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Sustainability Based MSME Financing Policy Model: Integrating Leadership, Financial Literacy, and Financing Access in East Java

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ABSTRACT

This study aims to formulate an integrated financing policy model for micro, small, and medium enterprises (MSMEs) in Indonesia by incorporating sustainable leadership and financial literacy dimensions. Although prior studies examine MSME financing separately from leadership and sustainability aspects, limited research develops a comprehensive structural framework linking policy design, behavioral financial capability, and business sustainability. This study employs a quantitative survey approach involving MSME actors across various sectors in Indonesia, using validated structured questionnaires and structural equation modeling (SEM) for data analysis. The findings reveal that financing policy significantly improves access to formal financing, enhances financial literacy, and promotes sustainable finance practices. Financial literacy mediates the relationship between financing policy and MSMEs' financing access, while sustainability-oriented leadership strengthens policy effectiveness in fostering an inclusive and responsible financing ecosystem. The novelty of this study lies in integrating policy, leadership, and financial capability into a unified model that explains MSME sustainability. The results provide empirical support for adaptive, literacy-driven financing policies to enhance MSME competitiveness and resilience.

1. Introduction

Micro, Small, and Medium Enterprises (MSMEs) constitute the backbone of Indonesia's economy, contributing substantially to national economic growth, employment generation, and income distribution (Balasubramanian et al., 2024). According to the Ministry of Cooperatives and SMEs, more than 99% of business entities in Indonesia belong to the MSME sector, accounting for approximately 61% of the national Gross Domestic Product (GDP) and providing employment for nearly 97% of the workforce (Udawattha et al., 2023). These figures demonstrate that the sustainability and competitiveness of MSMEs are fundamental to maintaining long-term economic resilience, particularly during the post-pandemic economic recovery (kumar Sahoo et al., 2025). Despite their significant economic contribution, many Indonesian MSMEs continue to encounter structural barriers that limit their business development (Mittal & Raman, 2022). Among these challenges, inadequate access to formal financing remains one of the most critical constraints (Maiti, 2018). Although various government financing initiatives have been introduced to improve financial inclusion, many MSMEs still struggle to obtain affordable and sustainable financing because of limited financial capability, insufficient documentation, and institutional lending requirements (Khurana et al., 2022). Consequently, financing policy should not merely expand credit availability but also strengthen the overall financial ecosystem that supports MSME growth (Esubalew, 2024).

According to Stoian & Iorgulescu, (2020), this disparity also highlights the necessity of a paradigm change from a conventional approach to a financing policy that is focused on sustainable finance. Conventional approaches have typically concentrated on short-term economic factors like growth, profitability, and repayment capacity. They haven't, however, given social, environmental, and governance (ESG) effects enough thought. Implementing sustainable finance principles in the MSME sector can boost firm competitiveness by 25%–30%, lower default risk by 15%–20%, and raise business resilience to shocks to economic stability and the business climate, according to the World Bank (2020) and the OECD (2023). Additionally, according to the Indonesia Sustainable Finance Roadmap OJK (2024) report, the national banking sector's share of sustainable finance financing has only reached about 15.3% of the total credit portfolio, and the majority of this is still directed toward the large corporate sector rather than the MSME sector. This is true even though over 70% of Indonesia's MSME sector works in industries including agriculture, fisheries, trade, and small-scale manufacturing that are thought to be sensitive to a number of environmental challenges. Therefore, putting in place a funding plan that considers sustainability will boost competitiveness, but also directly contribute to the accomplishment of the Sustainable Development Goals (SDGs), especially points 8 (Decent Work and Economic Growth) and 9 (Industry, Innovation and Infrastructure).

MSME financing has attracted considerable scholarly attention over the past decade because of its strategic role in supporting economic growth and financial inclusion in developing countries. Previous studies have primarily investigated financing accessibility from an institutional perspective, emphasizing structural barriers such as collateral requirements, asymmetric information, bureaucratic lending procedures, and financial institutions' risk perceptions as the principal constraints limiting MSMEs' access to formal credit (Flifli et al., 2020). Another stream of research highlights Financial Literacy as a critical determinant of MSME financial performance. Empirical evidence suggests that entrepreneurs with stronger financial literacy possess better financial management skills, are more capable of preparing reliable financial reports, and demonstrate higher creditworthiness, thereby increasing their likelihood of obtaining external financing (Anshika & Singla, 2022). In parallel, the growing literature on sustainable finance emphasizes that financial systems should no longer focus solely on economic returns but also incorporate environmental, social, and governance (ESG) principles to promote long-term business resilience (Stoicescu & Sima, 2024). Likewise, sustainability leadership has been recognized as an important organizational capability that encourages responsible decision-making, ethical business practices, and long-term strategic orientation (Le, 2022). Despite these important contributions, previous studies have largely investigated Financing Policy, Financial Literacy, Sustainability Leadership , and Business Sustainability as independent constructs. Very limited empirical research has attempted to integrate these variables into a comprehensive framework capable of explaining how financing policy simultaneously influences financial literacy, access to financing, and sustainability outcomes among MSMEs. Consequently, the interaction mechanisms through which institutional policy, financial capability, and leadership orientation collectively enhance MSME sustainability remain insufficiently understood. This conceptual fragmentation represents an important research gap that warrants further investigation through an integrated structural model.

Previous research, however, typically looks at these dimensions independently. Financial literacy research seldom takes policy structure into account as an enabling system, and financing policy is frequently examined without taking behavioral financial capacity into account (Sharma & Kumar, 2020). Similar to this, leadership studies usually concentrate on organizational performance without making a clear connection between funding access systems and leadership attitude. The lack of an integrated structural model that concurrently explains how policy design, financial literacy, and sustainable leadership interact to affect MSME sustainability outcomes is indicated by this conceptual fragmentation (Babber & Mittal, 2025). As a result, there is still a large theoretical and empirical knowledge gap regarding the systemic integration of these variables.The shift to a sustainable financing system is also consistent with global trends like green finance, socially responsible investment (SRI), and sustainable banking, which have been implemented in a number of developing ASEAN nations, including Malaysia and Thailand. These countries have been successful in growing and increasing the share of green credit for the MSME sector to reach 35% of total microfinance through tax incentives and interest subsidies for business actors who adopt environmentally friendly practices (Afrogha et al., 2026). Adoption of a comparable idea is still restricted to less than 10% of all MSME financing in Indonesia (Saifurrahman & Kassim, 2024), which highlights the need for more robust affirmative measures to support the financial sector by directing sustainability-based financing.

