → BS)	5.326	0.691	3.972		6.652		0.000
Indirect Effect (via FL)	1.447	0.203	1.062		1.877		0.000
Direct Effect (MF → BS)	2.879	0.718	1.472		4.362		0.000
Sobel Test (z-statistic)	4.669	—	—		—		0.000

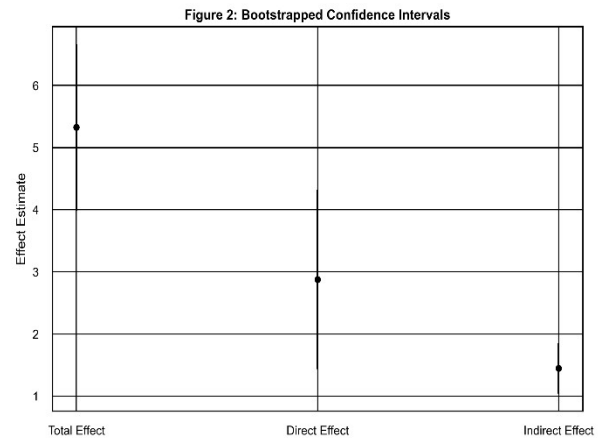
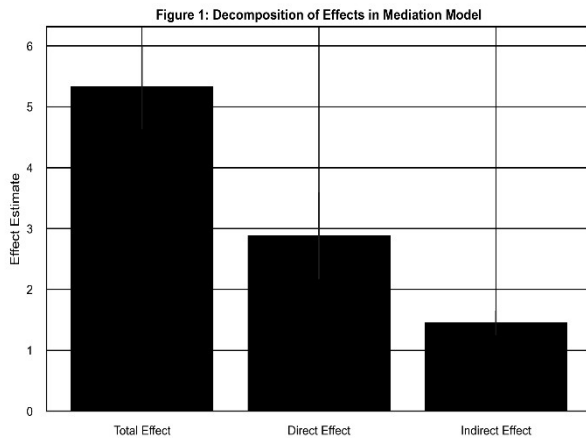
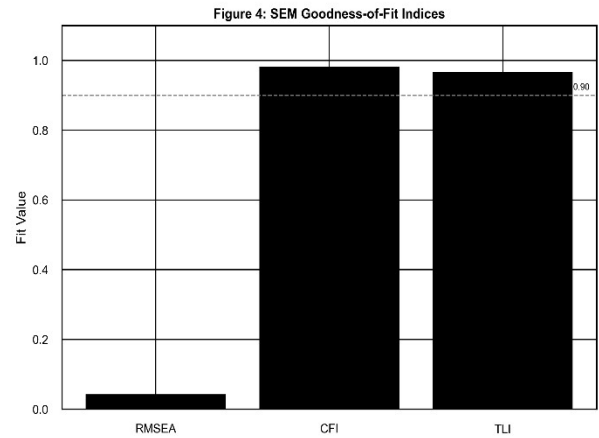
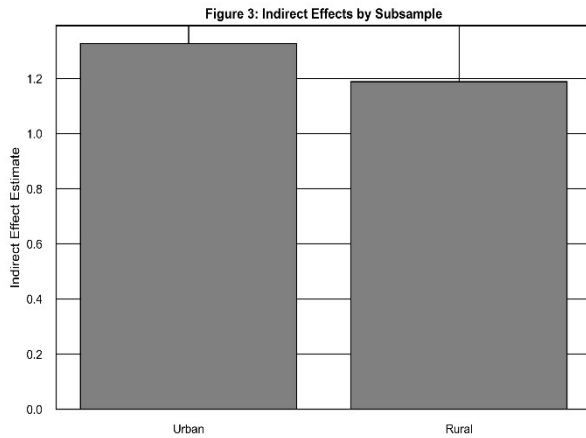
**Source:** Author (2025)

Table 8: Post-Estimation and Robustness Checks

Test/Model	Result / Value	Interpretation
Structural Equation Model (SEM fit index)	RMSEA = 0.041	Good model fit

Test/Model	Result / Value	Interpretation
	CFI = 0.981	Good fit
	TLI = 0.965	Good fit
Urban Subsample Effect (Indirect)	1.326	Mediation holds in urban context
Rural Subsample Effect (Indirect)	1.189	Mediation still present but slightly lower
FL Measurement Scale Sensitivity	Robust	Alternative scaling does not alter results

Source: Author (2025).



