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Financial Technology, Financial Literacy, and MSMEs' Financial Performance: The Mediating Role of Financial Inclusion in East Java

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Abstract

Micro, Small, and Medium Enterprises (MSMEs) are key contributors to economic growth, yet many still experience constraints in accessing formal financial systems. This research aims to analyze the impact of financial technology and financial literacy on the financial performance of MSMEs, while considering financial inclusion as an intervening variable. The study adopts a quantitative method using primary data collected through questionnaires from 160 MSMEs owners who actively use digital financial services. The data were processed using Partial Least Squares - Structural Equation Modeling (PLS-SEM). The findings reveal that financial literacy significantly enhances both financial inclusion and MSMEs financial performance. Furthermore, financial inclusion plays a mediating role in the relationship between financial literacy and financial performance. In contrast, financial technology does not demonstrate a significant direct influence on MSMEs financial performance, nor does financial inclusion mediate this relationship. The results emphasize the critical role of improving financial literacy in conjunction with expanding access to digital financial services to support better financial outcomes for MSMEs.

Keywords: entrepreneurial, financial inclusion, financial literacy, financial performance, financial technology, MSMEs

INTRODUCTION

In a constantly changing, highly competitive global economy, the role of entrepreneurs—especially those who own MSMEs—has become even more critical to global economic growth. To remain competitive and meet the demands of a modern economy, MSME business owners must not only obtain capital and access to markets but also develop adequate entrepreneurial skills through an entrepreneurial approach, which has been proven to improve MSME performance (Endris, 2022; Sunyoto, Sendy, & Lay, 2024). However, MSMEs are still facing significant obstacles to achieving this goal, including limited access to formal financial services such as financing, savings, and insurance. These limitations restrict MSME growth, jeopardizing their long-term sustainability. Therefore, innovative solutions are needed, one of which is to apply digital technologies to the financial industry (Sholeha & Kharisma, 2024; Agustina & Hafidh, 2025; Riadloh & Nasution, 2023).

Fintech, which encompasses a range of digital financial services from P2P lending to mobile banking and e-wallets, is expected to

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improve the financial performance of small and medium enterprises by increasing transaction efficiency, expanding access to finance, and accelerating financing. Additionally, financial literacy plays an important role in the survival of microenterprises, especially in terms of managing capital and using fintech services appropriately (Putri et al., 2022; Sholeha & Kharisma, 2024; Riadloh & Nasution, 2023). When respondents possess a good deal of financial knowledge, they are likely to make more rational and efficient decisions, thereby improving their businesses' financial performance. Financial inclusion refers to the extent to which individuals and businesses have access to formal financial services and use them efficiently (Putri et al., 2022; Agustina & Hafidh, 2025). Gains in financial inclusion for MSMEs will likely improve their access to financing and operational efficiency, both of which are associated with significant improvements in liquidity, profitability, and solvency (Sholeha & Kharisma, 2024; Riadloh & Nasution, 2023).

Several studies have found a positive correlation among fintech adoption, financial literacy, and MSMEs' financial performance (Putri et al., 2022; Sholeha & Kharisma, 2024; Agustina & Hafidh, 2025). However, most studies on these related variables examine their relationships directly and separately, omitting financial inclusion, which is associated with fintech and financial literacy, as a mediating factor in MSME performance. In addition, past studies conducted across various regions using traditional methods are unlikely to capture the more complex interactions among variables. Therefore, these limitations suggest that the relationship between financial technology, financial literacy, and MSME financial performance warrants further research that integrates financial inclusion. The aim of this study is to identify the directional (one-tailed) impact of financial technology and financial literacy on MSMEs' financial performance, through the mediating role of financial inclusion, within a geographic area that has not been extensively studied in previous literature, using a single, integrated model.

