

## ***Financial Technology and MSME Sustainability: The Mediating Role of Financial Literacy, Financial Inclusion, and Moderating Government Support***

Heri Mahyuzar<sup>1\*</sup>, Awaludin Abid<sup>2</sup>, Candra Prawira Budi Pamungkas<sup>3</sup>

Universitas Putra Bangsa, Indonesia<sup>1,2,3</sup>

[Mahyuzar.heri@gmail.com](mailto:Mahyuzar.heri@gmail.com)<sup>1</sup>, [Abid.Awaludin@gmail.com](mailto:Abid.Awaludin@gmail.com)<sup>2</sup>, [prawirac51@gmail.com](mailto:prawirac51@gmail.com)<sup>3</sup>

### **ABSTRACT**

*This study examines how financial technology contributes to MSME sustainability by analyzing the mediating roles of financial literacy and financial inclusion and the moderating role of government support. While prior studies have largely emphasized the direct link between fintech adoption and MSME performance, less attention has been given to the capability-based and institutional mechanisms through which fintech generates sustainable outcomes. Drawing on Resource-Based Theory and Social Network Theory, this study applies an explanatory sequential mixed-method design by combining PLS-SEM analysis of survey data from 350 MSME actors in Kebumen, Surakarta, and Semarang with NVivo-based thematic analysis of semi-structured interviews. The findings reveal that fintech supports MSME sustainability primarily by strengthening financial literacy and financial inclusion, with financial literacy emerging as the more decisive mechanism for transforming digital financial use into sustainable business capability. However, government support does not significantly strengthen the effects of financial literacy and financial inclusion on sustainability, indicating that institutional assistance may remain ineffective when access is uneven, administratively complex, and poorly aligned with MSME needs. Theoretically, this study extends Resource-Based Theory by positioning financial literacy as a key capability that converts fintech and financial access into sustainability outcomes, while refining Social Network Theory by showing that external institutional support creates value only when it is accessible, relevant, and operationally aligned. Methodologically, the study contributes by integrating PLS-SEM and NVivo-based qualitative analysis to explain both statistical relationships and contextual mechanisms. The findings imply that MSME policy should move beyond general fintech adoption and financial access programs toward targeted digital financial literacy, productive financial inclusion, and need-based government support.*

**Keywords:** *Financial Technology, MSME Sustainability, Financial Literacy, Financial Inclusion, Government Support*

### **1. Introduction**

Micro, Small, and Medium Enterprises (MSMEs) play a strategic role in Indonesia's economic development by contributing significantly to employment generation, income distribution, and national economic growth. In 2024, Indonesia recorded more than 65 million MSME units operating across various sectors, including trade, manufacturing, agriculture, services, culinary, fashion, handicrafts, and digital-based businesses. MSMEs contributed approximately 61% of Indonesia's Gross Domestic Product (GDP), equivalent to around IDR 9,300 trillion, and absorbed nearly 97% of the national workforce (Ministry of Finance of the Republic of Indonesia, 2024; Perbanas Institute, 2025). Similar findings have also been emphasized in broader international contexts, where MSMEs are recognized as key drivers of sustainable economic development and social welfare (Endris & Kassegn, 2022). However, despite their substantial contribution, many MSMEs continue to face serious challenges related to limited capital, low managerial capability, inadequate digital readiness, weak financial management, and restricted access to formal financial institutions (Sujarwanto, 2022). Following the COVID-19 pandemic, MSMEs have become increasingly vulnerable to economic uncertainty, market disruption, and declining business resilience, highlighting the importance of

strengthening sustainable business capability (Agarwal et al., 2023). These conditions indicate that the large number and economic contribution of MSMEs do not automatically guarantee their long-term sustainability.

MSME sustainability refers to the ability of business actors to maintain operational continuity, adapt to environmental and market changes, strengthen competitiveness, and survive in the long term. Sustainable MSMEs are not only characterized by profit growth, but also by their capability to manage financial resources effectively, maintain customer relationships, adopt technology, and develop resilience against uncertainty. Previous studies have demonstrated that MSME sustainability is influenced by various internal and external factors, including financial capability, financial access, innovation, technological adoption, and institutional support (Hilmawati & Kusumaningtias, 2021; Papulasih et al., 2024; Kurniasari et al., 2025). Nevertheless, these factors are frequently examined separately, resulting in limited understanding regarding the integrated mechanisms through which technological, financial, and institutional factors jointly contribute to sustainable MSME development.

One of the most important developments affecting MSMEs in recent years is the rapid growth of financial technology (fintech). Fintech has transformed the financial ecosystem by enabling digital payments, mobile banking, peer-to-peer lending, e-wallets, online financing, and digital financial recording systems (Gomber et al., 2017; Lee & Shin, 2018). Fintech is considered capable of improving financial efficiency, expanding financial access, and supporting business growth among MSMEs (Ozili, 2018; Gherghina et al., 2020). In Indonesia, fintech adoption among MSMEs has continued to increase alongside the expansion of digital economic activity and government-led financial inclusion initiatives (Coordinating Ministry for Economic Affairs of the Republic of Indonesia, 2023). Global evidence also shows that digital finance and fintech contribute positively to financial resilience and business continuity in developing countries (Demirgüç-Kunt et al., 2022; Sahay et al., 2020). However, empirical evidence indicates that fintech adoption alone does not necessarily ensure MSME sustainability. Many MSME actors still utilize fintech only for basic transactions without adequate ability to manage cash flow, evaluate borrowing risk, prepare financial plans, or make strategic financial decisions (Morgan & Trinh, 2020; Lusardi et al., 2020). This condition suggests that fintech should not merely be viewed as a technological tool, but as a strategic resource whose effectiveness depends on the financial capability of its users.

In this context, financial literacy and financial inclusion become important mechanisms that may explain how fintech contributes to MSME sustainability. Financial literacy refers to the ability of individuals to understand financial concepts, evaluate financial risks, and make effective financial decisions (Lusardi & Mitchell, 2014). Financial inclusion refers to access to formal financial products and services, including savings, credit, digital payments, and risk management instruments (Bongomin et al., 2017). Previous studies have shown that financial literacy positively influences financial behavior, business management quality, and sustainability among small business actors (Babajide et al., 2021; Wardoyo & Mahyuzar, 2024). Similarly, financial inclusion enables MSMEs to access financing and business development opportunities more effectively (Hilmawati & Kusumaningtias, 2021). Several recent studies also found that fintech can improve MSME sustainability through financial literacy and financial inclusion (Tan & Syahwildan, 2022; Papulasih et al., 2024; Rohaeni et al., 2026). However, prior research generally treats financial literacy and financial inclusion as independent predictors rather than as integrated mediating mechanisms linking fintech adoption to sustainability outcomes. Consequently, the process through which fintech generates sustainable business performance remains insufficiently explained.

Besides internal financial capability, external institutional support also plays an important role in strengthening MSME sustainability. Government support may include training programs, capital assistance, digitalization initiatives, licensing facilitation, mentoring, and market access support. In Indonesia, the government has actively promoted MSME

empowerment through various programs, including financial inclusion and digital transformation initiatives. For example, the PNM Mekaar program in Central Java has been reported to support the growth and development of MSMEs through financing and mentoring assistance (Central Java Provincial Government, 2024). Previous studies indicate that government support can strengthen MSME competitiveness and sustainability (Songling et al., 2018; Kristiawati et al., 2024). Government support has also been found to strengthen the relationship between business capability and sustainable competitive performance (Alkahtani et al., 2020; Jayeola et al., 2022). Nevertheless, several studies reveal inconsistent findings, where government programs are sometimes less effective due to limited accessibility, uneven distribution, administrative complexity, and mismatch between policy implementation and actual MSME needs. These inconsistencies indicate that government support should not simply be assumed as a direct determinant of MSME sustainability, but rather as a contextual factor that may strengthen or weaken the influence of financial capability and financial access on sustainability outcomes.

