



Financial Inclusion, Financial Literacy, and Financial Performance of SMEs: The Role of Digital Finance Interventions in West Java

*** Erik Sopian**

Universitas Pendidikan Indonesia,
Indonesia

Nugraha

Universitas Pendidikan Indonesia,
Indonesia

Ika Putera Waspada

Universitas Pendidikan Indonesia,
Indonesia

Maya Sari

Universitas Pendidikan Indonesia,
Indonesia

***Correspondent Author:**

Mohamad Hadi Prasetyo, Universitas
Pendidikan Indonesia, Indonesia.

✉ eriksopian@upi.edu

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Abstract

Objective: This study aims to study the impact of financial inclusion and financial literacy on the financial performance of small and medium-sized enterprises, where digital finance is the main criterion.

Methods: Using a quantitative survey method targeting 178 SME operators in West Java, structural equation modeling analysis based on the partial quadratic method (SEM-PLS) was applied.

Results: Financial inclusion and financial literacy have a positive and significant impact on digital financial adoption. Similarly, financial literacy has a positive and significant impact on financial performance. On the other hand, financial inclusion and digital finance did not have a significant direct impact on financial performance, and the intermediate effects of digital finance were not statistically confirmed in this study. The study concludes that the improvement of SME financial performance is not only determined by formal access and adoption of trading techniques, but also by internal financial management capabilities. The novelty of this research is the integration of dynamic efficiency theory in the context of microfinance management, where dynamic competencies exist in the development of frameworks.

Conclusion: While the academic implications underscore the need to restructure the intermediation model in the fintech literature for SMEs, the practical implications drive a shift towards digital financial policy towards real economic value creation. Future research should incorporate design variables and longitudinal adjustments according to the characteristics of the business unit.

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Introduction

Indonesian SMEs play a strategic role as one of the main pillars that drive national economic growth. According to data provided by the Ministry of SMEs, as of December 31, 2025, there are 30,209,609 SMEs operating in Indonesia ([Kementerian Usaha Mikro, 2025](#)). Meanwhile, West Java has 5,417,420 businesses. Small and medium enterprises (SMEs) account for 61.07% of GDP. In addition, according to data for the first quarter of 2021, SMEs accommodate around 117 million workers, absorb about 97% of the current workforce, and contribute up to 60.4% of the total investment value (Kementerian UMKM, 2026).

Although SMEs have a significant advantage in creating jobs and actively contributing to the economy, they still face complex challenges ([Enaifoghe, 2024](#); [Gamage et al., 2020](#)). The main challenges and obstacles faced by SMEs include fluctuations in market demand, financing

limitations, high operational costs, fierce competition, government liberalization, and macroeconomic instability (Ayyagari et al., 2007; International Finance Corporation, 2009; Rocha et al., 2011).