This research contributes both theoretically and practically to enhancing financial performance in MSMEs through digital finance. The study expands on existing research on entrepreneurial orientation by integrating a financial behavioral perspective encompassing fintech adoption, financial literacy, and financial inclusion. Additionally, these findings offer policy implications that serve as a baseline for the development of integrated, technology-optimized MSME empowerment programs (Agustina & Hafidh, 2025; Putri et al., 2022). According to the resource-based view (RBV), a company's performance depends on its ability to use valuable, rare, difficult to imitate, and non-substitutable resources effectively, including intangibles such as knowledge, capabilities, and technological capabilities (Barney 1991; Wernerfelt 1984). In the context of MSMEs, financial literacy is considered an intangible knowledge resource, while fintech is viewed as a technological capability that enables businesses to more efficiently access and manage financial resources. Through financial inclusion, these internal resources are transformed into financial outcomes by relieving some of the financial constraints that limit access to and use of formal financial services. Therefore, RBV can serve as a basis for understanding the direct and indirect effects of financial literacy and fintech on MSMEs' performance, through the role of financial inclusion.

MSMEs can enhance their business performance through fintech adoption by reducing transaction costs, improving their operational efficiency, and expanding access to financial services. Empirical evidence from emerging markets has shown that MSMEs utilizing fintech positively impact their financial performance through the use of digital payment systems, online finances and financial management applications and that adoption can also improve MSME performance through the provision of quicker transaction times and access to a larger number of markets (Gunawan, Jufrizen, & Pulungan, 2023; Tullaili & Susanto, 2025; Serang et al., 2025). Overall, fintech adoption is likely an important factor influencing MSMEs' financial performance.

H_1: Financial technology has a positive effect on MSMEs' financial performance

Financial literacy is important to the financial performance of MSMEs because it helps owners better control cash flows, evaluate other financing sources, and make more informed financial management decisions. Empirical data continues to support the notion that MSMEs with higher levels of financial literacy achieve stronger financial performance. The latest research is demonstrating that financial literacy positively impacts the financial performance of MSMEs by enhancing financial planning and controls (Dewi & Setiyono, 2022; Gunawan, Jufrizen, & Pulungan, 2023). Additionally, Haikal et al. (2025) confirm that financially literate MSME owners operate their businesses more effectively by using financial resources more effectively. Therefore, financial literacy is a major factor in determining the financial performance of MSMEs.

H_2: Financial literacy has a positive effect on MSMEs' financial performance

The use of fintech enables financial inclusion for MSMEs by providing additional options for accessing formal financial services. Specifically, MSMEs without access to the formal banking sector are likely to benefit most from fintech financial services. Much evidence exists to support this claim; for example, some of the most widely cited studies show how the use of fintech has significantly improved the ability of MSMEs to access a variety of digital payment methods, finance sourcing platforms and other financial service offerings, thus contributing to improving their financial inclusion (Serang et al., 2025; Tullaili & Susanto, 2025). In support of this finding, Gunawan et al. (2023) also show that the use of fintech positively impacts the level of financial inclusion for MSMEs by reducing existing barriers to accessing finance. The combined evidence from these studies indicates that fintech is an important facilitator of expanding financial inclusion.

H_3: Financial technology has a positive effect on financial inclusion

Another important determinant of financial inclusion is financial literacy, which refers to the knowledge one has about financial products and services. Several empirical studies have examined the impact of financial literacy on MSME owners' ability to access and use formal financial products, such as savings accounts, lines of credit, and digital payments. MSME owners who are financially literate are more likely to access and use formal financial products than those who are not (Dewi & Setiyono, 2022; Rizky & Fitriyah, 2024). Further, Haikal et al. (2025) demonstrate that the level of financial literacy of MSME owners directly influences their participation in formal financial institutions; thus, financial literacy is a key determinant of financial inclusion among MSMEs.