Theoretically, this study integrates Resource-Based Theory (RBT) and Social Network Theory (SNT) to explain MSME sustainability. Resource-Based Theory argues that firms achieve sustainable competitive advantage through the acquisition and utilization of valuable, rare, and strategic resources (Barney, 1991). In this study, fintech is positioned as a technological resource, financial literacy as a human capital resource, and financial inclusion as a financial access resource that collectively support MSME sustainability. Meanwhile, Social Network Theory emphasizes the importance of external relationships and institutional networks in supporting organizational performance and survival. Government support is therefore conceptualized as an external institutional resource that may enhance MSMEs' access to information, financing, training, and market opportunities.

Although previous studies have examined fintech, financial literacy, financial inclusion, and MSME sustainability, several important research gaps remain. First, most prior studies primarily focus on the direct effect of fintech adoption on MSME performance or sustainability, while the internal mechanisms explaining how fintech contributes to sustainability are still underexplored. Second, financial literacy and financial inclusion are commonly examined separately, even though both variables may function simultaneously as complementary mediating mechanisms that transform fintech adoption into sustainable business outcomes. Third, government support has mostly been treated as a direct independent variable, whereas its moderating role in strengthening the relationship between financial capability, financial access, and MSME sustainability remains insufficiently investigated. Fourth, many prior studies rely predominantly on quantitative self-reported data, limiting deeper contextual understanding of how MSME actors experience fintech adoption, financial capability, financial inclusion, and government support in practice.

This study extends the work of Tan and Syahwildan (2022), who investigated the relationship between financial technology and sustainable MSME performance through financial literacy and financial inclusion. While their study successfully demonstrated the mediating roles of financial literacy and financial inclusion, it did not incorporate government support as a moderating variable and relied mainly on quantitative methods. Therefore, this study addresses these limitations by incorporating government support into the research model, focusing on MSMEs in Central Java, and applying an explanatory sequential mixed-method approach that combines PLS-SEM analysis with NVivo-based qualitative analysis. This approach is expected to provide not only statistical evidence but also contextual explanations regarding the relationships among fintech, financial literacy, financial inclusion, government support, and MSME sustainability.

The novelty of this study lies in three main aspects. First, this study develops a more comprehensive integrated model that simultaneously examines the relationships among fintech, financial literacy, financial inclusion, government support, and MSME sustainability.

Second, this study combines Resource-Based Theory and Social Network Theory to explain sustainability from both internal resource capability and external institutional support perspectives. Third, unlike many previous studies that rely solely on quantitative approaches, this study applies a mixed-method design to provide both statistical testing and qualitative contextual explanation, thereby offering a more comprehensive understanding of MSME sustainability in the digital financial era.

Based on the background and research gaps identified above, this study aims to analyze the effect of financial technology on MSME sustainability, examine the mediating roles of financial literacy and financial inclusion, and test the moderating role of government support. The findings of this study are expected to contribute theoretically to the literature on MSME sustainability by clarifying the mechanisms through which fintech supports sustainable business outcomes and by explaining the conditional role of government support. Practically, the findings are expected to provide recommendations for policymakers, fintech providers, and MSME actors in designing more effective digital financial empowerment and MSME sustainability strategies.

## **2. Literature Review**

### **MSME Sustainability**

MSME sustainability refers to the ability of business actors to maintain operations, adapt to environmental changes, and build long-term resilience. Sustainability is reflected not only in financial performance, but also in operational efficiency, customer retention, and resource management (Endris & Kassegn, 2022; Agarwal et al., 2023). MSMEs often face challenges related to limited capital, weak managerial systems, and high market uncertainty, making sustainability an important issue. Previous studies indicate that MSME sustainability is influenced by managerial capability, access to finance, technological adoption, and institutional support (Agarwal et al., 2023; Kurniasari et al., 2025; Papulasih et al., 2024). However, inconsistent findings suggest that sustainability depends not only on resource availability, but also on MSMEs' ability to transform resources into strategic capabilities (Bongomin et al., 2017; Kurniasari et al., 2025).

From the perspective of Resource-Based Theory (RBT), firms achieve sustainable performance through valuable and well-managed resources (Barney, 1991). In this study, fintech, financial literacy, and financial inclusion are viewed as strategic resources that support MSME sustainability when effectively integrated into business operations and decision-making.

### **Financial Technology and MSME Sustainability**

Financial technology (fintech) refers to digital financial services such as digital payments, mobile banking, e-wallets, online lending, and crowdfunding (Lee & Shin, 2018; Gomber et al., 2017; Imerman & Fabozzi, 2020). Fintech can improve transaction efficiency, financial recording, and access to financial services for MSMEs. Prior studies generally report a positive relationship between fintech adoption and MSME performance or sustainability, although the results are not always consistent (Gherghina et al., 2020; Papulasih et al., 2024; Kurniasari et al., 2025). In some cases, fintech is only used for basic transactions and does not significantly contribute to long-term sustainability.

Within the RBT framework, fintech is considered a technological resource whose value depends on MSMEs' ability to integrate it into financial planning and business management. Therefore, fintech is expected to positively influence MSME sustainability.

*H1: Financial technology has a positive effect on MSME sustainability*

### **Financial Technology and Financial Literacy**

Financial literacy refers to the ability to understand and apply financial knowledge in decision-making, including managing cash flow, budgeting, evaluating credit risk, and planning business finances. Fintech may improve financial literacy by providing transaction histories, financial reports, and digital financial information. Previous studies suggest that fintech increases users' exposure to financial knowledge and digital financial activities (Lusardi et al., 2020; Morgan & Trinh, 2020). However, some MSME actors use fintech only passively for transactions, limiting its contribution to financial understanding.

From the RBT perspective, financial literacy represents human capital that enables MSMEs to convert technological resources into business capability. Therefore, fintech is expected to positively influence financial literacy.

*H2: Financial technology has a positive effect on financial literacy*

### **Financial Technology and Financial Inclusion**

Financial inclusion refers to access to formal financial services such as savings, credit, insurance, and digital payments. Fintech is considered an important driver of financial inclusion because it reduces barriers related to distance, cost, and administrative procedures (Ozili, 2018). Previous studies generally show that fintech improves financial inclusion, especially among underserved MSMEs (Babajide et al., 2021; Sahay et al., 2020). However, infrastructure limitations, low digital trust, and weak financial awareness may reduce its effectiveness (Demirgüç-Kunt et al., 2022).

Within RBT, financial inclusion is viewed as a financial access resource that supports MSME growth and resilience. Therefore, fintech is expected to positively influence financial inclusion.

*H3: Financial technology has a positive effect on financial inclusion*

### **Financial Literacy and MSME Sustainability**

Financial literacy affects MSME sustainability by improving financial planning, risk management, and resource allocation. MSMEs with stronger financial literacy are generally better able to manage debt, separate business and personal finances, and make rational financial decisions. Most studies confirm that financial literacy positively affects MSME sustainability (Bongomin et al., 2017; Papulasih et al., 2024), although some findings indicate that financial literacy alone may not be sufficient when external constraints remain significant (Kurniasari et al., 2025; Bazeley & Jackson, 2013).

From the RBT perspective, financial literacy is a human capital resource that enables MSMEs to utilize available resources effectively. Therefore, financial literacy is expected to positively influence MSME sustainability.

*H4: Financial literacy has a positive effect on MSME sustainability*

### **Financial Inclusion and MSME Sustainability**

Financial inclusion supports MSME sustainability by improving access to credit, savings, digital payments, and financial risk management. Such access can strengthen liquidity, business expansion, and resilience against financial shocks. However, financial inclusion may also create risks if MSMEs use financial services without adequate planning (Demirgüç-Kunt et al., 2022; Kurniasari et al., 2025). Thus, financial inclusion should be understood not only as access, but also as productive and responsible use of financial services.

