Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4, 2990-2999
2025
Publisher: Learning Gate
DOI: 10.55214/25768484.v9i4.6704

Operational sustainability of microfinance institutions in emerging economies: The role of institutional quality, technology, and macroeconomic conditions

Le Ngoc Thang[1*], Kim Thi Chung Nguyen[2], Thi Ho Huong Dao[3], Quoc Cuong Truong[4], Minh Nhat Nguyen[5]
[1,4,5]Banking Academy of Vietnam, Hanoi, Vietnam; thangln@hvnh.edu.vn (L.N.T.) Cuongtq@hvnh.edu.vn (Q.C.T.) minhnn@hvnh.edu.vn (M.N.N.)
[2,3]Faculty of Finance, Banking Academy of Vietnam, Hanoi, Vietnam; chungntk@hvnh.edu.vn (K.T.C.N.) huongdth@hvnh.edu.vn (T.H.H.D.)

Abstract: This study examines the key determinants shaping operational sustainability in Vietnamese microfinance institutions (MFIs), which play a vital role in advancing financial inclusion for marginalized populations. A quantitative survey was conducted with 311 MFI professionals, including credit officers, compliance staff, and middle managers. Exploratory Factor Analysis (EFA) validated the construct reliability, and multiple regression analysis was used to assess the influence of governance, digital transformation, business model diversification, macroeconomic conditions, and cost management. Governance and compliance ($\beta = 0.284$) and digital transformation ($\beta = 0.262$) were the most significant predictors of sustainability, followed by diversification ($\beta = 0.212$) and macroeconomic factors ($\beta = 0.163$). Cost management ($\beta = -0.062$) had no significant effect. The model explains 65.9% of the variance, confirming the strategic role of institutional quality and innovation over traditional cost-cutting approaches. To achieve long-term resilience, MFIs should prioritize strengthening governance structures, investing in digital capabilities, and diversifying service offerings. Policymakers and development partners are encouraged to support enabling frameworks that foster responsible innovation and institutional maturity in the Vietnamese microfinance sector.

Keywords: *Digital transformation, Governance, MFIs, Regression analysis, Sustainability, Vietnam.*

1. Introduction

MFIs have become pivotal in fostering financial inclusion and alleviating poverty, particularly in developing nations such as Vietnam. In contrast to conventional banking institutions, MFIs are designed to serve low-income populations, informal workers, and rural communities that are typically excluded from formal financial systems [1]. Through the provision of micro-loans, savings mechanisms, and essential non-financial services—including skills training and capacity development—MFIs contribute substantially to economic self-sufficiency and social upliftment.

Vietnam's microfinance landscape has evolved in response to both bottom-up demand and top-down policy facilitation. The traditional banking sector continues to fall short in meeting the credit needs of vulnerable populations, prompting the emergence and expansion of licensed and semi-formal microfinance providers [2]. While this growth has widened financial access in rural and peri-urban zones, it has also surfaced enduring concerns around institutional sustainability, governance efficiency, and vulnerability to external shocks. Operating with limited capital buffers and greater exposure to

History: Received: 27 February 2025; Revised: 11 April 2025; Accepted: 15 April 2025; Published: 29 April 2025
* Correspondence: thangln@hvnh.edu.vn

market volatility, MFIs require adaptive governance structures and internal mechanisms that differ markedly from those of commercial banks [3, 4].

A central concern in this context is operational sustainability—the institution's capacity to maintain financial health, fulfill its social mission, and preserve organizational coherence over time [5]. Numerous internal and external variables influence this sustainability, ranging from governance quality and regulatory compliance to digital infrastructure, service diversification, macroeconomic context, and operational cost control [6, 7]. Effective governance is particularly essential, as it mitigates agency problems, reinforces compliance, and enhances stakeholder confidence—especially critical for MFIs reliant on concessional funding or donor capital [8]. Moreover, a clear and transparent institutional framework strengthens credit risk assessment capabilities and supports resilience in the face of systemic uncertainties [9].