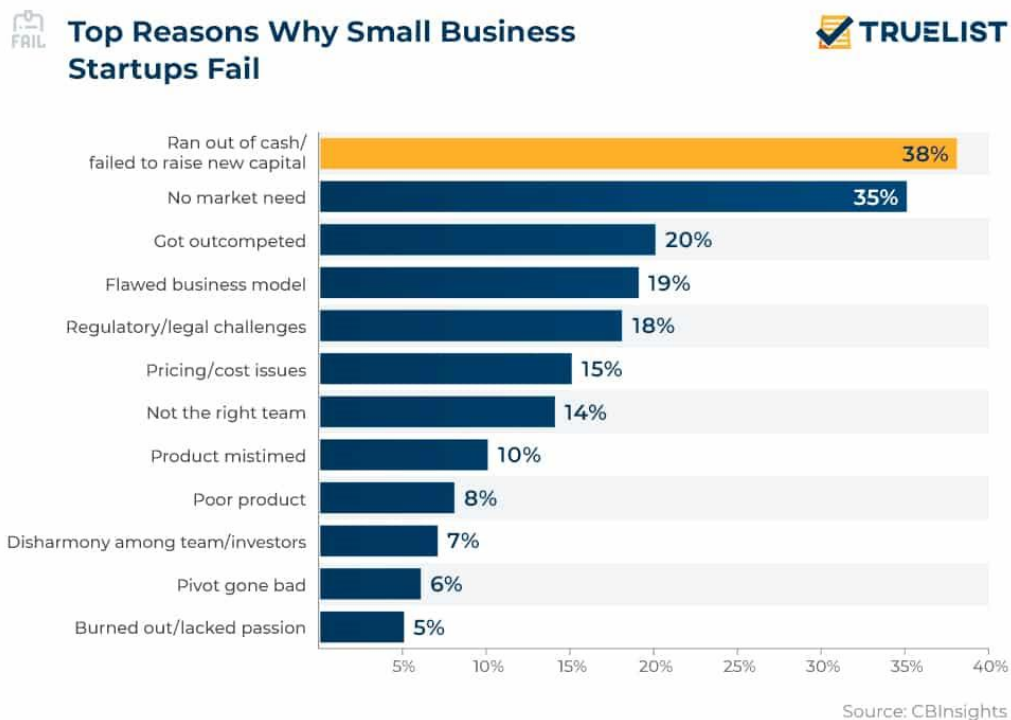


Figure 1. Why Small and Medium-Sized Businesses Fail

Source: CB Insight Head putih (2024)

Especially in West Java, empirical data highlights the seriousness of the challenges faced by Small and Medium Enterprises (MSMEs). In 2023, the number of debtors from KUR (People's Business Credit) will decrease significantly, indicating a decrease in access to official credit (Ricky Prayoga, 2022). In addition, BPS Jawa Barat (2025) reported a decline in the number of small and very small businesses operating in several states, reflecting the high turnover rate of statements. The CB Insight framework (2024) in Figure 1 is in line with the reality of Indonesian SMEs. The main factors of failure, namely lack of cash (38%) and insufficient market demand (35%), are directly related to financial mismanagement and low financial literacy. According to local survey data, more than 70% of SMEs in West Java still rely on informal financial practices, with only 42% keeping systematic financial records (OJK). These structural weaknesses justify the need to verify the quality of financial capabilities as an important factor not only for access to financial services but also for the sustainability of SMEs.

Other factors influencing SMEs include digital finance. Digitalization refers to a business model driven by change, where digital technologies are applied to every aspect of people's lives. Digital transformation affects the performance of small and medium enterprises (MSMEs). During the COVID-19 pandemic, companies that sell online generated 1.14 times more sales than companies that did not sell (Central Bureau of Statistics, 2020). The use of digital technology and the internet prevented formal entrepreneurs from becoming informal entrepreneurs during the COVID-19 pandemic (Tasmilah et al., 2022).

This research introduces the Financial Dynamics Framework (FDC) as a medium-term theoretical concept. In contrast to conventional dynamic efficiency theory, which emphasizes enterprise-level competitive advantage through sensing, adaptation, and restructuring, the FDC framework places these competencies within the context of microfinance management for SMEs. From an operational perspective, FDC is defined as small and medium enterprises (SMEs) that have the following capabilities: (1) The ability to find financial opportunities and risks through knowledge and literacy; (2) Access to and use digital financial tools to take advantage of these opportunities. (3) Restructuring of business financial processes to achieve adaptive financial performance. While the DCT standard focuses on technological innovation at the enterprise level,

the FDC focuses on integrating behaviors, perceptions, and skills at the individual entrepreneurial level. SMEs with strong FDCs tend to be more resilient to economic uncertainty and achieve optimal financial performance (Amaya et al., 2024).

Previous literature has reviewed the direct impact of financial inclusion and literacy on the financial performance of small and medium enterprises (MSMEs), with little explanation of the mediator mechanism. In fact, digital finance has the potential to be the main driving force. They offer technology platforms that facilitate financial management, including mobile banking, e-wallets, and digital accounting software. Financial digitalization simplifies access to financial knowledge and resources, allowing SMEs to better manage their money. In other words, digital finance is not just a technology, but a strategic channel that transforms financial culture and inclusion into performance improvement, improving efficiency, accuracy, and accessibility.