From the RBT perspective, financial inclusion is a strategic financial resource that supports MSME growth when utilized effectively. Therefore, financial inclusion is expected to positively influence MSME sustainability.

*H5: Financial inclusion has a positive effect on MSME sustainability*

### Mediating Role of Financial Literacy and Financial Inclusion

The relationship between fintech and MSME sustainability is unlikely to be purely direct. Fintech may improve sustainability by strengthening MSMEs’ financial capability and financial access. Previous studies show that financial literacy mediates the relationship between fintech and MSME performance by improving users’ ability to manage financial information (Tan & Syahwildan, 2022). Financial inclusion also mediates this relationship by facilitating access to formal financial services (Kurniasari et al., 2025).

Theoretically, fintech represents a technological resource, while financial literacy and financial inclusion represent human capital and financial access resources. Therefore, these variables act as mechanisms that explain how fintech contributes to MSME sustainability.

*H6: Financial literacy mediates the relationship between financial technology and MSME sustainability*

*H7: Financial inclusion mediates the relationship between financial technology and MSME sustainability*

### Moderating Role of Government Support

Government support includes training, financial assistance, infrastructure provision, licensing facilitation, digitalization programs, and market access support. Several studies indicate that government support strengthens MSME performance and sustainability by providing institutional resources and business opportunities (Songling et al., 2018; Kurniawati, 2022). However, some studies also show that government programs may be ineffective due to administrative complexity, unequal distribution, or weak alignment with MSME needs (Kristiawati et al., 2024; Natungga, 2022).

From the perspective of Social Network Theory, government support represents an external network resource that may strengthen MSMEs’ access to knowledge, financing, and institutional assistance. Government support is expected to strengthen the effects of financial literacy and financial inclusion on MSME sustainability because MSMEs with stronger financial capability and financial access are more likely to utilize government programs effectively.

*H8: Government support moderates the relationship between financial literacy and MSME sustainability*

*H9: Government support moderates the relationship between financial inclusion and MSME sustainability*

### Conceptual Framework

The conceptual framework of this study integrates fintech, financial literacy, financial inclusion, government support, and MSME sustainability based on Resource-Based Theory and Social Network Theory.

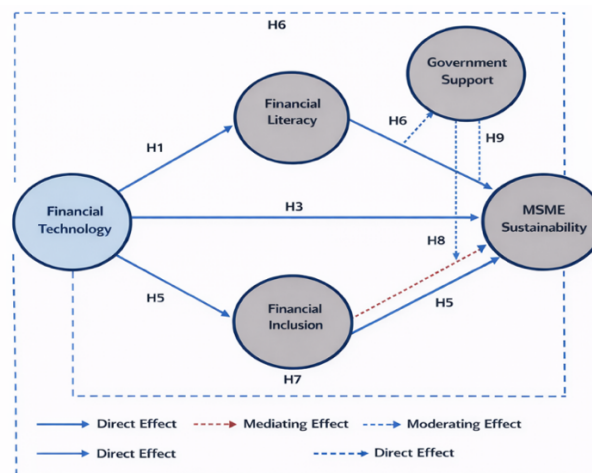


Figure 2. Conceptual Framework

### **3. Methods**

This study employed an explanatory sequential mixed-method design that integrates quantitative and qualitative approaches in two consecutive stages. In the first stage, quantitative data were collected and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the relationships among financial technology, financial literacy, financial inclusion, government support, and MSME sustainability. In the second stage, qualitative data were collected through semi-structured interviews to explain and deepen the interpretation of the quantitative findings. This design was selected because it allows the researcher to first test theoretical relationships statistically and then clarify the meaning of significant and non-significant results through qualitative evidence (Creswell & Creswell, 2018). The integration of both approaches was conducted at the interpretation stage, where qualitative findings were used to contextualize the PLS-SEM results, particularly in explaining the mediating roles of financial literacy and financial inclusion and the non-significant moderating role of government support.

#### **Research Location and Population**

This study focused on MSME actors in Central Java, particularly in Kebumen Regency, Semarang City, and Surakarta City. These locations were selected because they represent regions with active MSME development programs, relatively strong economic activity, and institutional support through training, financing access, digitalization initiatives, and business mentoring. The population consisted of MSME actors operating in various sectors, including culinary, fashion, creative industries, trade, and services. These sectors were selected because they represent common MSME activities that increasingly interact with digital financial services and government-supported business development programs.

#### **Sampling Technique and Respondent Criteria**

The quantitative stage used purposive sampling. This technique was considered appropriate because the study required respondents who had direct experience with fintech use and MSME development programs. The inclusion criteria were as follows: respondents had to be MSME owners or managers operating in Kebumen, Semarang, or Surakarta; had used at least one form of financial technology, such as QRIS, mobile banking, e-wallets, online lending, or marketplace-based payment systems; and had received or accessed government support in the form of training, financial assistance, licensing support, digitalization programs, or business development initiatives.

The minimum sample size referred to SEM requirements, which recommend at least 300 observations to ensure statistical robustness for complex models (Hair et al., 2022). In this study, 380 questionnaires were distributed to MSME actors through online and offline channels. A total of 350 usable questionnaires were returned and analyzed, resulting in a response rate of 92.1%. Questionnaires that were incomplete, duplicated, or did not meet the respondent criteria were excluded from the final analysis. To reduce potential sampling bias, respondents were drawn from multiple regions and business sectors.

#### **Pilot Testing and Questionnaire Validation**

Before the main survey was conducted, the questionnaire was pilot-tested with 30 MSME actors who had similar characteristics to the target respondents but were not included in the final sample. The pilot test aimed to assess the clarity of wording, the relevance of indicators, the estimated completion time, and the respondents' understanding of the measurement items. Feedback from the pilot test was used to refine several statements to make them clearer and more suitable for the MSME context.

The questionnaire validation process was conducted in several stages. First, content validity was assessed by reviewing the measurement indicators based on previous studies and the theoretical constructs used in this research. Second, the instrument was examined by academic experts in entrepreneurship, finance, and MSME studies to ensure that each item reflected the intended construct. Third, the pilot test results were used to identify ambiguous or redundant items. Finally, construct validity and reliability were statistically evaluated using the PLS-SEM measurement model through outer loading, Average Variance Extracted (AVE), Cronbach's Alpha, and Composite Reliability. Indicators were considered valid when the outer loading values exceeded 0.70 and AVE values were above 0.50, while reliability was accepted when Cronbach's Alpha and Composite Reliability values exceeded 0.70.

### **Data Collection Techniques**

Quantitative data were obtained through structured questionnaires distributed both online and offline. Online questionnaires were distributed using digital forms, while offline questionnaires were administered directly to MSME actors with assistance from local MSME networks and institutional partners. The researcher collaborated with the Integrated Business Service Center for Cooperatives and MSMEs (PLUT-KUMKM) in Kebumen, Semarang, and Surakarta to facilitate access to respondents and support the data collection process.

Qualitative data were collected after the quantitative analysis had been completed. Semi-structured interviews were conducted with 12 MSME actors selected from the survey respondents. The participants were chosen purposively to represent different business sectors, levels of fintech use, and experiences with government support. The interviews explored respondents' experiences in using fintech, managing financial literacy, accessing financial services, receiving government support, and maintaining business sustainability. Semi-structured interviews were used because they provide flexibility for exploring participants' experiences while maintaining consistency with the research objectives (Kallio et al., 2016).