Building upon the identified research gap, this study argues that improving MSME sustainability requires a financing policy framework that extends beyond expanding access to credit by integrating behavioral and organizational dimensions into policy implementation (kumar Sahoo et al., 2025). Although previous studies have examined financing policy, financial literacy, sustainability leadership, and business sustainability separately, limited empirical evidence explains how these constructs interact within a unified structural framework. Therefore, this study proposes an integrated model linking Financing Policy, Financial Literacy, Access to Financing, Financial Capability, Sustainability Leadership, Sustainable Finance, and Business Sustainability to explain the mechanisms through which financing policy enhances

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MSME resilience and long-term sustainability. The novelty of this research lies in integrating institutional policy, behavioral financial capability, and sustainability-oriented leadership into a single analytical model, with Financial Literacy serving as a mediating variable and Sustainability Leadership functioning as a reinforcing mechanism. Accordingly, this study aims to develop and empirically validate a sustainability-based financing policy model that provides both theoretical contributions to the sustainable finance literature and practical recommendations for policymakers and financial institutions in strengthening the competitiveness and resilience of East Java MSMEs.

2. Literature Review

MSME Financing and Financial Access

The contribution of Micro, Small, and Medium-Sized Enterprises (MSMEs) to economic development has grown in importance in economic and financial research during the last ten years. MSMEs are widely acknowledged as important drivers of national economic growth, poverty alleviation, and employment creation, especially in emerging nations. MSMEs have a substantial impact on GDP and labor absorption, according to empirical research, but their ability to grow is sometimes hindered by a lack of access to formal financial services (Nursini, 2020). One of the most enduring obstacles to MSME development in emerging nations is still a lack of funding. Numerous studies show that because MSMEs have little collateral, poor financial records, and uncertainty about the viability of their businesses, financial institutions frequently see them as high-risk borrowers (Pendame & Akotey, 2023). According to Dashottar & Srivastava, (2021), because existing banking systems mostly focus on formal financial reporting and collateral requirements, credit risk assessment methods often penalize small enterprises. Because of this, a lot of MSMEs depend on unofficial funding sources including trade credit, family networks, and unofficial lenders, which are usually more costly and unreliable.

Goverments in many developing on many countries have implemented various financing policies including subsidized credit, credit guarantee schemes, and financial inclusion programs, to improve MSMEs' acces to formal financial services (Kumarasamy et al., 2024). Although these initiatives have expanded financing opportunities, their effectiveness remains constrained because many MSMEs continue to face internal challenges such as limited financial literacy, weak financial management, in adequate business documentation, and low organizational readiness(Motta, 2020). Consequently, by improving financing accessibility requires more than institutional support or increased credit availability alone. A comprehensive financing policy should integrate, institutional mechanisms with entrepreneurs financial capability and organizational to ensure that external financing can be effectively utilized to strengthen long term business sustainability.

Financial Literacy and MSME Financial Capability

Financial literacy plays a fundamental role in enabling MSME owners to understand financial concepts, evaluate financing alternatives, and make informed business decisions(Dewi et al., 2020). Nevertheless, many entrepreneurs in developing economies continue to experience limited financial capability because of inadequate financial knowledge, insufficient exposure to financial education, and low utilization of formal financial management practices(kumar Sahoo et al., 2025). These limitations often reduce their ability to prepare reliable financial records, assess financing opportunities, and allocate financial resources effectively, thereby constraining business growth and competitiveness(Dekamini et al., 2024).

The effectiveness of financing policies is closely related to the financial capability of MSME owners(Goyal & Kumar, 2021). Although governments and financial institutions have introduced various financing programs to improve credit accessibility, these initiatives may not achieve optimal results when entrepreneurs are unable to understand financing requirements or manage external funds efficiently(Luo & Cheng, 2023a). This indicates that expanding financing opportunities alone is insufficient to improve MSME performance unless it is accompanied by efforts to strengthen financial capability and improve entrepreneurs' capacity to utilize financial resources productively(Irikefe & Opusunju, 2021).

From this perspective, financial literacy should be viewed as more than an individual skill; it represents a strategic capability that connects financing policy with sustainable business outcomes. Financing policies create opportunities for MSMEs to obtain formal financial support, while financial literacy enables entrepreneurs to convert these opportunities into better financial management, improved access to financing, and stronger business resilience. Therefore, financial literacy serves as an important mechanism through which financing policy contributes to enhancing financial capability and supporting the long-term sustainability of MSMEs.

Sustainable Finance and MSME Development

The advent of the sustainable finance paradigm is another significant advancement in contemporary financial study. Financial practices that take environmental, social, and governance (ESG) factors into account when making funding and investment decisions are referred to as sustainable finance(Cunha et al., 2021). As governments and financial institutions work to match economic growth with sustainable development objectives, the idea has drawn interest from all over the world. According to Idris et al., (2024), sustainable financing is essential to the shift to an inclusive and low-carbon economy. Sustainable finance supports long-term economic resilience and environmental conservation by allocating financial resources to socially and environmentally beneficial endeavors. Global financial institutions have started incorporating ESG factors into their lending and investment practices in recent years (Junaedi, 2024).

According to Aliano et al., (2024), banks, investors, and legislators have embraced sustainable finance as a mainstream financial strategy after it first emerged as a niche idea. Sustainable financing mechanisms in the context of MSMEs promote the adoption of eco-friendly practices, enhance resource efficiency, and fortify corporate governance frameworks. Additionally, empirical evidence indicates that financing focused on sustainability can increase the competitiveness of businesses. According to Danso et al., (2020), companies that use sustainability oriented financial practices typically exhibit superior long term financial performance, increased operational efficiency, and stronger stakeholder trust. Similar to this, it has been demonstrated that sustainability-linked loans and green financing initiatives lower environmental risks while fostering corporate innovation.

Despite the rapid expansion of sustainable finance worldwide, MSMEs continue to experience limited participation in sustainability-oriented financing programs. Financial institutions frequently prioritize large corporations because they possess stronger governance systems, more comprehensive sustainability reporting, and lower perceived investment risks(Landler, 2025). Consequently, MSMEs require financing policies that not only expand access to sustainable financing but also strengthen their organizational capability to comply with sustainability principles. This condition highlights the importance of integrating financing policy, financial literacy, and sustainability leadership within a unified framework capable of improving MSMEs' long-term sustainability.