H_4: Financial literacy has a positive effect on financial inclusion

According to studies, MSMEs with greater financial inclusion will perform better financially than those with lower levels of financial inclusion, due to increased access to credit and financial services (Majid & Imronudin, 2025; Rizky & Fitriyah, 2024). In addition, empirical evidence supports the conclusion that MSMEs benefit from financial inclusion, which is essential for the growth and sustainability of businesses (Haikal et al. 2025). Overall, these findings demonstrate that financial inclusion is an important factor contributing to the financial success of MSMEs.

H_5: Financial inclusion has a positive effect on MSMEs' financial performance

Financial inclusion is expected to mediate the relationship between fintech use and the extent of MSME financial performance, as the full benefits of fintech can be realized once MSMEs are integrated into formal financial systems. Prior studies provide empirical evidence of a positive indirect impact on MSME performance through increased financial inclusion and greater access to the formal financial system resulting from MSME use of fintech (Gunawan, Jufrizen, & Pulungan, 2023; Serang et al., 2025). Tullaili & Susanto (2025) provide further support for the indirect impact of fintech on MSME business performance, demonstrating that greater access to digital financial products will improve MSMEs' overall performance. These findings support the mediating role of financial inclusion in the relationship between fintech use and MSME performance.

H_6: Financial inclusion mediates the relationship between financial technology and MSMEs' financial performance

Financial inclusion is also expected to mediate the link between financial literacy and MSME financial performance, as financial literacy by itself will not translate into improved performance unless there is access to formal financial services. Prior studies provide empirical evidence of a positive indirect impact of financial literacy on MSME financial performance via improved financial inclusion (Haikal et al., 2025; Gunawan, Jufrizen, & Pulungan, 2023). Moreover, prior studies demonstrate that MSME owners with financial literacy are more likely to use formal banks (Majid & Imronudin, 2025), and the use of formal banks directly improves the performance of MSME owners' businesses. These findings support the mediating role of financial inclusion in the relationship between financial literacy and MSME performance.

H_7: Financial inclusion mediates the relationship between financial literacy and MSMEs' financial performance

METHOD

The main goal of this research is to explore how financial technology and financial literacy affect the financial performance of MSMEs, with financial inclusion serving as a mediating variable. The study uses a quantitative, statistical approach to accurately measure causal relationships between the defined variables. The primary data was collected by distributing structured questionnaires through both online and offline methods to MSME owners. The measurement items were modified from Putri et al.'s (2022) work and assessed using a 5-point Likert scale.

Data were analyzed using PLS-SEM to determine the relationships among the variables, as it is a suitable technique for examining complex causal relationships involving latent constructs (Hair et al., 2019). Similar methodological approaches have been employed in previous studies (Sholeha & Kharisma, 2024;

Agustina & Hafidh, 2025). The study population consisted of MSME owners in East Java who were familiar with digital financial services, including QRIS, e-wallets, and online financing platforms. East Java was selected as the research location due to its large number of MSMEs and the rapid growth of fintech adoption in the region. Respondents were selected using purposive sampling, with the criterion that MSMEs must have been operating for at least one year and actively using at least 1 fintech-based financial service.

Primary data were collected through a structured questionnaire distributed using an online survey instrument. The questionnaire consisted of two sections: respondent demographic information and research measurement items. The measurement section comprised 16 Likert-scale items, representing four study variables, with four indicators per variable. The questionnaire was directly disseminated to MSME owners via business communities and digital networks to ensure respondents met the specified criteria. Respondent demographics were measured for MSME name, year established, domicile area, business sector, and how each MSME uses e-wallets, digital banking, P2P lending, and crowdfunding services, as well as the primary purpose of their fintech use. The participant's level of usage of the four key concepts will be measured by Financial Technology, Financial Literacy, Financial Inclusion, and MSME Financial Performance. The Financial Technology variable was operationalized using four items from previous studies by Mendari & Kewal (2013), Margaretha & Pambudhi (2015), and Putri et al. (2022) to indicate the levels of e-wallet use, digital banking, peer-to-peer lending, and crowdfunding.