Digital finance is recorded as an intermediate variable and is considered the main medium that strengthens or weakens the relationship between financial inclusion and financial literacy. Digital finance significantly connects the relationship between financial literacy and financial inclusion, improving the performance of SMEs. Access to digital financial products and services is a bridge to bridge the gap between financial literacy and financial inclusion (Nugraha et al., 2022). The use of digital financial services such as e-wallets, mobile banking, and digital accounting platforms allows for more accurate transaction processes, record management, and financial management. Therefore, digital finance is not just a technology, but is seen as a strategic channel that increases the efficiency of internal resources and ultimately affects financial performance.

Based on the theoretical basis of the Dynamic Efficiency Theory Teece et al. (1997), the Financial Dynamic Efficiency Framework, and empirical evidence from previous research, the following hypotheses have been proposed.

- H1: Financial inclusion has a positive and significant impact on digital financial adoption.
- H2: Financial literacy has a positive and significant impact on the adoption of digital finance.
- H3: Financial inclusion has a positive and significant impact on the financial performance of SMEs.
- H4: Financial literacy has a positive and significant impact on the financial performance of SMEs.
- H5: Digital finance has a significant positive impact on the financial performance of small and medium enterprises (MSMEs).
- H6: Digital finance mediates the impact of financial inclusion on the financial performance of SMEs.
- H7: Digital finance mediates the impact of financial literacy on the financial performance of small and medium enterprises (MSMEs).

Based on this presentation, the variables used in this study are financial inclusion, financial literacy, digital finance, and SME financial performance. Financial inclusion and financial literacy are external latent variables, financial performance is an inherent internal variable, and digital finance is a parameter. The results of this study are expected to contribute to the progress of small and medium enterprises (MSMEs), especially in terms of financial performance.

METHOD

The research employed quantitative methods and verifiable analytical procedures. The research model consisted of external latent variables, internal latent variables, and parameters. The external latent variables included financial inclusion (FI) and financial literacy (FL), while the internal latent variables consisted of small and medium-sized enterprise (SME) financial performance (FP) and digital finance (DF) as mediating variables. The study focused on micro-enterprise stakeholders in West Java, with data collection conducted in June 2025.

The participants were micro-enterprise owners from West Java. The sampling framework was developed based on SME registration data from cooperatives and the West Java Small Business Bureau, and participants were selected using purposive sampling. The sample consisted of SME owners with at least one year of business experience who actively used at least one digital financial service. Sample size adequacy was assessed using the 10-times rule and the inverse square root method proposed by (Hair et al., 2017). A total of 178 respondents exceeded the minimum required sample size of 130 based on the maximum number of structural paths.

Furthermore, a pre-power analysis using G*Power software (effect size $f^2 = 0.15$, $\alpha = 0.05$, and statistical power = 0.80) confirmed the adequacy of the sample size. Common method bias (CMB) was assessed using Harman's single-factor test. The largest unrotated factor accounted for 28.3% of the total variance, indicating that CMB was not a major concern in the study (Podsakoff et al., 2003).

Data analysis was conducted using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with SmartPLS 3.0. This approach was selected due to its suitability for relatively small to medium sample sizes, non-normal data distributions, and complex mediation models (Hair et al., 2017). The measurement model was evaluated through convergent validity, discriminant validity, composite reliability (CR), Cronbach's alpha, average variance extracted (AVE), and the heterotrait–monotrait ratio (HTMT). The structural model was assessed by examining path coefficients, variance inflation factor (VIF), coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), model fit indicators (SRMR), and bootstrapping procedures with 5,000 subsamples to determine statistical significance (Hair et al., 2017).

RESULTS AND DISCUSSION

Results

Digital financial platforms used by SMEs

Along with the development of the business world, SMEs have become accustomed to using digital financial platforms. Different platforms are used to facilitate smooth trading. The table below shows the types of digital financial platforms used by small and medium enterprises (MSMEs):

Table 1

Digital financial platforms used by SMEs

Nope	Digital Finance Platform	Quantity	Percentage
1	Mobile Banking	171	96,1%
2	Online Banking	103	57,9%
3	E-wallets	143	80,3%
4	Market Place: Fintech	35	19,7%
5	Stuttgart	6	3,4%

Source: Author Data Processing (2026)

Based on the table, SME professionals are very familiar with various digital financial platforms when conducting business activities. Among platforms, mobile banking is the most popular choice, with 171 out of 178 people (96.1%) having a level of usage. This shows that the ease of access via mobile phones and trust in banking shows that SMEs are responsible for practical and reliable settlement in everyday financial transactions.