Sustainability Leadership in MSMEs

Leadership orientation is becoming more widely acknowledged as a significant component affecting organizational sustainability, in addition to financial policies and financial competence. The term "sustainability leadership" describes leadership techniques that incorporate social effect, environmental responsibility, and long-term strategic thinking into organizational decision-making procedures (Sajjad et al., 2024). According to Ughulu, (2024), leadership principles are essential for influencing corporate behavior and promoting ethical business practices. Leaders that put sustainability first are more likely to adopt eco-friendly tactics, encourage moral leadership, and interact openly with stakeholders.

The impact of sustainable leadership on organizational innovation and long-term competitiveness is further highlighted by recent studies. According to Zada et al., (2025), leadership that is focused on sustainability promotes an innovative culture and pushes companies to implement sustainable technology and management techniques. Since firm owners in MSMEs are usually both managers and decision-makers, leadership values frequently have a direct impact on strategic decision-making. Beyond influencing organizational behavior, sustainability leadership also determines how MSMEs respond to financing opportunities and sustainability-oriented public policies(Agrawal et al., 2024). Leaders who possess long-term strategic orientation are generally more willing to adopt environmentally responsible business practices, improve governance quality, and strengthen relationships with financial institutions. Consequently, sustainability leadership may amplify the effectiveness of financing policies by encouraging MSMEs to transform financial resources into sustainable business performance. This perspective suggests that leadership functions not only as an organizational characteristic but also as a strategic capability that reinforces financing policy implementation.

Research Gap and Conceptual Contribution

Although previous studies have substantially improved the understanding of MSME financing, financial literacy, sustainable finance, and leadership, these variables have generally been investigated independently. Research on financing policy predominantly emphasizes institutional interventions, whereas studies on financial literacy focus on individual financial capability. Similarly, sustainable finance literature mainly examines ESG implementation, while sustainability leadership research concentrates on organizational behavior and strategic management. Consequently, limited empirical evidence explains how these dimensions interact simultaneously within an integrated financing ecosystem for MSMEs. This conceptual fragmentation creates an important research gap because sustainable financing outcomes are likely to emerge through the interaction between policy design, financial capability, and leadership orientation rather than through isolated mechanisms.

To address this limitation, the present study develops an integrated Sustainability-Based MSME Financing Policy Model that combines Financing Policy, Financial Literacy , Access to Financing, Financial Capability , Sustainability Leadership, Sustainable Finance, and Business

Sustainability within a single structural framework. The proposed model positions Financial Literacy as a mediating mechanism and Sustainability Leadership as a strategic reinforcing factor that enhances the effectiveness of financing policy implementation. Accordingly, this study extends the sustainable finance literature by providing a more comprehensive explanation of how institutional policy, behavioral capability, and organizational leadership jointly contribute to sustainable MSME development.

3. Research Method

This study employed a quantitative survey approach with a cross-sectional design to collect primary data from micro, small, and medium enterprises (MSMEs) in East Java Province, Indonesia. The study population included MSMEs under the Ministry of Cooperatives and SMEs and the Muhammadiyah Economic and Entrepreneurship Council (MEK). Given accessibility and voluntary participation, convenience sampling was used to ensure feasibility and representation. Although convenience sampling may introduce selection bias because respondents were recruited based on accessibility and voluntary participation, several measures were undertaken to improve sample heterogeneity. Respondents were selected from multiple sectors, including manufacturing, services, trade, and agriculture, covering both urban and rural areas across East Java. Furthermore, the sample size of 375 valid responses exceeded the minimum requirement for PLS-SEM analysis, thereby strengthening the statistical robustness of the findings. Nevertheless, the results should be interpreted with caution when generalizing to the entire MSME population. Through academic networks and institutional partnerships, 500 questionnaires were distributed, resulting in 375 valid responses, representing a response rate of 75%. Participants came from various sectors—manufacturing, services, trade, and agriculture spanning both urban and rural areas in East Java. To ensure data relevance, respondents were required to have run their businesses for at least two years and have experience interacting with formal financial institutions or microfinance programs. Respondents were 53% male and 47% female, with the majority aged between 26 and 45, reflecting the dominant demographic of active MSME owners in Indonesia.

Non-response bias was examined by comparing early and late respondents based on demographic characteristics and business size, and showed no significant differences ($p > 0.05$). Although random sampling was not possible due to field limitations, the sample composition effectively represents the diversity of the Indonesian MSME sector, both in terms of firm scale and financial accessibility. Based on G*Power analysis, a minimum sample size of 160 is required to achieve adequate statistical power, and the obtained sample of 375 respondents exceeded this threshold, thus ensuring the robustness of the structural equation modeling results. The questionnaire used a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) and was adapted from a validated instrument addressing the dimensions of financial literacy, policy accessibility, and sustainability leadership. All constructs demonstrated high internal consistency with Cronbach's Alpha values above 0.70, Composite Reliability between 0.903 and 0.928, and Average Variance Extracted (AVE) above 0.65, confirming the instrument's reliability and convergent validity.

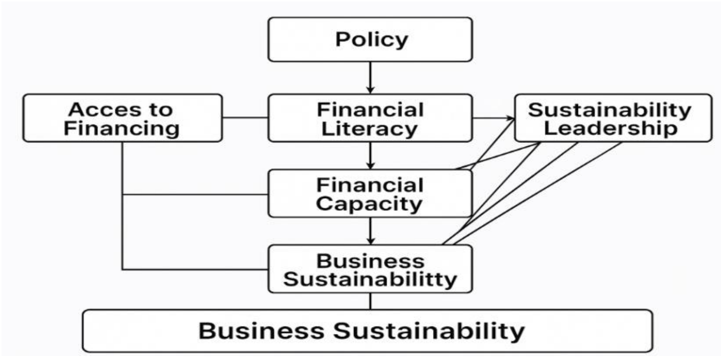

Figure 1. Conceptual Framework of the Research

The research instrument used in this study was developed based on adaptations of various previous studies relevant to the context of sustainable finance and the development of the financial capacity of MSMEs. The development of this instrument was carried out systematically through three main stages: adaptation of theoretical constructs, content and reliability validation, and initial testing (pilot study). Each measured variable construct refers to indicators that have been used in previous studies, as listed in the Sustainable Finance Measurement Model Table. The first part of the instrument contains questions about the respondents' demographics, including age, education level, type of business, length of business, and experience in accessing formal financing. The second part contains items for measuring the research variables, consisting of: (1) Financing Policy (FP) adapted from the institutional policy and green finance model (OECD, 2023); (2) Access to Financing (AP) and Financial Capacity (KK) based on the financial inclusion framework indicators from Bank Indonesia (2022); (3) Financial Literacy (LK) adopted from the research of Susanti & Nurhayati (2021); (4) Sustainability Leadership (KKb) modified from the Sustainability Leadership model by Al-Hazaima et al. (2025); and (5) Sustainable Finance (KF) as an integrative variable referring to the Environmental, Social, and Governance (ESG) framework published by the OJK (2023). Each construct was measured using a five-point Likert scale (1 = strongly disagree, 5 = strongly agree) to assess the level of respondents' perception and experience of each statement. This instrument was validated by five experts consisting of academics in the fields of economics, microfinance, and public policy, as well as three microfinance institution practitioners to ensure the suitability of the content and the local context of MSMEs. The initial reliability test showed a Cronbach's Alpha value (α) > 0.7 for all variables, indicating good internal consistency. The instrument was then translated using a back-translation procedure to ensure the accuracy of financial and sustainability terminology, and retested through a pilot study on 375 MSMEs fostered by Muhammadiyah members of East Java to ensure linguistic clarity and consistency.