Financial literacy relates to financial management and knowledge of savings and loan management. The measurement of financial literacy was based on Muchlis (2018), Ansori (2019), and Putri et al. (2022), using adapted items. Financial Inclusion measures access to, usage of, and satisfaction with formal financial services. Access to, use of, and satisfaction with Formal Financial Services will be assessed using the Adapted Items from Rohmah & Gunarsih (2021) and Putri et al. (2022). The financial performance of MSMEs will be measured based on the work of Winbaktianur & Siregar (2021) and Putri et al (2022) and consists of eight adaptable items in relation to meeting short-term obligations, long-term capacity for debt obligations, profitability, and stability of the business, as based on the prior reviews. Based on Hair et al. (2019), the minimum sample size of 160 respondents will allow for at least ten (10) for each variable. Thus, a sample size of 160 will be sufficient for use with (PLS-SEM) analyses. The data analysis involved: a) Testing outer model; b) Testing inner model; c) Testing hypotheses through bootstrapping.

The mediation effect was examined using an indirect effect test, and multicollinearity was assessed using a variance inflation factor (VIF) value of less than 5 (Hair et al., 2019). The validity and reliability of the instruments were established through content validity (expert judgment), and construct validity and composite reliability were assessed using PLS-SEM. A pilot study with 30 participants was conducted to assess the clarity of the survey, and ethical considerations were followed by ensuring voluntary participation and the confidentiality of responses.

The conceptual framework illustrates how financial technology and financial literacy relate to MSMEs' financial performance through financial inclusion and shows that financial inclusion is a mediator between financial technology

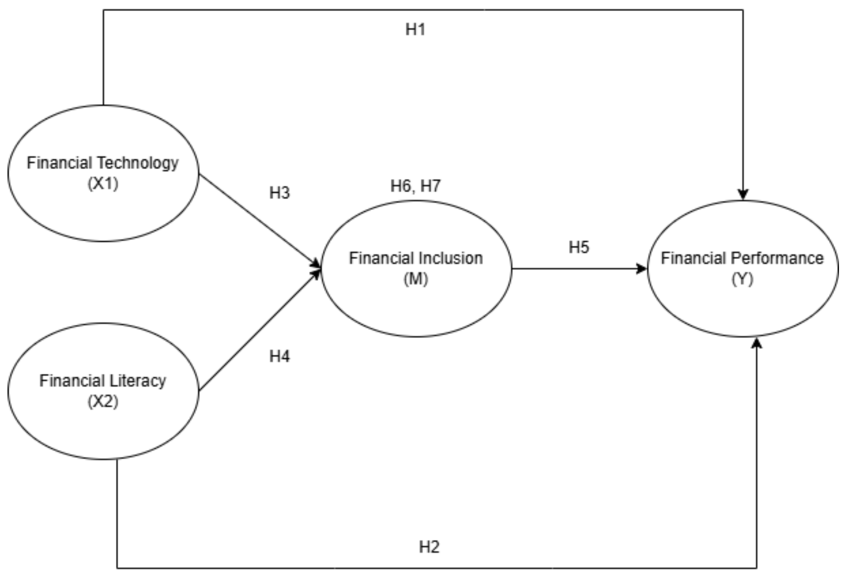

Figure 1 Research Model

and financial literacy and between financial technology and financial performance (Figure 1). In this way, MSMEs' financial performance reflects the overall effectiveness of their financial management practices and their ability to manage resources and maintain the organization (Agustina & Hafidh, 2025). Financial performance is evaluated by measuring MSMEs' liquidity, solvency, and profitability, which are traditional indicators of a business's sustainability (Riadloh & Nasution, 2023).