### **Measurement of Variables**

All variables were measured using a five-point Likert scale, which is commonly used to measure attitudes and perceptions in social science research (Likert, 1932), ranging from 1, indicating strongly disagree, to 5, indicating strongly agree. The indicators were adapted from previous studies to ensure theoretical and empirical relevance. Financial technology was measured through indicators related to digital payments, online lending, e-commerce payment systems, and fintech applications, adapted from Lee and Shin (2018) and Imerman and Fabozzi (2020). Financial literacy was measured through respondents' ability to manage finances, understand budgeting, interpret financial concepts, and evaluate credit and investment decisions, adapted from Lusardi and Mitchell (2014). Financial inclusion was measured through access to financial services, frequency of use, service quality, and perceived benefits, adapted from Bongomin et al. (2017). Government support was measured through infrastructure availability, policy support, training programs, financial assistance, and access to business information, adapted from Songling et al. (2018). MSME sustainability was measured through business growth, operational efficiency, customer satisfaction, financial performance, and business resilience, adapted from Endris and Kassegn (2022).

### **Quantitative Data Analysis**

Quantitative data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM was selected because it is suitable for analyzing complex models involving mediation and moderation and does not require strict assumptions of normality (Hair et al., 2022). The analysis was conducted in two stages. First, the measurement model was evaluated to assess convergent validity, discriminant validity, and reliability. Convergent validity was assessed using outer loading and AVE, while reliability was evaluated using Cronbach's Alpha

and Composite Reliability. Second, the structural model was assessed using R-square, effect size or f-square, predictive relevance or Q-square, and hypothesis testing through bootstrapping procedures. The mediation effects of financial literacy and financial inclusion and the moderating effects of government support were tested using the bootstrapping results.

### **Qualitative Data Analysis and Rigor**

Qualitative data were analyzed using NVivo software through thematic analysis. The analysis followed several coding stages. First, open coding was conducted by identifying meaningful statements from the interview transcripts related to fintech use, financial literacy, financial inclusion, government support, and MSME sustainability. Second, axial coding was applied to group similar codes into broader categories. Third, selective coding was used to develop final themes that explained the quantitative findings. These themes were then compared with the results of the PLS-SEM analysis to identify whether the qualitative evidence supported, explained, or extended the statistical findings.

To ensure qualitative rigor, this study applied triangulation and member checking. Triangulation was conducted by comparing survey results, interview findings, and relevant field observations obtained during the data collection process. This procedure helped ensure that the interpretation was not based on a single source of evidence. Member checking was carried out by summarizing the main interview interpretations and confirming them with selected participants to ensure that the researcher's interpretation accurately reflected their experiences. In addition, the use of NVivo supported data organization, coding transparency, and systematic theme development.

### **Integration of Quantitative and Qualitative Data**

The integration of quantitative and qualitative findings was conducted at the interpretation stage. The quantitative results were first used to identify significant and non-significant relationships among variables. The qualitative findings were then used to explain why these relationships occurred in the MSME context. For example, significant mediation effects were interpreted through respondents' experiences in using fintech to improve financial records, understand cash flow, and access financial services. Meanwhile, the non-significant moderating role of government support was explained through qualitative evidence showing uneven access, administrative complexity, and limited alignment between government programs and MSME needs. This integration strengthened the validity and depth of the research findings by combining statistical patterns with contextual explanations.

### **Potential Bias and Mitigation**

The use of purposive sampling may introduce selection bias because respondents were selected based on specific criteria rather than random procedures. To mitigate this limitation, data were collected from three different regions and various business sectors to improve respondent diversity. The study also combined online and offline data collection to reduce the risk of excluding MSME actors with limited digital access. In addition, the use of both quantitative and qualitative methods strengthened the robustness of the findings through methodological triangulation. Self-reported data may also create response bias; therefore, respondents were assured that their answers would remain anonymous and would be used only for academic purposes.

### **Ethical Considerations**

This study followed ethical research principles by ensuring voluntary participation, informed consent, confidentiality, and anonymity. Before completing the questionnaire or participating in interviews, respondents were informed about the purpose of the study, their right to withdraw, and the confidentiality of their responses. Personal identities were not

disclosed in the analysis or reporting. Interview participants were coded using respondent codes to protect their identities. All data were used only for research purposes and stored securely to maintain research integrity and respondent protection (Israel & Hay, 2006).

#### 4. Result and Discussion

##### Results

##### Quantitative Analysis

The questionnaire distribution was conducted in three research locations, namely Kebumen Regency, Semarang City, and Surakarta City, using both online and offline methods. A total of 350 valid responses were collected and analyzed using SmartPLS. The demographic profile of the respondents is presented in Table 1.

**Table 1. Respondent Demographics**

Characteristic	Criteria	Total	Percentage
Gender	Male	214	61.1%
	Female	136	38.9%
Age	18–25 years old	40	11.4%
	26–35 years old	120	34.2%
	>35 years old	190	54.4%
Education Level	JHS or equivalent	0	0%
	SHS or equivalent	182	52.0%
	Bachelor’s Degree	168	48.0%
Type of Business	Culinary	173	49.4%
	Fashion	67	19.1%
	Creative Industry	58	16.6%
	Others	52	14.9%
Business Duration	<3 years	79	22.6%
	3–5 years	183	52.3%
	6–10 years	88	25.1%
	>10 years	0	0%
Monthly Turnover	<IDR 5 million	133	38.0%
	IDR 5–25 million	182	52.0%
	>IDR 25 million	35	10.0%

Table 1 indicates that the respondents were dominated by male MSME actors and business owners above 35 years old. This profile suggests that most respondents had sufficient business experience to evaluate the role of fintech, financial literacy, financial inclusion, and government support in their business activities. The dominance of culinary businesses also reflects the characteristics of Indonesian MSMEs, where food-based businesses are highly prevalent and often require flexible transaction systems, digital payment adoption, and practical financial management. Most businesses had operated for three to five years and generated moderate monthly turnover, indicating that the respondents represented relatively stable MSMEs rather than newly established businesses. This profile is relevant because sustainability issues are more visible among businesses that have passed the initial establishment phase and must maintain long-term operational continuity.

##### Measurement Model Analysis

##### Convergent Validity

Convergent validity was assessed using the outer loading values of each indicator. In PLS-SEM, an indicator is generally considered valid when its outer loading value exceeds 0.70. The results of the outer loading test are presented in Table 2.

**Table 2. Outer Loading Results**

Indicator	Government Support	MSME Sustainability	Financial Literacy	Financial Technology	Financial Inclusion
M1.1			0.829		
M1.2			0.863		
M1.3			0.854		
M1.4			0.850		
M1.5			0.844		
M1.6			0.822		
M2.1					0.849
M2.2					0.870
M2.3					0.840
M2.4					0.845
M2.5					0.863
M2.6					0.847
X1.1				0.703	
X1.2				0.793	
X1.3				0.824	
X1.4				0.740	
X1.5				0.805	
X1.6				0.802	
Y1		0.769			
Y2		0.798			
Y3		0.842			
Y4		0.759			
Y5		0.825			
Y6		0.844			
Y7		0.849			
Y8		0.841			
Z1	0.752				
Z2	0.799				
Z3	0.818				
Z4	0.838				
Z5	0.816				
Z6	0.867				
Z7	0.872				
Z8	0.838				

Table 2 shows that all indicators have outer loading values above 0.70. This confirms that the indicators adequately represent their respective constructs. The consistently high loading values indicate that the measurement items were empirically reliable in capturing the concepts of financial technology, financial literacy, financial inclusion, government support, and MSME sustainability.

**Average Variance Extracted**

The Average Variance Extracted or AVE was used to assess whether each construct explained more than half of the variance of its indicators. An AVE value above 0.50 indicates adequate convergent validity.