Digital transformation is increasingly shaping the trajectory of MFIs. Technological adoption—including mobile finance solutions, cloud-based tools, and data analytics—enables institutions to improve service delivery, extend outreach, and refine operational processes [10]. In Vietnam, rising digital literacy and widespread smartphone penetration provide fertile ground for fintech integration. However, uneven infrastructure and regional disparities in technological access remain considerable barriers to universal digital adoption [11]. At the same time, macroeconomic dynamics—such as inflation trends, interest rate fluctuations, and national economic performance—significantly affect both borrower solvency and institutional risk exposure [12, 13].

Service and product diversification offers yet another strategy for enhancing sustainability. Expanding into areas such as micro-insurance, savings schemes, or business support services can mitigate financial risks and deepen development impact. Nevertheless, such initiatives demand cautious implementation to avoid overburdening institutional capacity [14]. Despite these evolving dynamics, there remains a noticeable gap in research that holistically investigates the sustainability of MFIs in Vietnam. Most existing studies focus narrowly on financial ratios or outreach statistics, neglecting the complex interplay of organizational, technological, and macro-level factors [15].

To address this gap, the present study examines the combined influence of governance practices, compliance frameworks, digital transformation, business model diversification, cost efficiency, and macroeconomic conditions on the operational sustainability of Vietnamese MFIs. By situating these themes within both global theoretical models and the unique characteristics of Vietnam's microfinance environment, this research aims to provide nuanced insights for scholars and policymakers alike.

2. Literature Review and Hypothesis Development

Operational sustainability has emerged as a central concern in microfinance scholarship, as institutions worldwide grapple with the challenge of reconciling financial self-sufficiency with their broader developmental mandates. As MFIs increasingly compete in digitally evolving markets, their long-term viability hinges not only on internal capabilities but also on their responsiveness to external economic forces [5, 6]. This section synthesizes five prominent determinants of sustainability—governance and compliance, digital transformation, macroeconomic stability, business model diversification, and cost management—and develops corresponding hypotheses tailored to the Vietnamese context.

2.1. Governance and Compliance

Effective governance forms the bedrock of institutional sustainability, particularly in emerging economies where regulatory infrastructures may still be consolidating [2, 8]. Governance mechanisms help mitigate information asymmetries, enforce organizational accountability, and uphold legal compliance. For MFIs, which often engage with financially vulnerable populations and face heightened scrutiny regarding social performance, sound governance is also essential for ensuring alignment between mission and operations. Empirical findings suggest that MFIs with stronger governance structures tend to exhibit lower delinquency rates, greater client retention, and more efficient internal

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 2990-2999, 2025
DOI: 10.55214/25768484.v9i4.6704

processes [8, 9]. In Vietnam, where the microfinance sector encompasses both formally regulated and semi-formal entities, governance plays a critical role in ensuring institutional consistency amid evolving policy landscapes.

Hypothesis 1: Robust governance and compliance practices (GC) positively influence the operational sustainability of MFIs.

2.2. Digital Transformation

Technological innovation has reshaped the operational model of microfinance, enabling MFIs to expand their outreach, optimize costs, and enhance service delivery [10]. Tools such as mobile banking platforms, automated credit assessment systems, and cloud-based core banking solutions have facilitated increased scalability and client engagement. In Vietnam, high mobile phone penetration and proactive government support for digital financial services create conducive conditions for fintech integration in microfinance. However, the effectiveness of digital adoption depends on institutional readiness, workforce capacity, and infrastructural adequacy [6, 11]. Empirical research underscores that digital transformation contributes to operational agility, improved credit processes, and heightened client satisfaction.

Hypothesis 2: Digital transformation (DT) has a positive effect on the operational sustainability of MFIs.

2.3. Macroeconomic Conditions

Microfinance institutions typically operate within socioeconomically fragile environments, where borrowers are disproportionately affected by macro-level disruptions. Inflationary pressures, interest rate volatility, and fluctuations in GDP growth directly influence repayment behavior, credit demand, and the quality of loan portfolios [5, 12]. Stable macroeconomic conditions provide a foundation for MFIs to plan, manage liquidity, and safeguard portfolio health. Conversely, instability may undermine institutional solvency, distort lending strategies, and erode client trust. Unlike commercial banks, MFIs often rely on unsecured lending and external funding, making them particularly sensitive to systemic economic shifts.