Fintech refers to technology-based financial services that enable businesses and consumers to make digital payments, apply for loans online, and conduct other financial transactions. The use of fintech has enabled MSMEs to be more productive, safer, and easier to conduct their financial functions (Agustina & Hafidh, 2025; Riadloh & Nasution, 2023). Financial Literacy, along with the ability to manage and work with financial resources, is the capacity of an MSME actor to understand the various financial concepts. Financial Literacy involves several specific skills, such as budgeting, cash flow management, and financial planning, all of which help an MSME actor maintain their business in a stable manner and make long-term decisions about their business activities (Agustina & Hafidh, 2025; Putri et al., 2022; Riadloh & Nasution, 2023). Financial Inclusion, which is the amount of MSMEs using and having access to formality, is the primary source of formal access to the services provided by formal financial institutions. An increase in Financial Inclusion will help develop and drive growth in the MSME business community through access to formal financing and reduced reliance on informal financing currently used (Putri et al., 2022; Agustina & Hafidh, 2025).

RESULTS

Construct validity and reliability were evaluated through the measurement model (Table 1). Construct validity via convergence was assessed using outer loadings and Average Variance Extracted (AVE). Hair et al. (2021) indicate that

Table 1 Validity and Reliability Test

Construct	Item Code	Outer Loading	AVE	Cronbach's Alpha	Composite Reliability
Financial Technology (X)	X1.1	0.807	0.515	0.690	0.721
	X1.2	0.601			
	X1.3	0.702			
	X1.4	0.707			
Financial Literacy (X2)	X2.1	0.812	0.501	0.670	0.709
	X2.2	0.641			
	X2.3	0.802			
	X2.4	0.787			
Financial Inclusion (M)	M1	0.658	0.583	0.762	0.786
	M2	0.671			
	M3	0.715			
	M4	0.814			
MSMEs' Financial Performance (Y)	Y1	0.707	0.573	0.756	0.794
	Y2	0.643			
	Y3	0.841			
	Y4	0.820			

outer loadings greater than 0.5 and 0.6 are indicative of good convergent validity. Additionally, an AVE greater than 0.5 indicates that the construct explains more than 50% of the variance in the indicators it measures (Hair et al., 2022). Furthermore, construct reliability was determined using Cronbach's Alpha and Composite Reliability. A construct with a Cronbach's Alpha of more than 0.6 and a Composite Reliability of more than 0.7 is considered to demonstrate construct reliability (Pratiwi, Sanusi, & Hasibuan, 2022).

The evaluation of the structural model was completed using the coefficient of determination (R^2) to assess the extent to which the exogenous variables explained variance in the endogenous constructs. Hair et al. (2022) state that R^2 values greater than 0.75 indicate strong explanatory power, values between 0.50 and 0.75 indicate moderate explanatory power, values around 0.25 to 0.50 indicate weak explanatory power, and values less than 0.25 indicate very weak explanatory power. Based on the results in Table 2, variable M (Financial Inclusion) exhibits very weak explanatory power, as it receives only an 8.3% contribution from X_1 and X_2; the remaining 91.7% of its variance is explained by factors outside the research model. Meanwhile, variable Y (Financial Performance) shows a low level of explanatory power, with X_1, X_2, and M collectively accounting for 26.2% of its variance, leaving 73.8% unexplained by the other unexamined factors.

Prior to testing the significance of the structural relationships, collinearity among the constructs was assessed using the Variance Inflation Factor (VIF). A VIF value below 5 indicates the absence of multicollinearity in the

Table 2 R-Square Test (R^2)

Variable	R-square
M	0.083
Y	0.262

Table 3 Variance Inflation Factor (VIF)

Construct	VIF
M → Y	1.090
X1 → M	1.049
X1 → Y	1.055
X2 → M	1.049
X2 → Y	1.124

model (Marliana, 2020). As shown in Table 3, all indicators have VIF values less than 5, indicating that multicollinearity is not a concern and that the constructs are appropriately represented in the model.