**Table 3. Average Variance Extracted Results**

Construct	Average Variance Extracted	Remarks
Government Support	0.682	Valid
MSME Sustainability	0.667	Valid
Financial Literacy	0.712	Valid
Financial Technology	0.607	Valid
Financial Inclusion	0.727	Valid

As shown in Table 3, all constructs have AVE values above 0.50. This result confirms that each latent variable explains a sufficient proportion of the variance in its indicators. The highest AVE value is found in financial inclusion, suggesting that the indicators used to measure access, use, service quality, and perceived financial service benefits are strongly associated with the construct. Overall, the measurement model demonstrates adequate convergent validity.

**Discriminant Validity**

Discriminant validity was assessed using cross-loading values. Each indicator should have a higher loading value on its own construct than on other constructs.

**Table 4. Cross-Loading Results**

Indicator	Government Support	MSME Sustainability	Financial Literacy	Financial Technology	Financial Inclusion
M1.1	0.661	0.709	0.829	0.618	0.690
M1.2	0.727	0.798	0.863	0.655	0.711
M1.3	0.734	0.738	0.854	0.618	0.691
M1.4	0.701	0.749	0.850	0.596	0.723
M1.5	0.712	0.732	0.844	0.617	0.712
M1.6	0.686	0.720	0.822	0.630	0.687
M2.1	0.712	0.729	0.758	0.649	0.849
M2.2	0.699	0.713	0.737	0.654	0.870
M2.3	0.683	0.693	0.710	0.639	0.840
M2.4	0.637	0.644	0.665	0.584	0.845
M2.5	0.704	0.745	0.716	0.671	0.863
M2.6	0.645	0.690	0.665	0.586	0.847
X1.1	0.399	0.452	0.433	0.703	0.481
X1.2	0.542	0.574	0.565	0.793	0.593
X1.3	0.541	0.587	0.567	0.824	0.560
X1.4	0.612	0.652	0.636	0.740	0.592
X1.5	0.547	0.611	0.613	0.805	0.602
X1.6	0.577	0.621	0.602	0.802	0.617
Y1	0.645	0.769	0.662	0.622	0.659
Y2	0.712	0.798	0.721	0.569	0.645
Y3	0.678	0.842	0.745	0.640	0.663
Y4	0.698	0.759	0.702	0.546	0.619
Y5	0.691	0.825	0.700	0.622	0.656
Y6	0.678	0.844	0.744	0.617	0.693
Y7	0.665	0.849	0.725	0.681	0.728
Y8	0.659	0.841	0.738	0.630	0.724
Z1	0.752	0.679	0.639	0.464	0.636
Z2	0.799	0.669	0.649	0.573	0.616
Z3	0.818	0.680	0.696	0.560	0.661
Z4	0.838	0.741	0.760	0.590	0.688
Z5	0.816	0.625	0.646	0.570	0.636

Z6	0.867	0.691	0.704	0.592	0.660
Z7	0.872	0.719	0.722	0.645	0.720
Z8	0.838	0.669	0.682	0.594	0.651

Table 4 indicates that each indicator has the highest loading value on its corresponding construct. This confirms that the constructs are empirically distinct from one another. This distinction is important because financial literacy, financial inclusion, and financial technology are conceptually related but represent different dimensions of MSME capability and resource access.

### Reliability Test

Reliability was assessed using Cronbach’s Alpha and Composite Reliability. A construct is considered reliable when both values exceed 0.70.

**Table 5. Reliability Test Results**

Construct	Cronbach’s Alpha	Composite Reliability
Government Support	0.933	0.945
MSME Sustainability	0.928	0.941
Financial Literacy	0.919	0.937
Financial Technology	0.870	0.902
Financial Inclusion	0.925	0.941

Table 5 shows that all constructs have Cronbach’s Alpha and Composite Reliability values above 0.70. These results indicate that the measurement instruments have strong internal consistency. Therefore, the model is considered reliable for further structural analysis.

### Structural Model Analysis

#### R-Square Analysis

R-square was used to assess the explanatory power of the model. The R-square results are presented in Table 6.

**Table 6. R-Square Results**

Construct	R-Square	Adjusted R-Square
MSME Sustainability	0.828	0.825
Financial Literacy	0.545	0.543
Financial Inclusion	0.549	0.548

Table 6 shows that the R-square value for MSME sustainability is 0.828. This means that financial technology, financial literacy, financial inclusion, and government support explain 82.8% of the variance in MSME sustainability. This value indicates substantial explanatory power. The R-square values for financial literacy and financial inclusion are 0.545 and 0.549, respectively, indicating that financial technology explains a moderate proportion of the variance in these two mediating variables. These results suggest that fintech is not only associated with sustainability directly, but also plays an important role in shaping the internal financial capability and financial access of MSME actors.

### Effect Size

The f-square value was used to examine the relative contribution of each exogenous construct to the endogenous construct. The results are presented in Table 7.

**Table 7. Effect Size Results**

Relationship	f-square
Government Support × Financial Literacy → MSME Sustainability	0.004
Government Support → MSME Sustainability	0.049
Government Support × Financial Inclusion → MSME Sustainability	0.000
Financial Literacy → MSME Sustainability	0.182

Financial Technology → MSME Sustainability	0.044
Financial Technology → Financial Literacy	1.196
Financial Inclusion → MSME Sustainability	0.040

Table 7 indicates that financial technology has a very large effect on financial literacy. This suggests that fintech use strongly contributes to the formation of financial knowledge and awareness among MSME actors. Financial literacy also has a moderate effect on MSME sustainability, while financial technology and financial inclusion have smaller direct effects. This pattern supports the argument that fintech does not operate primarily as a direct driver of sustainability, but as an enabling resource that becomes more valuable when it strengthens financial literacy. The very small effect sizes of the interaction terms indicate that government support does not substantially change the strength of the relationship between financial capability, financial access, and sustainability.

**Predictive Relevance**

Predictive relevance was assessed using the Q-square value. A Q-square value greater than zero indicates that the model has predictive relevance.

**Table 8. Q-Square Results**

Construct	SSO	SSE	Q <sup>2</sup>
Government Support × Financial Literacy	350.000	350.000	-
Government Support	2800.000	2800.000	-
Government Support × Financial Inclusion	350.000	350.000	-
MSME Sustainability	2800.000	1288.180	0.540
Financial Literacy	2100.000	1298.847	0.382
Financial Technology	2100.000	2100.000	-
Financial Inclusion	2100.000	1275.750	0.392

Table 8 shows that the Q-square values for MSME sustainability, financial literacy, and financial inclusion are all greater than zero. These results indicate that the model has predictive relevance. The highest Q-square value is found in MSME sustainability, suggesting that the model is particularly strong in predicting the main outcome variable. This strengthens the argument that fintech, financial literacy, and financial inclusion are relevant predictors of MSME sustainability.

**Model Fit Analysis**

Model fit was assessed using the Standardized Root Mean Square Residual or SRMR and the Normed Fit Index or NFI. The results are shown in Table 9.

**Table 9. Model Fit Results**

Indicator	Saturated Model	Estimated Model
SRMR	0.052	0.133
d_ ULS	1.635	10.467
d_ G	0.886	1.238
Chi-Square	1740.613	2100.553
NFI	0.838	0.804

Based on Table 9, the SRMR value for the saturated model is 0.052, while the SRMR value for the estimated model is 0.133. The saturated model meets the commonly recommended threshold of below 0.08, but the estimated model exceeds the recommended threshold. This indicates that the estimated model does not fully meet the ideal model fit criterion. Therefore, the model fit result should be interpreted cautiously.

However, in PLS-SEM, model assessment should not rely solely on global fit indices because PLS-SEM is primarily oriented toward prediction and explanation rather than covariance-based model fit. The strong R-square and Q-square values indicate that the model

still has substantial explanatory and predictive power. Nevertheless, the SRMR result suggests that future research may need to consider additional variables, alternative paths, or more refined measurement specifications to improve model fit.