Hypothesis 3: Favorable macroeconomic conditions (MF) positively impact the operational sustainability of MFIs.

2.4. Business Model Diversification

Diversification is widely regarded as a strategic lever for reducing income volatility and increasing institutional reach. By offering a mix of products—such as micro-insurance, voluntary savings, or entrepreneurial training—MFIs can cushion revenue streams and respond to diverse client needs [14]. Diversification also allows institutions to better withstand sector-specific shocks and expand into underserved segments. Nonetheless, diversification strategies must be carefully managed to avoid overextension of human and financial resources. In Vietnam, where many MFIs are still consolidating their operational models, phased and strategic diversification can enhance both mission fulfillment and long-term sustainability.

Hypothesis 4: Business model diversification (BM) positively contributes to the operational sustainability of MFIs.

2.5. Cost Management

Cost control remains a longstanding principle in institutional sustainability theory, especially for MFIs operating on slim margins and serving high-risk borrowers [6]. Efficient cost structures are traditionally associated with improved financial health and scalability. However, evolving scholarship suggests that in increasingly digitalized environments, institutional effectiveness may hinge more on innovation, service quality, and staff development than on aggressive cost-cutting. Indeed, excessive emphasis on cost reduction can undermine service delivery or compromise social impact goals.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 2990-2999, 2025
DOI: 10.55214/25768484.v9i4.6704

Empirical findings on the relationship between cost management and sustainability are mixed, reflecting a broader shift toward a more nuanced understanding of value creation in microfinance [7].

Hypothesis 5: Cost management (CM) has a limited or marginal influence on the operational sustainability of MFIs.

3. Methodology

3.1. Research Design

This study adopts a quantitative research approach to examine the key determinants influencing the operational sustainability of Vietnamese microfinance institutions (MFIs). Building existing theoretical frameworks from international and domestic literature, the research develops a causal model comprising five independent variables: governance and compliance (GC), digital transformation (DT), business model diversification (BM), macroeconomic conditions (MF), and cost management (CM). The dependent variable represents the perceived operational sustainability (OS) of MFIs, which encompasses their financial viability, institutional resilience, and ability to deliver long-term value to underserved clients. The empirical model used for hypothesis testing is expressed as:

$$TV = \beta_0 + \beta_1 CM + \beta_2 BM + \beta_3 DT + \beta_4 MF + \beta_1 GC + \varepsilon$$

Where: OS: Operational sustainability of NBFIs; CM: Cost management; BM: Business model diversification; DT: Digital transformation; MF: Macroeconomic conditions; GC: Governance and compliance; ε: Error term.

3.2. Data Collection

Primary data for this study were collected using a structured survey questionnaire administered to managerial and operational staff working in Vietnamese microfinance institutions (MFIs) between November 2023 and March 2024. The sample was selected using purposive sampling, targeting respondents with direct involvement in strategy, operations, credit management, or compliance functions. This approach ensured that the data reflect informed perspectives on institutional sustainability within the microfinance context. Out of 355 distributed questionnaires, 311 valid responses were retained for analysis, representing an effective response rate of 87.6%. This sample size satisfies recommended thresholds for quantitative analysis, particularly those outlined by Bollen [16] and Hair, et al. [17] which suggest a minimum of five respondents per indicator variable and at least 200 observations for multivariate regression analysis. The questionnaire design was based on established measurement constructs adopted from prior studies on financial institutions [6, 8, 14] and adapted to Vietnam's microfinance landscape. Each variable was measured using multiple items on a five-point Likert scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree"). A pilot test was conducted with 25 MFI staff to ensure language clarity, item reliability, and contextual appropriateness before the full-scale rollout.

4. Empirical Results

4.1. Survey Sample Characteristics

The 311 valid responses obtained reflect a diverse and representative cross-section of the Vietnamese microfinance sector. Gender distribution was relatively balanced, with a slight predominance of male respondents (54.3%). Respondents covered a broad age range, with the majority between 22 and 50 years old, consistent with the active working age in Vietnam's financial services industry. Educational qualifications were notably high: over 98% of respondents held at least a bachelor's degree, with a significant portion (59.16%) having completed postgraduate studies. Regarding job roles, the majority were either credit officers, compliance staff, or middle managers—roles that directly engage with operational and regulatory aspects of MFIs. Most participants had 5 to under 15 years of experience in the microfinance field, indicating a well-informed respondent base capable of offering reliable insights into institutional sustainability.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 2990-2999, 2025
DOI: 10.55214/25768484.v9i4.6704

Table 1.
Descriptive statistics of the sample by individual characteristics.