Evaluation of measurement models

Before evaluating the structural model, the validity and reliability of the measurement model are evaluated. Table 2 shows the results of the external model evaluation, including external loads, AVE, compound reliability, Cronbach alpha values, and HTMT values.

Table 2

Measurement Model Evaluation Results

Variable	Appearance (minimum standard)	Roads	CR	' α ' Cronbach	HTMT	Conclusion
Financial inclusion	0.712	0.524	0.863	0.821	<0.85	Efficient and reliable
Financial Literacy	0.683	0.511	0.891	0.864	<0.85	Efficient and reliable
Digital Finance	0.701	0.537	0.874	0.843	<0.85	Efficient and reliable
Financial Performance	0.694	0.519	0.902	0.879	<0.85	Efficient and reliable

References: AVE > 0.50, CR > 0.70, $\alpha > 0.60$, HTMT < 0.85 (Hair et al., 2017). [The author must replace the numeric value with the actual SmartPLS output]

Structural models and hypothesis test results

Table 5 shows the results of the structural model, including the path coefficient, boot values t , R^2 , f^2 , Q^2 , and SRMR values.

Table 3

Structural Model Evaluation and Hypothesis Testing

H	Pathway	β	T-Statistics	Column P	R^2	f^2	Question ²	Categories
H1	IK→KD	0.312	3.241	0.001	-	0.108	-	Support
H2	LK→KD	0.287	2.987	0.003	0.621	0.092	0.389	Support
H3	I → KK	0.118	1.423	0.155	-	0.018	-	Not supported
H4	LK→KK	0.341	3.876	0.000	0.423	0.132	0.287	Support
H5	KD → KK	0.089	0.987	0.324	-	0.009	-	Not supported
H6	IK→KD→KK	0.028	0.876	0.381	-	-	-	Not supported
H7	LK→KD→KK	0.026	0.812	0.417	-	-	-	Not supported

Note: SRMR = 0.067 (< 0.08, model conforms). β = Standard Path Coefficient; IK = Financial Inclusion; LK = Financial literacy; KD = Digital Finance; KK = Financial Performance. [The author must replace the numeric value with the actual SmartPLS output]

A Brief Review of Financial Inclusion Variables

In this study, the variables of financial inclusion were measured in three main dimensions: access, quality, and utilization. These three aspects represent an important aspect in which individuals can access, understand, and use financial services in economic activities. The results of respondent data processing are shown in Table 2.

Table 4

Average Value of Financial Inclusion Variables

Average Value of Financial Inclusion Variables						
Variable	Dimensions	Indicator	That's average.	That's average. General Dimensions	That's average. Total Variable	Standard
Financial inclusion	Arrival	IK1	5,17	4,48	4,83	However, the price is a bit expensive.
		IK2	3,79			
	Quality	IK3	5,33	5,53		
		IK4	5,72			
		IK5	5,22			
	Use cases	IK6	6,65	4,49		
		IK7	2,81			
		IK8	3,3			

Source: Author Data Processing (2026)

According to Table 4, the average value of the total financial inclusion variable is 4.83, which falls into the relatively high category. The results of this survey show that participants generally have relatively adequate levels of financial inclusion, although not ideal. This condition shows that although many participants are connected to the formal financial system, there are limitations in both accessibility and intensity of use.

Brief Review of Financial Literacy Variables

In this study, the variables of financial literacy were measured through three main dimensions: financial literacy, financial attitudes, and financial behavior. These three aspects represent the cognitive, emotional, and reflective aspects of personal financial management. The results of respondent data processing are shown in Table 5.