**Hypothesis Testing**

Hypothesis testing was conducted using bootstrapping. A relationship is considered significant when the t-statistic is greater than 1.96 and the p-value is less than 0.05. The path coefficient results are presented in Table 10.

**Table 10. Path Coefficient Results**

Relationship	Original Sample	Sample Mean	Standard Deviation	T-Statistic	P-Value
Financial Technology → Financial Literacy	0.738	0.738	0.035	21.094	0.000
Financial Technology → Financial Inclusion	0.741	0.742	0.037	19.953	0.000
Financial Technology → MSME Sustainability	0.140	0.139	0.045	3.083	0.002
Financial Literacy → MSME Sustainability	0.405	0.407	0.057	7.108	0.000
Financial Inclusion → MSME Sustainability	0.171	0.173	0.045	3.765	0.000

Table 10 shows that all direct relationships are statistically significant. Financial technology has the strongest direct effect on financial literacy and financial inclusion. This finding indicates that fintech adoption plays an important role in improving MSME actors’ financial exposure, transaction experience, and access to formal financial services. However, the direct effect of financial technology on MSME sustainability is weaker than the effect of financial literacy. This pattern suggests that fintech contributes to sustainability more effectively when it is transformed into financial knowledge and managerial capability. Therefore, fintech should be interpreted as an enabling resource rather than an independent solution for MSME sustainability.

Financial literacy has the strongest direct effect on MSME sustainability. This finding highlights that the ability to understand financial information, manage cash flow, evaluate financing risks, and make financial decisions is more decisive for sustainability than technology adoption alone. Financial inclusion also significantly improves sustainability, but its effect is smaller than financial literacy. This indicates that access to financial services is important, but access must be accompanied by adequate financial capability to generate productive business outcomes.

**Mediation Effect Testing**

The mediation effects were tested using specific indirect effects. The results are presented in Table 11.

**Table 11. Specific Indirect Effect Results**

Indirect Relationship	Original Sample	Sample Mean	Standard Deviation	T-Statistic	P-Value
Financial Technology → Financial Literacy → MSME Sustainability	0.299	0.301	0.046	6.558	0.000
Financial Technology → Financial Inclusion → MSME Sustainability	0.127	0.128	0.034	3.675	0.000

Table 11 confirms that financial literacy and financial inclusion significantly mediate the relationship between financial technology and MSME sustainability. The indirect effect through financial literacy is stronger than the indirect effect through financial inclusion. This result indicates that fintech contributes to sustainability primarily by improving financial understanding, rather than merely expanding access to financial services. In other words, MSME actors gain greater sustainability benefits from fintech when they can use digital financial information for planning, monitoring, and decision-making. This finding strengthens the Resource-Based Theory argument that technology becomes valuable only when it is supported by human capability.

**Moderation Effect Testing**

The moderating role of government support was tested by examining the interaction effects between government support and financial literacy, as well as between government support and financial inclusion. The results are presented in Table 12.

**Table 12. Moderation Effect Results**

Moderating Relationship	Original Sample	Sample Mean	Standard Deviation	T-Statistic	P-Value
Government Support × Financial Literacy → MSME Sustainability	-0.048	-0.046	0.051	0.936	0.350
Government Support × Financial Inclusion → MSME Sustainability	0.009	0.010	0.054	0.174	0.862

Table 12 shows that government support does not significantly moderate the relationship between financial literacy and MSME sustainability or the relationship between financial inclusion and MSME sustainability. This finding suggests that government support, as perceived by respondents, has not yet functioned as an effective strengthening factor. The non-significant moderation effect should not be interpreted as evidence that government support is irrelevant. Rather, it indicates that existing support may not be sufficiently accessible, continuous, or aligned with MSME needs to enhance the effect of financial capability and financial access on sustainability.

From the perspective of Social Network Theory, government support should function as an external network resource that provides MSMEs with access to training, capital, information, licensing, and market opportunities. However, the insignificant interaction effects suggest that the external network has not yet operated effectively as a reinforcing mechanism. This result highlights the importance of improving the quality, relevance, and implementation of government programs so that they can strengthen the sustainability impact of financial literacy and financial inclusion.

**Qualitative Analysis and Mixed-Method Integration**

The qualitative analysis was conducted using NVivo through thematic analysis. The process consisted of three stages: open coding, axial coding, and selective coding. In the open coding stage, interview transcripts were reviewed line by line to identify meaningful statements related to fintech use, financial literacy, financial inclusion, government support, and MSME sustainability. In the axial coding stage, similar codes were grouped into broader categories, such as digital transaction efficiency, financial recordkeeping, access to financing, government program accessibility, and business resilience. In the selective coding stage, these categories were integrated into five main themes: financial technology, financial literacy, financial inclusion, government support, and MSME sustainability.

Triangulation was conducted by comparing qualitative interview findings with the quantitative PLS-SEM results. Member checking was also conducted by confirming the main

interpretation of interview findings with selected participants to ensure that the themes accurately reflected their experiences. This process strengthened the credibility of the qualitative findings and ensured that the interpretation did not merely repeat the statistical results but provided deeper contextual explanation.

The first theme, financial technology, explains why fintech has a strong effect on financial literacy and financial inclusion. Respondents generally adopted fintech because of customer demand, transaction convenience, and the increasing use of digital payments in the market. For example, one respondent stated that QRIS made transactions faster and easier because many customers had shifted to digital payments. This indicates that fintech adoption among MSMEs is often driven by external market pressure rather than by internal strategic planning. Therefore, fintech improves transaction efficiency and financial access, but its long-term contribution to sustainability depends on whether MSME actors can transform digital usage into financial capability.

The second theme, financial literacy, explains why financial literacy has the strongest effect on MSME sustainability. Interview results show that many MSME actors were aware of the importance of financial management, but their practices remained simple. Some respondents still relied on manual bookkeeping or informal memory-based records. This gap between awareness and practice indicates that financial literacy among MSMEs is still developing. The qualitative evidence supports the quantitative finding that financial literacy is essential for sustainability, but it also adds an important interpretation: financial literacy should not only be understood as awareness, but also as the practical ability to apply financial knowledge in cash flow management, business planning, and risk control.

The third theme, financial inclusion, explains the mediating role of access to financial services. Respondents stated that fintech helped them access payment systems, monitor transactions, and obtain information about financing opportunities more easily. However, the interviews also revealed that access alone does not guarantee sustainability. MSMEs still need the ability to evaluate loan risks, allocate capital productively, and avoid excessive debt. This explains why financial inclusion significantly mediates the relationship between fintech and sustainability, but its effect is weaker than financial literacy. Financial inclusion provides opportunities, while financial literacy determines whether those opportunities are used productively.

The fourth theme, government support, provides an important explanation for the non-significant moderation results. Respondents recognized the value of government assistance, especially in training, capital access, licensing, and market facilitation. However, they also reported several obstacles, including limited information about available programs, administrative complexity, uneven access, and support that was not always aligned with their actual business needs. One respondent stated that government policies should prioritize MSME needs, such as easier access to financing, affordable raw materials, and business-friendly taxation. This finding shows that the issue is not the absence of government support, but the limited effectiveness of its implementation. Therefore, government support did not significantly strengthen the relationship between financial literacy, financial inclusion, and sustainability because the support received by MSMEs was not yet sufficiently targeted, accessible, and operationally relevant.

The fifth theme, MSME sustainability, integrates the overall findings. Respondents perceived sustainability as the ability to maintain business operations, adapt to digital transactions, manage finances, access markets, control costs, and survive amid competition. This perception confirms that MSME sustainability is multidimensional and cannot be explained by fintech adoption alone. Fintech acts as an entry point for digital transformation, but sustainability requires the combination of financial literacy, productive financial inclusion, and effective institutional support.