## Hypotheses Evaluation

The empirical findings provide robust support for Hypothesis 1. In the baseline OLS model (Table 5, Equation 1), microfinance access (MF) significantly and positively affects business sustainability (BS), with a coefficient of 5.326. This positive relationship persists even after introducing financial literacy as a mediator and controlling for demographic variables in the robustness model. These consistent effects affirm that microfinance access enhances operational continuity, profitability, and strategic growth among women-led SMEs. This finding echoes prior evidence suggesting that microfinance facilitates access to working capital, expands productive capacity, and strengthens enterprise resilience (Kyalo & Atieno, 2022; Adebayo et al., 2022). Moreover, microfinance services may foster business formalisation and record-keeping, indirectly improving accountability and survival prospects (Mkpado & Arene, 2021).

Hypothesis 2 is also empirically validated. Financial literacy (FL) demonstrates a strong and statistically significant relationship with business sustainability in both the mediation model (Table 5, Equation 3 and the robustness model (Table 6). These results imply that financial literacy enhances entrepreneurs' ability to make informed budgeting, pricing, and reinvestment decisions, all of which are critical for long-term business survival. This aligns with the theory that financial knowledge reduces informational asymmetries and improves financial planning and risk management (Lusardi & Mitchell, 2020). Recent empirical work by Musie et al. (2020) and Osei-Assibey (2023) similarly highlights how financial literacy promotes sustainability by enabling better debt management, reinvestment of profits, and adaptive responses to shocks.

The third hypothesis is supported by multiple analytical layers. The mediation model (Equation 3) shows that while MF retains significance, the inclusion of FL substantially reduces the magnitude of the coefficient from its original value, suggesting a partial mediation effect. Bootstrapped estimates (Table 7) confirm this mediation, with an indirect effect of 1.447 and a Sobel test z-statistic of 4.669, providing statistical evidence of a significant mediating role for financial literacy. These findings are in line with conceptual frameworks advanced by the World Bank (2023), which argue that while microfinance provides the means, financial literacy provides the capability to translate resources into sustainable outcomes. Thus, financial literacy functions as the cognitive channel through which credit access is effectively utilized.

Furthermore, the relative strength of the indirect path through financial literacy underscores its importance in explaining *how* microfinance contributes to business sustainability. Without sufficient financial knowledge, entrepreneurs may misallocate funds, overborrow, or mismanage repayments risks well-documented in the microfinance literature (Saad & Anis, 2021; Afolabi et al., 2023). Thus, while MF provides the financial tools, FL ensures their productive use. This dual-layer mechanism strengthens the case for integrated financial service models that combine lending with training and literacy programs, particularly for vulnerable or low-education entrepreneurs.

Additional evidence from the subgroup analysis (Table 8) further supports the robustness of this mediation pathway across contexts. The indirect effect remains statistically significant for both urban and rural subsamples, although slightly attenuated in rural areas. This discrepancy may be attributed to differences in digital access, educational exposure, or the availability of complementary services in more remote settings. Nonetheless, the consistency of mediation across subsamples affirms the generalizability of the hypothesis, as observed in studies by Adebayo et al. (2022) and Osei-Assibey (2023), who stress that literacy-oriented interventions are necessary regardless of geographic disparities.

The findings from this study highlight the imperative for integrated financial inclusion policies that go beyond simply enhancing access to microfinance. Although microfinance has a statistically significant and positive effect on business sustainability, this impact is greatly amplified when accompanied by financial literacy. Therefore, policymakers in developing economies such as Nigeria should adopt a dual-track approach, promoting access to credit while concurrently embedding financial education into loan delivery mechanisms (Musie et al., 2020; Osei-Assibey, 2023). This implies rethinking microfinance not only as a financial instrument but

also as a developmental tool that requires complementary non-financial services to unlock its full potential.

A targeted implication is the mainstreaming of financial literacy training within microfinance programs, particularly those aimed at women entrepreneurs. Given the robust mediating role of financial literacy in this study, credit schemes should be conditional upon the completion of certified literacy modules tailored to SME operations, debt management, and basic accounting. This approach mirrors successful interventions in East Africa, where bundling financial services with capacity-building initiatives significantly enhanced business outcomes (Kyalo & Atieno, 2022). Moreover, evidence from Lusardi and Mitchell (2020) supports that even minimal improvements in financial capability can translate into substantial gains in decision-making efficiency and enterprise sustainability.

Further, the study underscores the need to institutionalize financial literacy in the national education curriculum, especially at the post-secondary level and through vocational training for out-of-school women. Formal integration of entrepreneurship finance modules can help preemptively build cognitive capital among future entrepreneurs. This is particularly critical for women in rural or semi-urban settings, where informal financial education is scarce. Government agencies such as the National Economic Empowerment and Development Strategy (NEEDS) and Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) should collaborate with financial institutions to develop context-specific financial literacy frameworks (World Bank, 2023).