Furthermore, the overall model fit was evaluated using several goodness-of-fit indicators in PLS-SEM, including the Standardized Root Mean Square Residual (SRMR), the Chi-square, the *dULS*, the *dG*, and the Normed Fit Index (NFI). As shown in Table 4, the SRMR values for both the saturated and estimated models are 0.094. SRMR measures the average discrepancy between observed and model-implied covariances, where lower values indicate a better model fit. A model is considered to have an acceptable fit if the SRMR value is below 0.10, and a value below 0.08 indicates a good fit (Shecillia & Atmaja, 2023). Because the SRMR values in Table 4 are below the 0.10 threshold, the model meets the fit criteria.

Based on the results of the direct path analysis in Table 5, it can be observed that not all relationships among variables have a significant effect on MSMEs' financial performance. The relationship between X_1 (Financial Technology) and Y (Financial Performance) is positive but not statistically significant (β = 0.148, p = 0.082). This result indicates that the use of financial technology has not had a significant direct effect on MSMEs' financial performance. Furthermore, the relationship between X_2 (Financial Literacy) and Y also shows a positive but insignificant effect (β = 0.085, p = 0.320). This finding suggests that the level of financial literacy among MSME actors has not directly contributed to improvements in MSMEs' financial performance. In addition, the relationship between X_1 and M (Financial Inclusion) shows a positive but not statistically significant effect (β = 0.074; p = 0.309), indicating that the use of financial technology by MSMEs has not optimally increased financial inclusion.

In contrast, the relationship between X_2 and M shows a positive and statistically significant effect (β = 0.262; p = 0.001). This result indicates that the higher the level of financial literacy among business actors, the greater the opportunity for MSMEs to use formal financial services. Likewise, the relationship between M and Y also has a positive and significant effect (β = 0.436; p = 0.000), indicating that financial

Table 4 Fit Summary Model

	Saturated Model	Estimated Model
SRMR	0.094	0.094
d_ULS	1.198	1.198
d_G	0.286	0.286
Chi-square	298.728	298.728
NFI	0.616	0.616

Table 5 Path Coefficient

	Hypothesis	Original Sample	T-statistics	P-values
Direct Effect				
$X_1 \rightarrow Y$	H_1	0.148	1.741	0.082
$X_2 \rightarrow Y$	H_2	0.085	0.996	0.320
$X_1 \rightarrow M$	H_3	0.074	1.017	0.309
$X_2 \rightarrow M$	H_4	0.262	3.375	0.001
$M \rightarrow Y$	H_5	0.436	5.778	0.000
Indirect Effect				
$X_1 \rightarrow M \rightarrow Y$	H_6	0.032	0.969	0.333
$X_2 \rightarrow M \rightarrow Y$	H_7	0.114	2.803	0.005

inclusion is one of the factors that can enhance MSMEs' financial performance. Furthermore, the indirect effect results show that the relationship between X_1 and Y through M is positive but not statistically significant (β = 0.032; p = 0.333). This finding indicates that financial inclusion cannot mediate the effect of financial technology on MSMEs' financial performance. Meanwhile, the indirect effect of X_2 on Y via M is positive and statistically significant (β = 0.114, p = 0.005). This finding confirms that financial inclusion plays a significant mediating role in the relationship between financial literacy and MSMEs financial performance.

DISCUSSION

This study showed that the effect of fintech on the financial performance of MSMEs was insignificant, and the results suggest that MSMEs' use of fintech has not yet led to measurable improvements in financial performance. Therefore, simply having access to fintech products will not improve MSMEs' financial performance if they do not use these technology services optimally. Therefore, MSMEs' overall use of fintech still mainly consists of basic payments and does not fully leverage the potential features fintech offers, including financial management, access to productive finance, and strategic decision-making. The low degree of readiness shown by MSMEs in adopting and integrating fintech is a direct result of these organisations failing to adopt the required infrastructure to use fintech in their business operations along with their lack of digital skills on the part of business owners and employees making it much more difficult and reducing the speed in which they can adapt for fintech has this adjustment period will be longer than anticipated (Safitri, 2024).