Overall, the mixed-method integration shows that the quantitative and qualitative findings complement each other. The quantitative results identify statistically significant relationships and non-significant moderation effects, while the qualitative findings explain the contextual reasons behind these results. The strong effect of fintech on financial literacy and financial inclusion is explained by the growing use of digital transactions among MSMEs. The stronger mediating role of financial literacy is explained by the importance of financial knowledge in converting fintech use into business decisions. Meanwhile, the non-significant moderating role of government support is explained by implementation gaps, uneven access, and limited alignment between government programs and MSME needs. This integration demonstrates that MSME sustainability is best understood as the result of both internal capability development and the quality of external institutional support.

## **Discussion**

### **Effect of Financial Technology on Financial Literacy**

The finding shows that financial technology has a positive and significant effect on financial literacy among MSME actors. Fintech functions not only as a transactional tool, but also as a digital learning medium that exposes MSMEs to financial information, transaction records, and cash flow monitoring. Repeated interaction with fintech platforms can gradually improve users' understanding of financial concepts and decision-making. From the perspective of Resource-Based Theory (RBT), fintech is a technological resource that supports the development of human capital. Its value lies not only in availability, but also in its ability to stimulate financial awareness and learning among MSME actors (Basri 2014). Thus, fintech becomes strategically valuable when it helps MSMEs improve financial literacy and decision-making capability. This finding is consistent with Lusardi and Mitchell (2014), who emphasized that financial literacy improves financial decision-making, and Morgan and Trinh (2020), who argued that digital financial services can increase financial awareness. The qualitative finding also supports this result. Respondent R20 stated, "Since my customers have switched to digital payments, QRIS makes it easier for me as it is fast and simple." This suggests that fintech adoption driven by transaction convenience can also become an entry point for financial learning. Therefore, fintech providers and policymakers should strengthen educational features so MSMEs can use fintech not only for payments, but also for financial planning and business control.

### **Effect of Financial Technology on Financial Inclusion**

The finding confirms that financial technology has a positive and significant effect on financial inclusion. Fintech expands MSMEs' access to formal financial services such as digital payments, mobile banking, and online financing by reducing barriers related to distance, administrative complexity, and transaction costs. Theoretically, this finding supports RBT by showing that financial access can become a strategic resource for MSMEs through digital platforms. Fintech transforms underserved MSMEs into participants in the formal financial ecosystem, meaning that financial inclusion should also be understood as digital participation in financial networks. This finding aligns with Ozili (2018), who argued that fintech reduces financial access barriers, and Sahay et al. (2020), who explained that digital financial services accelerate inclusion in developing economies. Qualitative evidence reinforces this result. Respondent R11 stated, "It is very helpful because we can track our income and expenses, and the profits become clearer." However, respondents also reported obstacles such as unstable internet connections and delayed transaction confirmations, indicating that fintech-based inclusion requires adequate infrastructure and digital capability.

### **Effect of Financial Technology on MSME Sustainability**

The results show that financial technology has a positive and significant effect on MSME sustainability, although its direct effect is weaker than financial literacy. This suggests that fintech contributes more as an enabling resource than as an independent determinant. Fintech improves transaction efficiency, payment security, business recording, and access to financing, but these benefits become sustainable only when MSMEs can use digital financial information strategically. From an RBT perspective, this finding challenges the assumption that technology adoption alone creates sustainable advantage. Fintech becomes a source of sustainability only when combined with financial literacy and financial inclusion. Thus, technological resources are not self-executing; they require human capability and proper utilization. This finding is consistent with Gherghina et al. (2020) and Kurniasari et al. (2025), who found that fintech contributes more strongly to sustainability when supported by financial literacy and financial access. Qualitative findings also show that many MSMEs still perceive fintech mainly as a transaction tool. Therefore, fintech adoption should be accompanied by financial education, bookkeeping assistance, and digital business mentoring.

### **Effect of Financial Literacy on MSME Sustainability**

Financial literacy has a positive and significant effect on MSME sustainability and appears to be one of the strongest drivers in the model. This result indicates that sustainability depends heavily on MSMEs' ability to manage cash flow, evaluate risks, record transactions, and make rational financial decisions. Sustainability is therefore not only about access to technology or finance, but also about the capability to use resources effectively. This finding strongly supports RBT because financial literacy represents a strategic human capital resource. Compared with fintech and financial inclusion, financial literacy plays a more decisive role because it determines how MSMEs interpret and utilize financial information. Fintech provides tools, and financial inclusion provides access, but financial literacy determines whether both are used productively. This finding is supported by Lusardi and Mitchell (2014) and Bongomin et al. (2017). Qualitative findings add that many MSMEs still rely on simple manual bookkeeping despite recognizing the importance of financial literacy. Therefore, literacy programs should focus on practical skills such as bookkeeping, cash flow monitoring, loan evaluation, and digital financial planning.

### **Effect of Financial Inclusion on MSME Sustainability**

Financial inclusion has a positive and significant effect on MSME sustainability. Access to savings, loans, digital payments, and other financial products helps MSMEs maintain liquidity, expand operations, and strengthen resilience against financial shocks. From the RBT perspective, financial inclusion is a financial access resource. However, this study shows that access alone is insufficient because its effect is weaker than financial literacy. Financial services become strategically valuable only when MSMEs can use them responsibly and productively. Without adequate literacy, financial inclusion may lead to poor financial management or over-indebtedness. This finding is consistent with Babajide et al. (2021) and Demirgüç-Kunt et al. (2022). Respondents also emphasized that while fintech eases access to financial services, MSMEs still need the ability to manage income, expenses, and business capital effectively.

### **Financial Literacy as a Mediator between Financial Technology and MSME Sustainability**

The mediation result shows that financial literacy significantly mediates the relationship between financial technology and MSME sustainability. Fintech contributes to sustainability partly by improving MSMEs' financial knowledge and management capability. This finding contributes to RBT by showing that technological resources must first be converted into human capability before generating sustainable outcomes. Financial literacy therefore functions as a transformation mechanism linking fintech adoption with sustainability.

This finding is consistent with Tan and Syahwildan (2022) and Kurniasari et al. (2025), who emphasized the mediating role of financial literacy in the relationship between fintech and sustainable business performance.

### **Financial Inclusion as a Mediator between Financial Technology and MSME Sustainability**

Financial inclusion also significantly mediates the relationship between financial technology and MSME sustainability. Fintech supports sustainability by expanding MSMEs' access to payment systems, online loans, digital savings, and marketplace transactions. From an RBT perspective, fintech creates sustainability benefits by expanding financial access resources. However, the weaker mediating effect of financial inclusion compared with financial literacy indicates that access is only a supporting mechanism, while literacy determines how opportunities are utilized. This finding aligns with Ozili (2018), Sahay et al. (2020), and Rohaeni et al. (2026), while also emphasizing that financial inclusion should not be treated as an end goal, but as a pathway supported by literacy and responsible financial behavior.

### **Moderating Role of Government Support in the Relationship between Financial Inclusion and MSME Sustainability**

The finding shows that government support does not significantly moderate the relationship between financial inclusion and MSME sustainability. Although government programs may provide training, capital assistance, and market facilitation, their effectiveness depends on accessibility, continuity, and alignment with MSME needs. This finding refines Social Network Theory (SNT) by showing that external institutional support does not automatically strengthen sustainability. Government support becomes valuable only when it is accessible, relevant, and usable by MSME actors. This result differs from Songling et al. (2018), but is consistent with Jayeola et al. (2022), who argued that the impact of government support remains context-dependent. Qualitative findings support this interpretation. Respondent R16 stated, "It would be better if access to capital and buyers were made easier through government initiatives to promote MSME products." This indicates that government support is still needed, but its implementation and relevance remain limited.