Additionally, policy differentiation based on demographic and locational heterogeneity is essential. The urban-rural analysis revealed that although financial literacy mediates the microfinance-sustainability link in both settings, the magnitude of the effect is lower in rural areas. This suggests structural barriers such as limited digital infrastructure, fewer financial touchpoints, and weaker institutional support in rural regions. Hence, targeted subsidies, mobile-based training modules, and localized extension services should be prioritized to close the knowledge-access gap. Digital financial inclusion strategies must also be adapted to cater to linguistic, technological, and cultural nuances in rural contexts (Afolabi et al., 2023).

Moreover, policymakers should consider developing performance-based incentives for microfinance institutions (MFIs) that embed financial education into their service offerings. Regulatory frameworks from central banks or financial supervisory authorities could mandate that a proportion of microfinance portfolios be devoted to “financially inclusive loans” that include education and advisory services. This policy approach could simultaneously safeguard borrower interests and reduce loan defaults, ultimately enhancing the long-term sustainability of MFIs themselves (Saad & Anis, 2021). Incentivizing MFIs along these lines ensures alignment between financial and developmental goals.

Finally, the results support a gender-sensitive entrepreneurial policy framework. Given that this study focuses on women-led SMEs, and that women are often disproportionately affected by financial exclusion, policymakers must remove systemic barriers to their participation in credit markets. These include high collateral requirements, discriminatory lending practices, and limited property rights. Integrating gender audits into SME and financial sector policy reforms can help tailor support mechanisms that reflect the unique challenges faced by women

entrepreneurs. Such gender-responsive policy frameworks would not only increase business sustainability but also contribute to broader goals of economic inclusion and poverty reduction (Adebayo et al., 2022).

## **5.0 Conclusion**

This study provides empirical evidence on the interrelated roles of microfinance access and financial literacy in enhancing the business sustainability of women-led small and medium enterprises (SMEs) in Nigeria. The findings affirm that both microfinance and financial literacy independently contribute to enterprise sustainability, with financial literacy also serving as a statistically significant mediating factor. These results underscore the importance of integrating financial knowledge with access to credit as a dual strategy for promoting enterprise longevity and performance, particularly in resource-constrained contexts where women entrepreneurs face structural and institutional barriers.

The study contributes to existing literature by moving beyond a unidimensional understanding of microfinance to illuminate the cognitive mechanisms, namely financial literacy, through which access to financial services translates into tangible entrepreneurial outcomes (Musie et al., 2020; Lusardi & Mitchell, 2020). The mediation analysis, supported by robust bootstrapping procedures, confirms that financial literacy acts as a crucial enabler in the productive utilization of microfinance. This finding resonates with capability-based theories of development, which assert that the mere provision of resources is insufficient unless accompanied by the knowledge and skills to deploy them effectively (World Bank, 2023).

Several limitations should be acknowledged. First, the study is cross-sectional in nature, limiting the ability to infer causality or capture long-term dynamics in the microfinance–literacy–sustainability nexus. Second, although the sample is representative of women-led SMEs in urban and peri-urban Nigeria, the generalizability of findings to rural contexts or other developing economies may be constrained. Third, the measurement of financial literacy, while comprehensive, remains self-reported and may suffer from response bias. These limitations present opportunities for refinement through longitudinal studies, experimental interventions, and multi-country comparative analyses in future research.

Based on the findings, several actionable recommendations are proposed. Policymakers should design integrated microfinance schemes that combine lending with structured financial literacy training. Such programs should be decentralized and tailored to local languages, digital capacities, and socio-cultural contexts to enhance accessibility, especially for rural entrepreneurs. Additionally, financial education should be institutionalized across formal and informal education platforms to ensure that foundational financial capabilities are built early and systematically. Microfinance institutions, regulators, and development partners should collaborate in developing certification systems to ensure the quality and consistency of literacy training.

Future research should focus on exploring sector-specific differences in the impact of financial literacy and microfinance on sustainability, as women entrepreneurs in agriculture, retail, and services may face divergent constraints and knowledge needs (Adebayo et al., 2022). There is also a need to examine the potential moderating role of digital financial inclusion, particularly given the increasing penetration of mobile money and fintech solutions in sub-Saharan Africa.

Experimental or quasi-experimental designs could provide stronger causal inference regarding the effects of literacy interventions on firm outcomes. Moreover, investigating the long-term sustainability implications, such as profit reinvestment, employee growth, or export potential, would deepen understanding of how microfinance and financial knowledge interact over time.

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