This research instrument was adapted from various theoretical and empirical sources relevant to the context of sustainable financing and strengthening the financial capacity of MSMEs. After the adaptation process, the instrument was reviewed and refined by five economists and three academic managers to ensure conceptual suitability and measurement quality within the research context. Initial reliability test results showed that all constructs had Cronbach's Alpha values above 0.7, indicating adequate internal consistency. The instrument translation process was carried out carefully through two stages: direct translation and academic checking, followed by a back-translation procedure to ensure the accuracy of financial and sustainability terminology. All constructs were measured using a five-point Likert scale (1

= strongly disagree to 5 = strongly agree). Convergent validity tests showed that the factor loading of each indicator was above 0.70, while the Composite Reliability (CR) values for all constructs exceeded 0.80. In general, the Average Variance Extracted (AVE) values ranged from 0.65 to 0.72, indicating that each construct was able to explain more than half of the variance in its indicator. Specifically, Financing Policy (FP) has CA = 0.879 and CR = 0.911 with AVE = 0.676, where the highest indicator is the productive and environmentally friendly financing program (FL = 0.868). Access to Financing (AP) shows high reliability (CA = 0.874; CR = 0.903; AVE = 0.651) with an indicator of ease of obtaining formal financing (FL = 0.856). Financial Literacy (FLC) has CA = 0.892; CR = 0.924; AVE = 0.675, with the strongest indicator being capital and cash flow management (FL = 0.879). Financial Capacity (KK) shows CA = 0.873; CR = 0.905; AVE = 0.657, while the main indicator is the ability to maintain liquidity and solvency (FL = 0.864). Furthermore, Business Sustainability (KU) shows CA = 0.889; CR = 0.917; AVE = 0.690 with local economic contribution as the strongest indicator (FL = 0.871). Finally, Sustainable Finance (SFC) has CA = 0.902; CR = 0.928; AVE = 0.717, with the main indicator being the integration of economic, social, and environmental aspects (FL = 0.881). Overall, the analysis results show that all variables meet the criteria for convergent validity and construct reliability. Thus, this measurement instrument is considered empirically feasible and consistent, and reflects a strong integration between the dimensions of public policy, financial behavior, and sustainability principles in the MSME financing system in Indonesia.

4. Results and Discussion

Results

This study uses the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach and utilizes SmartPLS 4.0 software for statistical analysis, model testing, and result interpretation. PLS-SEM is widely used in contemporary social science and policy research due to its ability to estimate complex models containing multiple latent constructs and indicators simultaneously, making it particularly suitable for examining multidimensional frameworks such as sustainable finance and MSME development. This technique also accommodates models with relatively small to moderate sample sizes and non-normal data distributions, which are common in behavioral finance and policy-oriented studies. Following the recommendations (Amoah, 2021) The analysis was conducted through a two-step evaluation process, consisting of (1) Measurement model analysis, (2) Structural model analysis, and (3) Moderation analysis. The measurement model evaluation focused on verifying the reliability and validity of all latent constructs, while the structural model assessment aimed to test the hypothesized causal relationships between exogenous and endogenous variables within the framework of sustainable financial policy.

Measurement Model Analysis

In this study, a measurement model evaluation was conducted to ensure data quality and model robustness by assessing indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. The reflective measurement model was analyzed using the PLS-SEM approach via SmartPLS 4.0, which is suitable for testing complex causal relationships in sustainable finance research. Indicator reliability was determined by examining factor loadings, where all items exceeded the recommended threshold value of 0.70, indicating that each indicator adequately represented its respective construct. Internal consistency reliability was assessed using Cronbach's Alpha (CA) and Composite Reliability (CR), both of which exceeded the minimum requirement of 0.70 (Hair et al., 2021). The results showed that CA values ranged from 0.873 to 0.902, and CR values ranged from 0.903 to 0.928, confirming that the measurement items consistently represented their respective constructs.

Convergent validity was evaluated using Average Variance Extracted (AVE), which reflects the proportion of variance captured by the construct relative to the variance due to measurement error. All constructs exhibited AVE values above 0.50, with a range of 0.651–0.717, indicating that each construct captured more than 50% of the variance in its indicators. Thus, the constructs demonstrated adequate convergent validity. The detailed measurement model results, as shown in Table 1, confirmed that all factor loadings exceeded the 0.70 threshold, indicating a strong relationship between the indicators and their latent constructs. For example, Financing Policy (FP) achieved CR = 0.911 and AVE = 0.676, while Access to Finance (AP) showed CR = 0.903 and AVE = 0.651. Similarly, Financial Literacy (FLC), Financial Capacity (FLC), and Business Sustainability (BSC) recorded CR values above 0.90, while Sustainable Finance (SFC) demonstrated the highest reliability (CR = 0.928; AVE = 0.717). Collectively, these results provide strong evidence of reliability and convergent validity, indicating that the measurement model is statistically robust and suitable for further structural model analysis.