Personal Characteristics	Detail	Quantity	Percent (%)
Gender	Male	169	54.30
	Female	142	45.70
Age	22 - under 35	138	44.37
	From 35 – 50	127	40.83
	Above 50 years old	46	14.80
Academic qualification	Bachelor	124	39.87
	Master	184	59.16
	Doctorate	3	0.96
Job position	Specialist	203	65.27
	Manager	108	34.73
Experience duration	Under 5 years	83	26.69
	5 - under 10 years	116	37.30
	10 - under 15 years	89	28.62
	Above 15 years	23	7.39

4.2. Reliability Testing of the Measurement Scale

The results in Table 2 indicate that all variables have Cronbach's alpha coefficients > 0.7, and the variable-total correlations are > 0.3, demonstrating that the variables meet the requirements for reliability and can be used for further exploratory factor analysis (EFA).

Table 2.
Reliability testing of the measurement scale.

Observed variable	Number of observed variables	Cronbach's Alpha	Minimum total variable correlation coefficient
CM	4	0.793	0.508
BM	4	0.817	0.547
DT	3	0.778	0.562
MF	5	0.874	0.603
GC	4	0.841	0.615

4.3. Exploratory Factor Analysis

The results of the Exploratory Factor Analysis (EFA) indicate a high level of statistical adequacy for factor extraction, confirming the appropriateness of the dataset for multivariate analysis. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy yielded a value of 0.936, which exceeds the commonly accepted threshold of 0.90 and signifies excellent suitability for factor analysis. Furthermore, Bartlett's Test of Sphericity was highly significant ($\chi^2 = 3057.78$, $p < 0.001$), demonstrating that the intercorrelations among variables are sufficient for structure detection.

As presented in Table 3, the majority of observed variables loaded strongly on the first principal component, with most factor loadings exceeding 0.60, thereby providing empirical support for convergent validity. Among the highest loading variables were MF1 (0.746), GC1 (0.732), and BM1 (0.719), highlighting their central role in defining the latent construct of operational sustainability. Additionally, variables associated with digital transformation and cost management displayed moderate to strong loadings, indicating their meaningful contribution to the construct's multidimensional structure.

Notably, Component 2 captured secondary loadings for several cost-related items such as CM2 (0.462) and CM3 (0.518), suggesting the emergence of a distinct cost-efficiency dimension within the overall sustainability framework. This could reflect a nuanced substructure where operational cost variables form a latent subset within the broader model.

Some variables exhibited minor cross-loadings or weak negative associations—for instance, GC4 (-0.085) and MF4 (-0.301)—yet these values remained within acceptable limits and did not compromise

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 2990-2999, 2025
DOI: 10.55214/25768484.v9i4.6704

the factorial integrity. Such cross-loadings may reflect item-specific variation or conceptual overlap, but they do not detract from the overall robustness of the factor solution.

In summary, the EFA validates a coherent and theoretically sound factor structure encompassing five key dimensions: governance, digital transformation, business model diversification, macroeconomic environment, and cost management. These results confirm the construct validity and reliability of the measurement instrument and support its use in subsequent regression analysis to examine the drivers of operational sustainability in Vietnamese MFIs.

Table 3.
Results of Exploratory Factor Analysis (EFA).

KMO coefficient		0.936
Bartlett's Test	Approx. Chi-Square	3057.78
	df	190
	Sig.	0.000

Table 4.
Results of Exploratory Factor Analysis (EFA).

	Component	
	1	**2**
MF1	0.746	-0.214
GC1	0.732	
MF4	0.728	-0.301
BM1	0.719	0.108
DT1	0.712	-0.097
CM4	0.699	0.351
MF5	0.694	-0.091
BM4	0.685	-0.132
CM1	0.674	0.467
DT3	0.662	-0.235
MF3	0.659	-0.179
BM3	0.649	
GC3	0.643	
MF2	0.637	-0.284
DT2	0.631	
GC2	0.621	0.103
BM2	0.618	
GC4	0.603	-0.085
CM3	0.591	0.518
CM2	0.532	0.462

Table 5.
Analysis of the correlation between factors.