The conclusions in this study were consistent with other studies that have also established that no statistically significant relationship exists between fintech and the financial performance of MSMEs, along with financial literacy, which also does not have any significant direct relationship to the financial performance of MSMEs (Pramesari et al., 2025; Fijriah, Febriyanto & Widodo, 2025). This indicates that MSMEs have not applied their financial literacy to achieve improved financial outcomes. Financial literacy often remains at the conceptual level, without being applied in day-to-day operational and strategic decision-making. Business owners frequently cite limited access to capital, market competition, and rapidly changing economic conditions as barriers to fully applying their financial literacy. Moreover, traditional financial management practices and the small-scale nature of MSMEs may limit their ability to translate financial literacy into systematic financial planning and performance improvement. As a result, MSME actors may experience difficulties in making optimal financial decisions, thereby constraining their potential to enhance business performance (Anggriani, Armiani, & Wahyullah, 2023). This finding supports prior research, which also found that financial literacy does not directly and significantly influence MSMEs' financial performance (Rosyadah et al., 2022; Bahiu, Saerang, & Untu, 2021).

In terms of financial inclusion, evidence shows that financial technology (fintech) is not making a difference in providing formal financial services to MSMEs accessing these services. Since fintech has not yet significantly promoted financial inclusion, it is expected that the outcomes of basic transaction-type fintech adoption would not align with those of other businesses that provide financing access and/or tools for financial management. This also indicates that MSME business owners have little or no ability to adopt fintech, and a lack of awareness in fintech inhibits them from utilizing their full potential. this suggests that fintech cannot promote financial inclusion of MSME's until owners are sufficiently educated in financial literacy. The current findings are consistent with previous findings demonstrating an insignificant relationship between fintech solutions and financial inclusion (Puspitasari, 2024; Chyntia, 2024).

Compared with the other factors discussed in this study, financial literacy has been shown to have a strong, positive association with financial inclusion. Thus, the evidence suggests that by providing MSME stakeholders with information about various banking products, they are more likely than less financially literate stakeholders to use these products and subsequently become part of the formal financial system. Accordingly, a higher level of financial literacy yields greater confidence when engaging with banks and digital banking services, thereby increasing overall participation in the formal financial sector. Specifically, higher levels of financial literacy enable MSME stakeholders to evaluate, understand, and use financial products more effectively. Financial literacy will also provide MSME stakeholders with a solid means to address many of the typical challenges faced by MSMEs, such as limited access to finance, human resource constraints, and weaknesses in business operations. The evidence supports prior research findings that demonstrate a relationship between enhanced financial literacy and the increased use of formal financial institutions (Puspitasari et al., 2024; Wahyono, Yuliani, & Thamrin, 2025).

Financial inclusion has been found to significantly influence the financial performance of MSMEs. Increased access to formal finance enables MSME participants to leverage financing, manage cash flows more effectively, and operate more efficiently, thereby driving better financial outcomes. Conversely, low levels of financial inclusion could negatively affect businesses' ability to grow and improve performance. The findings also underscore the importance of financial inclusion as a strategic factor influencing the sustainability and profitability of MSMEs. This finding aligns with earlier research indicating that financial inclusion is a substantial and positive contributor to the financial performance of MSMEs (Wijayana, Muhdiyanto, & Utami, 2023; Sarfiah, Rayyani, & Alamsjah, 2025).

The discovery that financial inclusion is not a mediating factor in the relationship between fintech usage and MSME performance reinforces that fintech alone cannot improve performance without increasing access to or use of formal financial services. Fintech is used to a limited extent (both in terms of the variety of features used and their relationship to operations); it therefore cannot have a meaningful impact on improving financial inclusion or business performance. As such, financial inclusion cannot serve as an effective mediation process between fintech and MSME performance. These findings appear to align with those of Zahro, Hendra, & Dhany (2025), but are contrary to those of Asgara and Tasman (2025), who indicated that financial inclusion does serve a mediating role. These differences in opinion suggest that the effectiveness of financial inclusion in its mediating role depends heavily on both the extent to which fintech is used and users' willingness to use formal financial services.