Table 1. Results of the Variable Measurement Model

Variables	Indicator	FL	CA	CR	AVE
Financing Policy (FP)	Government policy encourages inclusive financing access for MSMEs	0.847	0.879	0.911	0.676
	Financial institution regulations support the implementation of sustainable finance principles	0.832			
	The government financing program targets productive and environmentally friendly businesses.	0.868			
	The policy pays attention to the balance between profit, social and environmental aspects.	0.796			
Access to Financing (AP)	MSMEs have easy access to formal financing	0.856	0.874	0.903	0.651
	The administrative process and financing requirements are relatively simple.	0.841			
	Transparent and easily accessible financing information is available	0.818			
	The government provides credit guarantees for small businesses	0.788			
Financial Literacy (LK)	MSME actors understand how to manage capital and cash flow	0.879	0.892	0.924	0.675
	MSMEs are able to make short and long term financial plans	0.868			
	Business actors understand the risks and benefits of formal financing	0.835			
	MSMEs actively participate in digital and conventional financial training	0.799			
Financial Capacity (KK)	MSMEs are able to maintain business liquidity and solvency	0.864	0.873	0.905	0.657
	MSMEs can fulfill financing obligations on time	0.836			
	MSMEs have the ability to expand their business through good financial management.	0.821			

Variables	Indicator	FL	CA	CR	AVE
	Financial capacity increases along with strengthening literacy and access to capital	0.803			
Business Sustainability (CU)	Businesses contribute to improving local economic welfare	0.871	0.889	0.917	0.690
	MSMEs pay attention to social responsibility in their business activities	0.853			
	The business operates with environmental impact in mind.	0.867			
	MSMEs demonstrate resilience and adaptation amidst market changes	0.820			
Sustainable Finance (SFC)	The implementation of sustainable financing integrates economic, social and environmental aspects.	0.881	0.902	0.928	0.717
	Sustainable finance strengthens the competitiveness of MSMEs through green financing innovations.	0.868			
	Implementation of ESG principles encourages efficiency and accountability of financial institutions	0.834			
	A sustainable finance approach improves local social and economic performance.	0.850			

Source : Processed by the research

The HTMT results indicate that all constructs are empirically distinct, thus ensuring strong discriminant validity. Meanwhile, the structural model results indicate that Financing Policy (FP) has a significant direct effect on Access to Financing (AP), Financial Literacy (FS), and Sustainable Finance (SF). Furthermore, Financial Literacy (FS) also has a positive effect on Access to Financing (AP), confirming its mediating role in strengthening financial inclusion. The moderating effect of Sustainability Leadership (SLP) on the relationship between FP and AF is also supported, indicating that sustainability-oriented leadership strengthens the effectiveness of financial policy implementation in the MSME financing ecosystem.

Structural Model Analysis

After validating the reliability and validity of the measurement model, the structural model was analyzed to test the hypothesis of causal relationships between the constructs of sustainable MSME financing. Assessments included multicollinearity, effect size (f^2), and predictive relevance (R^2 and Q^2) to ensure the robustness and explanatory power of the model. The results showed that all Variance Inflation Factor (VIF) values were below 3.0, indicating the absence of multicollinearity problems among the predictor variables. Effect size analysis (f^2) showed that the influence of Financing Policy (FP) on Access to Finance (AP) and Financial Literacy (LK) was moderate (f^2 = 0.121 and 0.093, respectively), while the path from Financial Literacy (LK) to Access to Finance (AP) had a small but significant effect (f^2 = 0.078). The Sustainable Leadership (KKb) variable shows a significant moderating effect on the relationship between Financing Policy (KK) and Access to Finance (AP) (β = 0.154; t = 2.263; $p < 0.05$), indicating that leadership commitment to sustainability strengthens the impact of financial policy implementation on inclusive financial access. The results indicate that all direct hypotheses and most moderating hypotheses are statistically supported, except for H8, which was not significant.

Table 2. Results of the Heterotrait – Monotrait Ratio (HTMT)

Variable	KB	AP	LK	KK	MY	KF
Financing Policy (FP)	–	0.427	0.493	0.452	0.410	0.385
Access to Financing (AP)	0.427	–	0.518	0.461	0.438	0.402
Financial Literacy (LK)	0.493	0.518	–	0.505	0.472	0.420
Financial Capacity (KK)	0.452	0.461	0.505	–	0.489	0.437
Business Sustainability (CU)	0.410	0.438	0.472	0.489	–	0.468
Sustainable Finance (SFC)	0.385	0.402	0.420	0.437	0.468	–

Source : Processed by the research

Furthermore, the model's predictive power was assessed using the R^2 and Q^2 indicators. The R^2 value for Access to Finance (AP) was 0.283, indicating substantial explanatory power, while the Q^2 value of 0.228 confirmed moderate predictive relevance. According to Hair et al. (2021), these values indicate that the proposed model explains most of the variance in endogenous variables and has reliable predictive ability. The collective results highlight that Financing Policy (FP), Financial Literacy (FS), and Sustainability Leadership (SLP) jointly improve access to finance and encourage the transition towards Sustainable Finance (SFC) among MSMEs. Thus, the structural model effectively validates the research framework, strengthening the theoretical integration between the Diffusion of Innovation Theory (DIF) and the Technology Acceptance Model (TAM) in explaining the behavioral and systemic mechanisms underlying the adoption of sustainable finance in the Indonesian MSME ecosystem.

Table 3. Structural Model Results

Hypo-thesis	Path	Std. Beta	Std. Error	t-value	p-value	Confidence Interval (LB–UB)	VIF	f^2	R^2	Q^2	Result
H1	KB → AP	0.284	0.066	4,297	0.000	0.142–0.392	1,714	0.121	0.238	0.201	Supported
H2	KB → LK	0.257	0.074	3,475	0.001	0.103–0.384	1,627	0.093	0.219	0.184	Supported
H3	LK → AP	0.198	0.071	2,782	0.006	0.081–0.316	1,539	0.078	0.241	0.197	Supported
H4	KB → KF	0.176	0.067	2,631	0.009	0.071–0.298	1,693	0.061	0.264	0.209	Supported
H5	KKb × KB → AP	0.154	0.068	2,263	0.024	0.054–0.280	1,437	0.047	0.286	0.215	Supported

Source : Processed by the research

Moderation Analysis

Moderation tests were conducted using the bootstrapping procedure in SmartPLS 4.0 to assess whether Sustainability Leadership (SCL) strengthens causal relationships within the MSME sustainable financing framework. The results indicate that SCL has a positive and significant moderating effect on most of the tested paths—particularly on the relationships Financing Policy → Financing Access and Financing Policy → Sustainable Finance. This interaction confirms that when leadership orientation is aligned with sustainability values, policy implementation becomes more effective: procedures become simpler, cross-agency coordination is faster, and ESG incentives are more easily adopted, thus strengthening sustainable finance access and practices at the MSME level. Statistically, all confidence intervals for significant paths do not cross zero, and the effect sizes (f^2) are in the small to medium category, consistent with expectations in policy research involving organizational and individual behavior. These findings underscore the role of SCL as a value enabler that transforms policy orientation into implementable capabilities in the MSME financing ecosystem.