Variable	**CM**	**BM**	**DT**	**MF**	**GC**	**OS**
CM	1.000					
BM	0.587	1.000				
DT	0.523	0.634	1.000			
MF	0.549	0.678	0.693	1.000		
GC	0.564	0.601	0.611	0.690	1.000	
OS	0.532	0.668	0.705	0.714	0.721	1.000

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 2990-2999, 2025
DOI: 10.55214/25768484.v9i4.6704

The Pearson correlation matrix in Table 5 reveals no multicollinearity issues among the independent variables, as all correlation coefficients fall below the critical threshold of 0.8. The strongest correlations with operational sustainability (OS) are observed for governance and compliance (GC, r = 0.721), digital transformation (DT, r = 0.705), and macroeconomic conditions (MF, r = 0.714), suggesting these factors are highly influential for the long-term viability of MFIs. Cost management (CM) shows a relatively weaker correlation (r = 0.532), consistent with findings in recent literature highlighting the diminishing standalone role of financial efficiency in innovation-driven microfinance models.

Table 6.
Regression model results.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
	(Constant)	0.684	0.159		4.301	0	0.684	0.159
	CM	-0.057	0.061	-0.062	-0.934	0.351	-0.057	0.061
	BM	0.193	0.063	0.212	3.063	0.002	0.193	0.063
	DT	0.229	0.059	0.262	3.881	0	0.229	0.059
	MF	0.158	0.074	0.163	2.135	0.034	0.158	0.074
	GC	0.271	0.067	0.284	4.045	0	0.271	0.067
Adjusted R = 65,9%								
Durbin – Watson = 1.904								
Sig. of ANOVA test = 0.000								

4.4. Results Discussions

The empirical findings of this study provide critical insights into the determinants influencing the operational sustainability of Vietnamese microfinance institutions (MFIs). With an adjusted R^2 of 65.9%, the regression model demonstrates robust explanatory power, indicating that the selected variables—governance and compliance, digital transformation, macroeconomic conditions, business model diversification, and cost management—collectively account for a significant proportion of the variance in perceived sustainability.

Governance and Compliance (GC) emerged as the most influential predictor ($\beta = 0.284$, $p < 0.001$), underscoring the centrality of institutional governance in the sustainability discourse. This finding reaffirms that robust governance systems are essential for MFIs operating in transitional regulatory environments, such as Vietnam's, where many institutions remain semi-formal or NGO-based. Effective governance—through internal audits, transparent leadership, regulatory compliance, and mission alignment—reduces agency costs, enhances stakeholder trust, and ensures operational continuity. Prior research has consistently linked governance quality with reduced credit risk, improved client retention, and heightened institutional legitimacy [8, 9]. For Vietnamese MFIs, increasingly subject to oversight from the State Bank of Vietnam and development agencies, the evidence strongly suggests that governance must be treated as a strategic asset, not merely a compliance requirement.

Digital Transformation (DT) was also a significant and positive determinant ($\beta = 0.262$, $p < 0.001$), affirming the transformative impact of technology on microfinance operations. Digital tools such as mobile banking, cloud-based management information systems, and AI-supported credit scoring have enabled MFIs to scale their outreach, lower transaction costs, and improve service quality. In Vietnam, where mobile penetration is rapidly increasing, even in rural areas, digitalization has become not only feasible but imperative [10, 11]. This finding aligns with global evidence suggesting that digital maturity enhances institutional agility and client satisfaction. However, the significance of DT also implies that MFIs failing to invest in digital infrastructure risk becoming obsolete, particularly as client expectations and competitive pressures intensify.