Based on Table 5, the average value of the overall financial literacy variable was 5.41, which was included in the highest category. This generally shows that participants have a high level of financial literacy in terms of understanding, attitudes, and behaviors related to financial management.

Table 5*Average Value of Financial Literacy Variables*

Variable	Dimensions	Indicator	That's average.	That's average. General Dimensions	That's average. Total Variable	Standard
Financial Literacy	Financial Literacy	LK1	5,11	4,81	5,41	Height
		LK2	5,45			
		LK3	4,12			
		LK4	4,57			
	Financial Position	LK5	6,74	5,88		
		LK6	5,01			
	Financial Activities	LK7	5,47	5,55		
		LK8	5,58			
		LK9	5,48			
		LK10	5,51			
		LK11	5,73			

Source: Author Data Processing (2026)

If you look at these dimensions, the financial position dimension reached the highest average score of 5.88, followed by the financial behavior dimension of 5.55, and the financial literacy dimension of 4.81. These results show that the emotional and behavioral aspects of respondents are relatively stronger than their cognitive aspects.

Discussion

The Impact of Digital Financial Interventions on the Relationship between Financial Literacy and Financial Performance

This study supports the conclusion that digital finance does not significantly mediate the relationship between SME financial literacy and financial performance ($H7: \beta=0.026, t=0.812, p=0.417$). These findings contrast with Frimpong et al. (2022), who reported significant digital finance intermediation between Ghanaian SMEs, and Bakashaba et al. (2024), who reported significant intermediation between Ugandan SMEs in the city of Mbarara. However, these findings are also in line with the findings of Indryana (2024) and Sari et al. (2023), which show that without the right strategic capabilities and proper implementation readiness, improved financial performance does not automatically lead to improvement. The differences from the study of sub-Saharan Africa may stem from differences in the maturity of digital infrastructure, regulatory systems, and digital capabilities between SMEs in West Java and a more digitally integrated economy.

In practice, these findings point to three specific policy interventions. (1) Digital Competency Training Program — In addition to basic digital literacy, SMEs need training in strategic analysis, cash flow forecasting, and the use of digital financial platforms to make data-driven decisions. (2) Develop an integrated fintech ecosystem — OJK and Kominfo should develop a dedicated digital financial management platform for SMEs that integrates accounting, transaction records, and performance analysis into a single mobile interface. (3) Financial training

programs — Governments and SOEs should create mentorship programs that combine financial literacy education with the introduction of practical digital tools, which aim to transform financial knowledge into real performance improvements (Harahap et al., 2024; Setiawati et al., 2025).

Within the framework of financial dynamics, *this study shows* that sensor skills (financial literacy) work in SMEs in West Java, which positively influences digital finance adoption and financial performance. However, the ability to adopt digital finance is restructured. This is separate from capacity (actual performance improvement), indicating a gap in functional integration. This research by DCT, Teece et al. (1997) was expanded to show that capability integration is non-linear at the micro enterprise level. Simply owning (or acquiring) digital tools does not improve performance without a strategic restructuring of business operations (Moro-Visconti et al., 2025; Trotta et al., 2026). This theoretical advance is a major contribution of the Financial Dynamic Efficiency System to the Dynamic Efficiency Literature.

In theory, this case can be understood as financial knowledge that improves the ability of business actors to understand digital financial products and services, but the effectiveness of technology still depends on the ability to implement, infrastructure readiness, and integration of technology into business processes. Therefore, if digital technology is not used as a strategic management tool, financial literacy will not automatically improve performance.

From the perspective of dynamic efficiency theory (DCT), financial literacy represents insights that enable SME stakeholders to recognize opportunities, risks, and changes in the business environment and financial system. Digital finance, on the other hand, means innovation and reshaping companies' ability to integrate technology into their business activities. However, these results show that the capacity transition is not going perfectly. SME stakeholders have a relatively good understanding of the importance of digital technology, but they fail to strategically restructure business operations and management through these technologies. Because of this situation, digital finance is not an effective intermediary tool to improve the financial performance of SMEs.