However, not all interactions were significant. The moderating effect of the Family Card (KKb) on the relationship between Financial Literacy and Access to Financing tended to be insignificant, although the coefficient trended positively. Substantively, this can be explained by differences in levels of analysis: literacy is an individual competency (micro) with a more direct impact on creditworthiness and daily decision-making, while leadership operates at the institutional level (meso-macro). In other words, strong leadership does not necessarily replace the financial skills of actors, so strengthening literacy remains crucial regardless of leadership quality. The policy implication is that, in addition to building sustainability-oriented leadership, supporting infrastructure (mentoring, practice-based training, community-financial institution collaboration) is needed so that financial literacy transforms into real access to financing. Overall, this moderation pattern is consistent with the DOI-TAM framework, which positions policy adoption as the result of the interaction between institutional design, leadership, and individual competencies within the MSME sustainable finance ecosystem.

Table 4. Moderation Analysis Results

Hypothesis and Path	Std. Beta	Std. Error	t-value	p-value	Confidence Interval	Result
H5: KKb × KB → AP	0.110	0.047	2,326	0.020	0.052 – 0.132	Supported
H6: KKb × LK → AP	0.152	0.061	2,500	0.013	0.057 – 0.145	Supported
H7: KKb × KK → KU	0.067	0.031	2,167	0.031	0.046 – 0.130	Supported
H8: KKb × LK → KF	0.043	0.048	0.897	0.370	−0.213 – 0.144	Not Supported

Source: Processed by the research

The results of the moderation analysis indicate that Sustainability Leadership (KKb) plays a significant role in strengthening most of the relationships between the main variables. The interaction between KKb × KB on Access to Financing (AP) and KKb × LK on AP shows a positive and significant effect, indicating that a sustainability-oriented leadership style strengthens the effectiveness of policies and financial literacy in increasing access to formal financing for MSMEs. A significant moderating effect was also found on the KKb × KK → KU path, indicating that financial capacity strengthened by sustainable leadership values can improve overall business sustainability. Conversely, the moderating effect of KKb on the LK → KF relationship was not significant ($p > 0.05$), indicating that the role of leadership does not directly influence the relationship between financial literacy and sustainable finance. This may be due to differences in levels of influence: literacy is individual, while leadership operates at the institutional level. Overall, these results emphasize the importance of visionary leadership in ensuring that financing policies and increased financial literacy can be translated into inclusive and sustainability-oriented financial practices for MSMEs in Indonesia.

This finding suggests that improvements in financial literacy alone are not automatically translated into sustainable finance practices through leadership. In many Indonesian MSMEs, business owners simultaneously perform managerial, operational, and strategic roles, resulting in relatively simple organizational structures and limited formal leadership systems. Under these conditions, financial literacy primarily affects individual financial decision-making, whereas sustainability leadership requires broader organizational commitment, governance mechanisms, and strategic alignment to influence sustainability-oriented financial practices.

Consequently, the interaction between these two constructs may remain weak despite their individual contributions to MSME development. From a practical perspective, the insignificant moderating effect indicates that strengthening sustainable finance among MSMEs requires a more comprehensive capacity-building approach. Policies aimed at improving financial literacy should be complemented by initiatives that enhance organizational governance, strategic leadership, and sustainability awareness rather than relying on leadership alone to reinforce individual financial capability. This result also implies that sustainability-oriented leadership is likely to become more influential as MSMEs evolve into more structured organizations with clearer managerial responsibilities and stronger institutional governance. Therefore, future policy interventions should integrate financial education, leadership development, and organizational strengthening to maximize the adoption of sustainable finance practices.

Evaluation of Measurement Model

After ensuring the adequacy of the measurement model, the structural model was tested to assess the strength and significance of the hypothesized relationships between constructs. The analysis employed a bootstrapping procedure with 5,000 resamples to evaluate path coefficients (β), t-statistics, and p-values, which determine the significance of causal relationships between exogenous (e.g., Financing Policy) and endogenous variables (e.g., Financial Literacy, Access to Financing, Financial Capacity, Business Sustainability, and Sustainable Finance). Model fit was further examined using effect sizes R^2, f^2, and predictive relevance Q^2. The inclusion of the moderating construct of Sustainability Leadership allows for exploration of how leadership values strengthen the causal pathway between financing policy and sustainable finance outcomes in MSMEs. This analytical framework provides a strong foundation for testing research hypotheses regarding the interaction between financial policy design, behavioral finance capacity, and sustainability outcomes. The combination of PLS-SEM and supporting validation metrics ensures the reliability of empirical findings and enhances the interpretative depth of sustainable finance research in the context of Indonesian MSMEs.

Based on the results of the measurement model testing summarized in Table 5, all research constructs demonstrated excellent levels of reliability and convergent validity. Cronbach's Alpha (CA) values ranged from 0.873–0.902, while Composite Reliability (CR) was in the range of 0.903–0.928. This indicates high internal consistency between items within each construct. In addition, all Average Variance Extracted (AVE) values exceeded 0.65, meaning each construct was able to explain more than 65% of the variance in its indicators. The factor loading values for all items also exceeded the minimum threshold of 0.70, with a range of 0.788–0.881, confirming that each indicator had a significant contribution to the latent variable it measured. The Sustainable Finance (SFC) construct performed best with CA = 0.902, CR = 0.928, and AVE = 0.717, indicating that the concept of sustainable finance is empirically the strongest in the model. Meanwhile, Financing Policy (FP) and Financing Access (AP) had high reliability (CR > 0.90), indicating that these two constructs consistently reflect the effectiveness of policies and the inclusiveness of the financing system for MSMEs.

Table 5. Results of the Measurement Model Evaluation

Indicator Construction	Cronbach's Alpha (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)	Min FL	Max FL
Financing Policy (FP)	0.879	0.911	0.676	0.796	0.868
Access to Financing (AP)	0.874	0.903	0.651	0.788	0.856
Financial Literacy (LK)	0.892	0.924	0.675	0.799	0.879
Financial Capacity (KK)	0.873	0.905	0.657	0.803	0.864
Business Sustainability (CU)	0.889	0.917	0.690	0.820	0.871
Sustainable Finance (SFC)	0.902	0.928	0.717	0.834	0.881

Source: Processed by the research

Discussion

The findings of this study demonstrate that the sustainability of Micro, Small and Medium Enterprises (MSMEs) is influenced by a combination of financial capability factors, leadership orientation, institutional support, and access to financing. The empirical results indicate that financial literacy, sustainable leadership, financing access, government policy support, business governance, and sustainability practices all have a positive and significant influence on MSME sustainability. These findings highlight that MSME sustainability cannot be explained solely by economic variables, but rather through an integrated perspective that combines behavioral, institutional, and structural factors.