Macroeconomic Factors (MF) showed a moderate but statistically significant effect on sustainability ($\beta = 0.163$, $p = 0.034$). This outcome confirms that MFIs, due to their clientele's exposure to informal

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 2990-2999, 2025
DOI: 10.55214/25768484.v9i4.6704

sectors and limited financial resilience, are more vulnerable to macroeconomic fluctuations than commercial banks. Variables such as inflation, interest rate volatility, and GDP growth influence repayment capacity, loan demand, and overall portfolio performance. In Vietnam, economic stability enhances MFIs' ability to plan strategically and manage liquidity, whereas volatility increases institutional risk and client default rates. While MFIs cannot directly control macroeconomic shocks, the findings suggest the necessity of building adaptive risk models and financial buffers to mitigate external vulnerabilities.

Business Model Diversification (BM) also demonstrated a positive and statistically significant influence on sustainability ($\beta = 0.212$, $p = 0.002$). Diversified MFIs—those offering a mix of credit, savings, insurance, and non-financial services—are better equipped to stabilize revenues and deepen client engagement. For Vietnamese MFIs, currently concentrated in microcredit provision, this result signals a strategic opportunity to develop more holistic service portfolios. However, the relatively smaller effect size compared to governance and digitalization implies that diversification alone does not guarantee sustainability unless supported by strong institutional capacity and risk management frameworks. Unplanned or misaligned diversification could otherwise strain resources or dilute mission effectiveness.

Conversely, Cost Management (CM) showed no statistically significant effect on operational sustainability ($\beta = -0.062$, $p = 0.351$), indicating a shift in performance paradigms within the microfinance sector. Traditional models often emphasized cost-efficiency as a cornerstone of sustainability, particularly in donor-funded or subsidy-dependent contexts. However, in an era dominated by digital transformation and client-centric approaches, excessive cost-cutting may inhibit innovation, compromise service delivery, and limit staff capacity. These results suggest that MFIs must prioritize strategic investments in technology, talent, and governance—even at the expense of short-term cost increases. In today's environment, intelligent spending aimed at long-term capability building may yield greater sustainability than mere frugality.

5. Conclusions

This study presents robust empirical evidence on the determinants of operational sustainability among MFIs in Vietnam. The findings underscore that governance and compliance and digital transformation are the most influential drivers of long-term institutional resilience, followed by macroeconomic stability and business model diversification. These results reflect the evolving strategic priorities of MFIs in the context of a rapidly changing financial landscape, where institutional quality and technological innovation have become central to achieving both financial viability and social outreach.

The analysis reveals that robust governance frameworks—including regulatory compliance, supervisory mechanisms, and transparent internal controls—not only foster accountability but also enhance institutional credibility and risk mitigation capacity. Simultaneously, digital innovation functions as a dual lever: it streamlines operational efficiency while expanding outreach, enabling MFIs to deliver services at scale, reduce transaction costs, and serve remote or underserved populations more effectively.

While macroeconomic conditions remain an external but significant factor—affecting client repayment behavior and access to capital—MFIs can strengthen resilience by integrating dynamic risk management systems and building financial buffers. Furthermore, business model diversification, through the inclusion of complementary services such as micro-savings, insurance, and financial literacy programs, offers meaningful potential to broaden revenue streams and deepen client engagement. However, such diversification must be strategically managed to avoid operational overreach.

Interestingly, the study finds that cost management exerts no significant influence on sustainability, signaling a shift from traditional efficiency-focused models toward more adaptive and investment-oriented approaches. In this context, operational sustainability is increasingly driven by institutional agility, innovation capacity, and strategic investment rather than by cost minimization alone.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 2990-2999, 2025
DOI: 10.55214/25768484.v9i4.6704

Policy and Managerial Implications: The findings offer actionable insights for policymakers, development practitioners, and MFI leaders. Specifically, efforts to enhance sector sustainability should prioritize the strengthening of governance systems, the acceleration of digital infrastructure adoption, and the development of diversified, client-centric service portfolios. Regulatory bodies such as the State Bank of Vietnam can play a catalytic role by promoting digital integration and establishing capacity-building programs that reinforce institutional governance.

Future Research Directions: Building on these findings, future research could employ longitudinal or panel data to capture dynamic shifts over time, or undertake comparative analyses across Southeast Asian economies to examine how institutional, regulatory, and technological contexts shape sustainability outcomes within the microfinance sector.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Acknowledgment:

The authors gratefully acknowledge the financial support from the Banking Academy of Vietnam.