The impact of financial inclusion on the relationship between financial literacy and MSME financial performance is that it acts as an important mediating factor. Thus, financial literacy is associated with better business success through direct and indirect routes (e.g., providing better access to formal finance). Financial literacy enhances the likelihood that an MSME owner will connect with a bank, have knowledge and understanding of the various forms of finance available to them, and will make use of the financial services they have been offered. As financial inclusion expands, MSMEs will have greater access to financial services, enabling them to grow their businesses and improve their financial performance. The findings are consistent with prior research (e.g., Maharani & Cipta, 2022; Fikri & Nahda, 2023) and demonstrate that financial inclusion serves as a critical mediating pathway between financial literacy and MSME financial performance.

This study has some limitations. First, the definition of financial technology used does not account for the different types of fintech services (e.g., digital payments, lending platforms), which may have varying effects on financial inclusion and performance outcomes. Secondly, using self-reported data from questionnaires may introduce bias, as respondents' perceptions do not always align with what happens in their finances. Finally, only a single type of MSME has been studied, which will limit the quality of the results and their generalizability to other types of MSMEs. To address these limitations, I recommend additional research that uses larger, more diverse samples, categorizes the different types of fintech services being studied, and employs longitudinal research designs to capture the relationship between financial technology and financial literacy and financial inclusion, and to examine an MSME's financial performance over time.

CONCLUSION

Financial literacy was found to be the most critical factor in improving MSME performance, as strengthening entrepreneurs' financial knowledge and skills is important for increasing MSMEs' use and access to financial services. The research shows that fintech has not made a significant difference in MSME financial performance or financial inclusion; therefore, more work is needed to increase digital readiness and entrepreneurship to fully utilize fintech. Overall, this research indicates that improving MSME performance is not as simple as just having access to technology. It also shows that having improved financial literacy and access to inclusive financial services are both necessary to promote the long-term growth of MSMEs. Thus, it is critical for policymakers and financial institutions to develop integrated programs that provide financial education and practical assistance to support access to and use of formal financial services, thereby further enhancing sustainable/market-resilient MSME development.

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APPENDIX

Construct	Questionnaire Item	References
Financial Technology	X1.1 I provide E-wallet to facilitate fast payment transactions X1.2 I utilize Digital Banking to monitor and manage my account balances efficiently X1.3 I know or have used Peer to Peer Lending loan services for funding needs X1.4 I know Crowdfunding services as an alternative to finding business funds	(Mendari & Kewal, 2013; Margaretha & Pambudhi, 2015; Putri et al., 2022)
Financial Literacy	X2.1 I am able to manage my expenses and business income well every month X2.2 I have a habit of saving and understand how to manage loans wisely X2.3 I understand the importance of having insurance to protect myself or my business from unexpected risks X2.4 I understand how to choose the right investments to increase the value of my assets	(Muchlis, 2018; Ansori, 2019; Putri et al., 2022)
Financial Inclusion	M1. I find it easy to get access to the financial products or services I need M2. I regularly use financial services (savings, loans, or digital payments) in my daily activities M3. I am satisfied with the quality of service and ease of procedures when using financial services M4. I have felt an increase in my financial well-being since I started using financial services regularly	(Rohmah & Gunarsih, 2021; Putri et al., 2022)
MSMEs' Financial Performance	Y1. My business always has sufficient funds to pay short-term obligations on time Y2. I am confident that my business will be able to pay off its long-term debt without any problems Y3. My business is able to generate satisfactory profits consistently Y4. My business has a stable and sustainable financial condition	(Winbaktianur & Siregar, 2021; Putri et al., 2022)

Note: Items are manifest variables (Hair et al., 2022)