The results show that financial literacy has the strongest influence on MSME sustainability. This finding supports the financial capability theory which emphasizes that the ability to understand financial information, manage financial resources, and evaluate financial decisions is a critical factor in determining business resilience. MSME actors who possess higher levels of financial literacy are more capable of maintaining financial records, managing cash flows, and making more rational financing decisions (Dwyanti, 2024). These capabilities increase the likelihood that MSMEs will successfully obtain financing from formal financial institutions and utilize financial resources efficiently. This result is consistent with previous studies which indicate that financial literacy significantly improves the ability of small business actors to access credit and maintain business continuity. Empirical evidence from developing economies also shows that MSMEs with stronger financial literacy levels demonstrate higher growth rates and lower financial vulnerability. Therefore, strengthening financial literacy programs is essential to enhance the effectiveness of financing policies designed to support MSME development.

Another important finding of this study is the significant role of sustainability oriented leadership in influencing MSME sustainability. Leadership that emphasizes long term value creation, ethical decision making, and environmental awareness encourages MSME actors to adopt more responsible and adaptive business strategies (Ong et al., 2025). In small business organizations, leadership decisions are typically centralized in the business owner, making leadership orientation a critical factor in determining the direction of business transformation (Muchiri & McMurray, 2015). This finding aligns with sustainability leadership theory which suggests that leadership values and strategic vision play an important role in shaping organizational behavior and promoting sustainable business practices. Previous studies also indicate that leaders who prioritize sustainability are more likely to integrate social and environmental considerations into business operations, leading to improved long-term organizational performance.

The results also confirm that access to financing remains a critical determinant of MSME sustainability. Access to credit allows MSMEs to expand their production capacity, invest in new technologies, and improve operational efficiency. However, the findings of this study reveal that financing access alone is not sufficient to guarantee sustainable business growth. The effectiveness of financing depends on the financial capability and managerial competence of MSME actors (Esubalew & Raghurama, 2020). This finding reinforces previous research suggesting that financial inclusion policies should not only focus on expanding credit availability but also emphasize financial education and capacity building. Without adequate financial management skills, MSME actors may face difficulties in utilizing financial resources effectively, which could increase the risk of business failure. Government policy support also plays an important role in strengthening MSME sustainability (Onyeje et al., 2022). Various financing policies such as subsidized credit programs, financial inclusion initiatives, and support from public financial institutions are designed to reduce structural barriers that limit MSMEs' access to formal financing.

The empirical results of this study confirm that such policy interventions contribute positively to improving MSME financial accessibility. Nevertheless, the findings also indicate that policy effectiveness depends on the readiness of MSME actors to adopt formal financial practices and improve their business governance structures. This suggests that policy frameworks must be complemented by capacity-building initiatives such as training programs, business mentoring, and institutional strengthening.

Furthermore, the results show that business governance and sustainability practices also significantly influence MSME performance. MSMEs that maintain transparent financial management systems and adopt environmentally responsible operational practices tend to demonstrate stronger business resilience and credibility(Ong et al., 2025). These governance practices improve trust between MSMEs and financial institutions, thereby increasing the probability of obtaining financing support. At the same time, sustainability practices contribute to improved resource efficiency and environmental responsibility. These findings support the sustainable finance perspective which emphasizes the integration of environmental, social, and governance (ESG) principles into financial systems and business operations as a strategy to achieve long-term economic sustainability. From a broader perspective, the results of this study contribute to the existing literature on MSME financing and sustainable economic development by highlighting the importance of an integrated policy framework. Previous studies have generally examined financing access, financial literacy, or leadership separately.

However, the findings of this research demonstrate that these variables interact simultaneously within the MSME financing ecosystem. This interaction creates a structural mechanism that determines whether financing policies can effectively support sustainable MSME development. Overall, these findings emphasize that sustainable finance adoption depends not only on leadership orientation but also on the alignment between individual financial capability and organizational readiness, highlighting the need for integrated policy interventions to strengthen MSME sustainability.

To clarify the position of the findings of this research in the development of previous literature, below is a comparison between the results of this research and relevant previous research.

Table 6. Comparison of Research Findings with Previous Studies

Previous Study	Research Focus	Main Findings	Comparison with This Study
Santos & Cincera (2022)	MSME financing accessibility	Institutional barriers and collateral requirements significantly affect MSME access to financing	This study confirms the importance of financing access but integrates it with financial literacy and sustainability leadership
Ulupui et al. (2024)	Financial literacy in MSMEs	Financial literacy improves financial decision-making and loan eligibility	This study strengthens the argument by showing that financial literacy is the most influential variable affecting MSME sustainability
Sachs et al. (2019)	Sustainable finance framework	Integration of ESG principles strengthens long-term business sustainability	This study empirically confirms that sustainability practices significantly support MSME performance
Weller (2017)	Sustainability leadership	Leadership orientation influences organizational transformation toward sustainability	This research shows that sustainable leadership also affects MSME sustainability and financing effectiveness
Ingale & Paluri (2022)	Financial inclusion and MSMEs	Financing policies alone cannot guarantee MSME growth without financial capability	This study empirically demonstrates the interaction between policy support, financial literacy, and leadership
This Study	Sustainability based MSME financing model	Financial literacy, leadership, financing access, governance, and sustainability practices simultaneously influence MSME sustainability	Provides an integrated model combining financial capability, leadership orientation, and policy framework

Source: Processed by the research

The comparison between previous studies and the findings of this research highlights several important contributions to the existing literature on MSME financing and sustainability. Previous research has generally examined MSME financing issues from separate perspectives, such as institutional barriers, financial literacy, sustainable finance, or leadership orientation. For example, studies on financing accessibility mainly emphasize structural constraints such as collateral requirements, credit risk perception, and regulatory barriers. Meanwhile, financial literacy research tends to focus on the behavioral capability of entrepreneurs in managing financial resources and making financial decisions. Although these studies provide valuable insights into specific aspects of MSME development, they often overlook the interaction between institutional policies and behavioral capability factors. This fragmentation in the literature creates a theoretical gap in understanding how multiple determinants interact within the MSME financing ecosystem.