### **Moderating Role of Government Support in the Relationship between Financial Literacy and MSME Sustainability**

Government support also does not significantly moderate the relationship between financial literacy and MSME sustainability. This suggests that MSMEs with stronger financial literacy already possess sufficient internal capability to manage finances and make business decisions independently. From the perspective of SNT, this finding implies that external institutional support must align with MSMEs' actual capability needs. Government programs may fail to strengthen literacy outcomes when they are too general or not connected to MSMEs' financial management challenges. This finding is consistent with Alkahtani et al. (2020). Qualitative evidence also supports this result. Respondent R34 stated, "The government should continue to provide relevant training aligned with developments such as digitalization." Therefore, government support should focus more on targeted capability-building programs, including digital bookkeeping, financial planning, loan risk management, and fintech utilization training.

### **Theoretical Implications**

This study provides several theoretical implications for Resource-Based Theory and Social Network Theory in explaining MSME sustainability. First, the findings show that fintech, financial literacy, and financial inclusion are interconnected resources that jointly shape sustainability. Financial literacy emerges as the most central resource because it determines whether technological and financial resources can be transformed into sustainable outcomes. Second,

this study refines RBT by showing that resource ownership alone is insufficient. Fintech and financial inclusion contribute more strongly to sustainability when supported by financial literacy, which functions as a resource orchestration mechanism. Third, the findings extend SNT by showing that government support does not automatically strengthen sustainability. External institutional support becomes effective only when it is accessible, relevant, continuous, and aligned with MSME needs. Finally, by integrating RBT and SNT, this study provides a more comprehensive explanation of MSME sustainability. RBT explains the role of internal resources, while SNT explains the influence of external institutional support. However, the findings indicate that internal capability, particularly financial literacy, is more decisive than external support when government programs are not sufficiently targeted. Overall, this study positions financial literacy as the key mechanism linking fintech adoption to MSME sustainability in the digital financial ecosystem.

## **5. Conclusions**

This study provides an integrative understanding of MSME sustainability by combining quantitative and qualitative evidence within an explanatory sequential mixed-method framework. The findings demonstrate that financial technology, financial literacy, and financial inclusion play significant roles in supporting MSME sustainability, although their contributions differ in nature and mechanism. Financial technology directly improves operational efficiency, transaction convenience, financial recording, and access to financial services; however, its direct effect on sustainability remains relatively limited when it is not supported by internal financial capability. Financial literacy emerges as the most critical determinant because it enables MSME actors to understand, evaluate, and utilize financial information in business decision-making. Financial inclusion also contributes positively to sustainability by expanding access to credit, savings, digital payments, and other financial services, but access alone is insufficient if MSME actors lack the knowledge and skills to use financial products productively and responsibly. The mediation results show that financial literacy and financial inclusion significantly mediate the relationship between financial technology and MSME sustainability, with financial literacy serving as the stronger mediating mechanism. Meanwhile, the moderating role of government support was not statistically significant. This finding does not imply that government support is unimportant, but rather indicates that existing support may not yet be sufficiently accessible, continuous, targeted, or aligned with the actual needs of MSME actors. The qualitative findings confirm this interpretation by revealing challenges such as uneven program access, administrative complexity, limited information, and mismatch between government initiatives and MSME operational realities. Overall, MSME sustainability in the digital era is not determined solely by technology adoption, but depends on the ability of MSME actors to integrate fintech use, financial literacy, productive financial inclusion, and effective institutional support into practical business capability and long-term resilience.

From a theoretical perspective, this study contributes to the development of Resource-Based Theory by showing that fintech, financial literacy, and financial inclusion should be understood as interrelated resources rather than isolated determinants of sustainability. Fintech functions as a technological resource, financial inclusion as a financial access resource, and financial literacy as a human capital resource. Among these resources, financial literacy plays the most central role because it enables MSME actors to transform digital tools and financial access into effective business decisions. This study also extends Social Network Theory by showing that government support, as an external institutional resource, does not automatically strengthen MSME sustainability. The value of external networks depends on the quality, relevance, accessibility, and usability of the support provided. Therefore, institutional support becomes meaningful only when it is aligned with MSME needs and can be practically used to strengthen business capability. From a practical perspective, the findings suggest that MSME

development strategies should prioritize capability building rather than merely expanding access to technology or financial services. Fintech providers should integrate educational features into their platforms, such as simple financial reports, cash flow reminders, credit risk information, and digital bookkeeping tools. MSME actors should also be encouraged to use fintech not only for transactions, but also for planning, monitoring, and evaluating business performance. From a policy perspective, government programs should shift from general assistance toward targeted and needs-based support, including digital financial literacy programs, practical bookkeeping training, loan risk management education, simplified access to financing schemes, and continuous business mentoring. Government support should also reduce administrative complexity and improve the alignment between policy programs and the real operational conditions of MSMEs.

Despite its contributions, this study has several limitations. First, the research was conducted only in selected regions of Central Java, namely Kebumen, Semarang, and Surakarta. Although these regions represent active MSME ecosystems, the findings may not fully capture the diversity of MSME conditions in other provinces, rural areas, or regions with different levels of digital infrastructure and government support. Therefore, the generalizability of the findings should be interpreted with caution. Second, this study used purposive sampling, which may limit the representativeness of the sample because respondents were selected based on specific criteria, particularly their experience in using financial technology and receiving or accessing government support. While this approach is appropriate for the research objectives, it may exclude MSME actors who have not adopted fintech or who have limited access to government programs. Third, the study relied on self-reported data collected through questionnaires and interviews, which may create potential response bias, including social desirability bias or respondents' tendency to provide favorable answers regarding their level of financial literacy, fintech usage, or business sustainability. Fourth, the study used a cross-sectional design, meaning that data were collected at one point in time. As a result, the study cannot fully explain changes in fintech adoption, financial literacy, financial inclusion, government support, and MSME sustainability over time. Fifth, MSME sustainability was measured using perceptual indicators, such as perceived business growth, operational efficiency, customer satisfaction, and financial performance. These indicators are useful for capturing respondents' perspectives, but they may not fully reflect objective business outcomes such as actual profit growth, sales records, productivity, or long-term survival rates (Allen et al., 2016).

Future research should expand the geographical scope by including MSMEs from different provinces, rural and urban areas, and regions with varying levels of digital infrastructure and institutional support. Comparative studies across regions or countries would be useful to examine whether the role of fintech, financial literacy, financial inclusion, and government support differs across institutional and socio-economic contexts. Future studies are also encouraged to use probability sampling techniques to improve sample representativeness and generalizability. Including MSMEs that have not yet adopted fintech would also provide a broader understanding of the barriers to digital financial transformation and sustainability. Longitudinal research is needed to examine how fintech adoption, financial literacy, financial inclusion, and government support influence MSME sustainability over time. A longitudinal design would allow researchers to capture dynamic changes in business capability, technology use, financial behavior, and sustainability outcomes more accurately. Future research may also combine perceptual data with objective business performance indicators, such as sales growth, profit records, transaction volume, number of customers, loan repayment performance, or business survival rates. This would strengthen the validity of sustainability measurement and reduce the limitations of self-reported data. In addition, future studies may include other relevant variables, such as digital capability, entrepreneurial orientation, innovation capability, market orientation, digital trust, financial behavior, and institutional quality. These variables

may provide a more comprehensive explanation of how MSMEs achieve sustainability in a digital financial ecosystem.

## Acknowledgement

The researcher would like to thank the Directorate of Research and Community Service, Directorate General of Research and Development, Ministry of Higher Education, Science and Technology of the Republic of Indonesia in 2025 for providing funding for this research.

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