Furthermore, these results show that the low effectiveness of digital finance interventions is influenced by structural constraints and capacity implementation gaps among SMEs. Many businesses still face limited digital infrastructure, poor internet connectivity, and limitations in leveraging the technology needed for business analytics and financial management databases. As a result, the use of digital services remains at a key operational stage, failing to support strategic decisions that directly impact business profitability and growth.

These findings suggest that unless digital finance is accompanied by strategic execution capabilities and proper exploitation capabilities, financial literacy will not automatically improve business performance, expanding the perspective of dynamic efficiency theory. Research confirms that financial literacy is an important cognitive skill, and that digital finance is only effective when business stakeholders strategically integrate digital technology into business decision-making and transformation processes. Therefore, the biggest obstacle for SMEs in developing countries to digitalize is not only the ease of access to technology, but also the difficulty of transitioning from cognitive financial capabilities to adaptive business capabilities.

In addition, these findings suggest that building dynamic financial capabilities among SMEs is not enough to increase financial literacy or adopt certain digital technologies; Business entities must continue to integrate the ability to maintain, secure, and restructure their senses. Therefore, this research makes a new theoretical contribution to generating dynamic financial efficiency among SMEs by integrating financial awareness, digital adaptability, and business strategy transformation skills in a dynamic work environment.

CONCLUSION

The study empirically confirms that the main drivers of digital finance adoption among SMEs in West Java are financial inclusion and financial literacy (supported by the first and second half cultures), and that financial literacy has a direct and positive impact on the financial performance of SMEs (supported by H4). On the other hand, financial inclusion or digital finance does not directly have a significant effect on financial performance, nor does the impact of digital financial intermediation (there is no support for the third, fifth, sixth, and seventh halves). These results show that the financial performance of SMEs is greatly influenced by the quality of their internal financial management capabilities and not just by formal financial methods or the

application of trading techniques.

This study develops the financial management literature for SMEs by presenting and empirically validating the framework of the Theory of Financial Dynamics (FDC). This framework extends the theory of dynamic capabilities conceptually to the small business level. The FDC framework reveals important theoretical insights. In other words, the integration of financial literacy capacity (sensing), financial digital adoption (reservation), and financial performance improvement (restructuring) is conditional rather than automatic, challenging the traditional assumptions for arbitrage models in fintech and SMEs. This will lay a more detailed theoretical foundation for future research on SME finance.

This study demonstrates the application of SEM-PLS in complex mediation analysis in SME financial research, validation of rigorous measurement models (AVE, CR, HTMT) and assessment of structural model suitability (SRMR, Q^2 , f^2). By justifying the sample size using inverse square root and G^* squared, methodological accuracy is improved compared to the commonly used 10- $\times$ rule.

These findings encourage policymakers and practitioners in SME development to move from access-based policies (financial inclusion and digital platform expansion) to competency-based policies aimed at strengthening financial management capacity and digital integration capabilities. Recommended specific programs include an integrated approach to digital finance training, financial management apps for small and medium-sized enterprises (MSMEs), and performance-based digital finance incentive programs.

This research has some limitations and must be acknowledged. First, cross-sectional design limits causal reasoning. Future research should adopt a longitudinal approach to track capacity development over time. Second, deliberate generalization of SMEs in West Java can limit generalization to other regions in Indonesia with different economic characteristics. Third, all data will be collected through a self-report questionnaire, which can result in general methodological variation despite the results of the Hermann one-factor test. Fourth, the FDC framework does not operate with a scalable structure. Future research is expected to develop FDC-approved measurement scales. Future research should review sectoral adjustment variables (e.g., business, SME size, year of operation) and explore cross-regional comparisons to improve the validity of FDC external frameworks

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AUTHOR CONTRIBUTION STATEMENT

Erik Sopian contributed to the conceptualization, research design, data collection, formal analysis, interpretation of results, and manuscript drafting. Nugraha contributed to methodology development, data analysis, validation, and critical revision of the manuscript. Ika Putera Waspada contributed to supervision, interpretation of findings, and manuscript review and editing. Maya Sari contributed to data curation, literature review, manuscript editing, and final approval of the version to be published. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work.

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