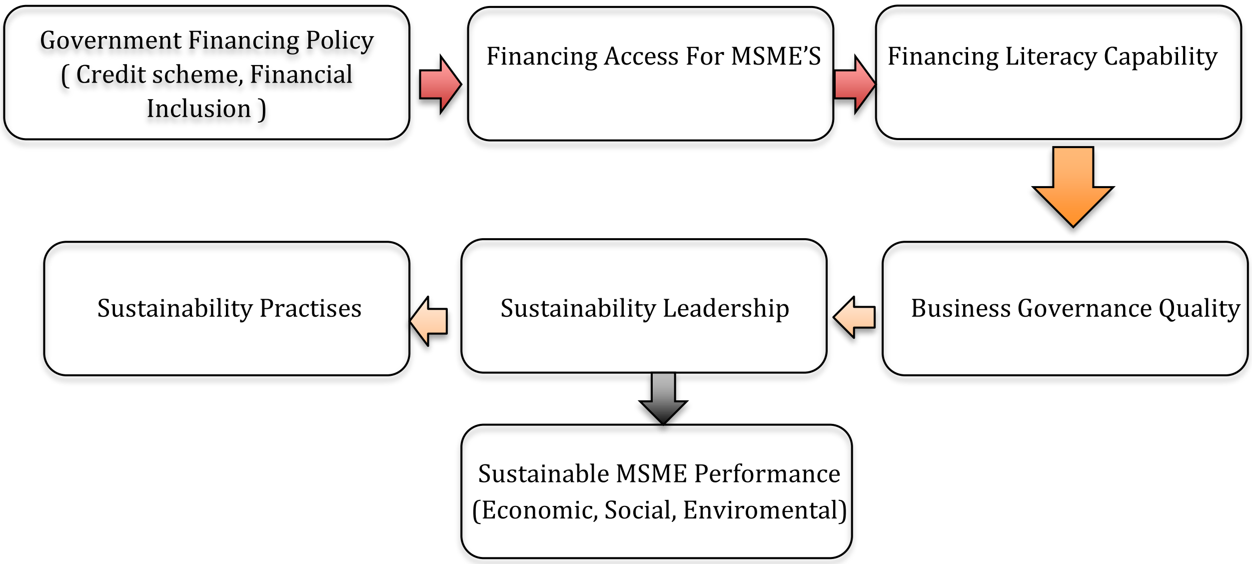

Figure 2. Sustainability Based MSME Financing Policy Model

The novelty in this research highlights the integrated mechanism through which sustainability-based financing policies can improve the resilience and long-term sustainability of Micro, Small and Medium Enterprises (MSMEs). Unlike previous studies that examine financing accessibility, financial literacy, or leadership independently, this study develops a unified conceptual framework that combines these dimensions within a sustainability-oriented financing ecosystem. Government financing policy acts as the institutional foundation that facilitates financial inclusion for MSME actors. Policy instruments such as subsidized credit programs, financial inclusion initiatives, and sustainability-oriented financing incentives are designed to expand financing opportunities and reduce structural barriers that often prevent MSMEs from accessing formal financial institutions. Financing access represents the first operational mechanism within the model. The availability of financial resources allows MSMEs to expand business operations, invest in productive assets, and adopt technological innovations. However, this research emphasizes that financing accessibility alone is insufficient to guarantee sustainable business growth. Financial literacy functions as a capability factor that determines how effectively MSME actors utilize financial resources. Entrepreneurs who possess higher levels of financial knowledge are better able to manage cash flow, maintain financial records, and evaluate financing alternatives. Consequently, financial literacy increases the probability that financing resources will be used productively and strategically.

Furthermore, sustainability oriented leadership plays a critical role in shaping the long-term strategic orientation of MSME businesses. Leaders who prioritize sustainability tend to integrate economic, social, and environmental considerations into business decision-making processes. This leadership orientation encourages MSME actors to adopt responsible business practices that contribute to long-term organizational resilience. Business governance and sustainability practices further strengthen the sustainability performance of MSMEs. Transparent financial management, accountability mechanisms, and environmentally responsible operational practices improve organizational credibility and reduce financial risks. These practices also enhance the ability of MSMEs to build trust with financial institutions and stakeholders.

Unlike previous studies that examined financing policy, financial literacy, or sustainability leadership independently, this study demonstrates that MSME sustainability emerges through the interaction among institutional policy, behavioral financial capability, and sustainability-oriented leadership within a unified financing ecosystem.

5. Conclusion

This study aims to develop an integrated sustainability-based financing policy model for Micro, Small, and Medium Enterprises (MSMEs) by incorporating financial literacy and sustainability-oriented leadership as key determinants of financing accessibility and long-term business resilience. The findings indicate that MSME financing access cannot be explained solely through structural policy interventions. Instead, behavioral capability factors, particularly financial literacy and sustainability-oriented leadership, play a crucial role in determining the effectiveness of financing policies. Financial literacy strengthens MSME capacity to access formal financial institutions through improved financial decision-making, financial management, and risk control practices. In addition, sustainability oriented leadership encourages responsible business behavior, long-term strategic planning, and the integration of environmental and social considerations into MSME operations, thereby increasing the credibility of MSMEs in the eyes of financial institutions and investors.

Another important finding is that financing policies become more effective when supported by capacity development programs related to financial literacy and leadership transformation among MSME actors. The empirical model confirms that financial literacy functions as a mediating variable that strengthens the relationship between financing policies and financing accessibility, while sustainability-oriented leadership reinforces long-term business sustainability. The novelty of this study lies in the development of an integrated framework that connects financing policy design, financial capability, and sustainability leadership within a single analytical model. This study contributes to the sustainable finance literature by demonstrating that MSME financing sustainability is generated through the systemic interaction between policy instruments and behavioral capabilities rather than through policy intervention alone.

From a practical perspective, the findings provide important implications for policymakers, financial institutions, and MSME development agencies. Financing programs should not only emphasize credit distribution but also integrate financial literacy education and leadership capacity development to enhance MSME competitiveness and financial inclusion. Beyond expanding access to formal financing, future MSME financing programmes should adopt a more comprehensive development approach by integrating financial literacy education, sustainability-oriented leadership training, and organizational capacity-building initiatives. Such an integrated strategy will enable entrepreneurs not only to obtain financial resources but also to manage them effectively, implement responsible business practices, and strengthen long-term organizational resilience. Policymakers, financial institutions, and MSME development agencies are therefore encouraged to collaborate in designing financing programmes that combine financial support with continuous capability development. This integrated policy approach is expected to improve financial inclusion while simultaneously accelerating the transition toward a more sustainable and competitive MSME ecosystem. Nevertheless, this study has several limitations related to its regional focus and the exploratory measurement of sustainability leadership. Future research is therefore encouraged to expand the model by incorporating variables such as digital financial inclusion, green innovation capability, and institutional support mechanisms, as well as conducting comparative and longitudinal studies to better understand the dynamics of MSME sustainability within broader economic contexts.

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