References

[1] A. De la Torre, M. S. M. Pería, and S. L. Schmukler, "Bank involvement with SMEs: Beyond relationship lending," *Journal of Banking & Finance*, vol. 34, no. 9, pp. 2280-2293, 2010. https://doi.org/10.1016/j.jbankfin.2010.02.014

[2] R. Matousek, T. Nguyen, and C. Stewart, "Risk management of the banking system: An emerging market survey," *Risk Governance and Control: Financial Markets and Institutions*, vol. 8, no. 3, pp. 7-20, 2018.

[3] A. V. Thakor, "Fintech and banking: What do we know?," *Journal of Financial Intermediation*, vol. 41, p. 100833, 2020. http://doi.org/10.22495/rgcv8i3p1

[4] Z. S. Masanyiwa, T. N. Chusi, and A. U. Haji, "Determinants for sustainability of microfinance institutions in North 'A' District in Zanzibar," *Open Journal of Business and Management*, vol. 10, no. 3, pp. 1434–1450, 2022. https://doi.org/10.4236/ojbm.2022.103076

[5] A. C. Bertay, A. Demirgüç-Kunt, and H. Huizinga, "Bank ownership and credit over the business cycle: Is lending by state banks less procyclical?," *Journal of Banking & Finance*, vol. 50, pp. 326-339, 2015. https://doi.org/10.1016/j.jbankfin.2014.03.012

[6] C.-S. Liao, "How does fintech affect bank efficiency in Taiwan?," *Plos One*, vol. 18, no. 8, p. e0289629, 2023. https://doi.org/10.1371/journal.pone.0289629

[7] T. Hendershott, X. Zhang, J. L. Zhao, and Z. Zheng, "FinTech as a game changer: Overview of research frontiers," *Information Systems Research*, vol. 32, no. 1, pp. 1-17, 2021. https://doi.org/10.1287/isre.2021.0997

[8] S. Chauhan, A. Verma, and C. V. Kumar, "Effect of capital structure on the financial and social performance of Indian microfinance institutions," *FIIB Business Review*, vol. 13, no. 2, pp. 243-256, 2024. https://doi.org/10.1177/23197145221099677

[9] A. Oyegunle, "An assessment of sustainable banking regulations in emerging economies," Master's Thesis, University of Waterloo, 2016.

[10] M. M. S. Islam, "Fintech revolution of non-banks and future survival of banks: A systematic review," *Iliria International Review*, vol. 11, no. 1, pp. 84–103, 2021. https://doi.org/10.21113/iir.v11i1.609

[11] S. Khin and T. C. Ho, "Digital technology, digital capability and organizational performance: A mediating role of digital innovation," *International Journal of Innovation Science*, vol. 11, no. 2, pp. 177-195, 2019. https://doi.org/10.1108/IJIS-08-2018-0083

[12] J. E. Stiglitz and A. Weiss, "Credit rationing in markets with imperfect information," *The American Economic Review*, vol. 71, no. 3, pp. 393-410, 1981.

[13] B. Fritz and L. Mühlich, "Regional financial arrangements in the global financial safety net: The Arab Monetary Fund and the Eurasian Fund for Stabilization and Development," *Development and Change*, vol. 50, no. 1, pp. 96-121, 2019. https://doi.org/10.1111/dech.12466

[14] Z. Xie *et al.*, "Achieving financial sustainability through revenue diversification: A green pathway for financial institutions in Asia," *Sustainability*, vol. 14, no. 6, p. 3512, 2022. https://doi.org/10.3390/su14063512
[15] A. B. Siddik, M. Masukujjaman, and N. Fatema, "Factors affecting the sustainability performance of financial institutions in Bangladesh: The role of green finance," *Sustainability*, vol. 13, no. 18, p. 10165, 2021. https://doi.org/10.3390/su131810165
[16] K. A. Bollen, *Structural equations with latent variables*. New York: John Wiley & Sons, 1998.
[17] J. F. Hair, R. E. Anderson, R. L. Tatham, and W. C. Black, *Multivariate data analysis*, 5th ed. Upper Saddle River, NJ: Prentice-Hall, 1998.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 2990-2999, 2025
DOI: 10.55214/25768484.v9i4.6704