



ASSESSING THE CAUSAL RELATIONSHIP BETWEEN PAYMENT GATEWAY INTEGRATION, FINANCIAL LITERACY, AND MSME FINANCIAL PERFORMANCE

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ABSTRACT

Micro, small, and medium enterprises (MSMEs) play a crucial role in supporting Indonesia's economic growth; however, their financial performance often remains limited due to low financial literacy and suboptimal technology adoption. This study aims to examine the influence of payment gateway integration and financial literacy on the financial performance of MSMEs by employing a quantitative approach using Partial Least Squares Structural Equation Modeling (PLS-SEM). Data were collected from 100 active MSME owners through an online questionnaire and analyzed using SmartPLS 3.2.7. The findings reveal that both payment gateway usage and financial literacy have positive and significant effects on MSME financial performance. The R^2 value of 0.317 indicates that these variables jointly explain 31.7% of the variance in financial performance, with financial literacy showing a medium effect size and payment gateway a smaller yet significant effect. The study confirms that digital payment adoption improves transaction efficiency and security, while financial literacy enhances financial planning, budgeting, and risk management capabilities. Theoretically, this research extends the Technology Acceptance Model (TAM) and the Theory of Reasoned Action (TRA) by highlighting the complementary relationship between technological adoption and cognitive financial competence. Practically, the results suggest that MSME managers and policymakers should prioritize digital finance adoption and financial literacy training to strengthen financial resilience and sustainability. Overall, this study provides empirical evidence that combining digital innovation with financial education can significantly improve MSME performance and promote inclusive economic development in emerging economies.

Keywords: Payment Gateway; Financial Literacy; Financial Performance; MSMEs; Fintech; Digital Transformation.

ABSTRAK

Usaha mikro, kecil, dan menengah (UMKM) memiliki peran penting dalam mendukung pertumbuhan ekonomi Indonesia. Namun demikian, kinerja keuangan UMKM sering kali masih terbatas akibat rendahnya tingkat literasi keuangan dan kurang optimalnya adopsi teknologi digital. Penelitian ini bertujuan untuk menganalisis pengaruh penerapan payment gateway dan literasi keuangan terhadap kinerja keuangan UMKM. Pendekatan kuantitatif digunakan dengan metode Partial Least Squares Structural Equation Modeling (PLS-SEM). Data diperoleh dari 100 pemilik UMKM aktif melalui kuesioner daring dan dianalisis menggunakan SmartPLS 3.2.7. Hasil penelitian menunjukkan bahwa baik penggunaan payment gateway maupun literasi keuangan berpengaruh positif dan signifikan terhadap kinerja keuangan UMKM. Nilai R^2 sebesar 0,317 mengindikasikan bahwa kedua variabel tersebut secara simultan mampu menjelaskan 31,7% variabilitas kinerja keuangan,

dengan literasi keuangan memberikan pengaruh sedang, sementara payment gateway memberikan pengaruh kecil namun signifikan. Temuan ini menegaskan bahwa adopsi sistem pembayaran digital meningkatkan efisiensi dan keamanan transaksi, sedangkan literasi keuangan memperkuat kemampuan perencanaan, penganggaran, serta pengelolaan risiko keuangan. Secara teoretis, penelitian ini memperluas penerapan Technology Acceptance Model (TAM) dan Theory of Reasoned Action (TRA) dengan menunjukkan hubungan komplementer antara adopsi teknologi dan kompetensi keuangan kognitif. Secara praktis, hasil penelitian merekomendasikan agar pengelola UMKM dan pembuat kebijakan memprioritaskan implementasi keuangan digital serta program peningkatan literasi keuangan guna memperkuat ketahanan dan keberlanjutan keuangan UMKM. Secara keseluruhan, penelitian ini memberikan bukti empiris bahwa sinergi antara inovasi digital dan pendidikan keuangan dapat meningkatkan kinerja UMKM serta mendorong pembangunan ekonomi yang inklusif di wilayah berkembang.

Kata Kunci: Payment Gateway; Literasi Keuangan; Kinerja Keuangan; UMKM; Fintech; Transformasi Digital.

PENDAHULUAN

Micro, Small, and Medium Enterprises (MSMEs) play a pivotal role in sustaining Indonesia's economic structure. Beyond serving as a major source of employment and income generation, MSMEs also contribute significantly to economic growth, local development, and equitable income distribution. According to recent studies, MSMEs account for approximately 61.41% of Indonesia's Gross Domestic Product (GDP) and 99% of total employment as of 2017 (Raden Ariansyah Kamil, 2022; Tambunan, 2019). Although their contribution to GDP remains relatively lower compared to their share in employment creation, MSMEs are still regarded as the backbone of Indonesia's economy due to their massive number and wide distribution across various sectors (Muktamar B, Bachtiar, Guntoro, Riyantie, & Ridwan, 2023; Pertiwi, Guihua, & Pingfeng, 2016). In the era of globalization and rapid technological transformation, MSMEs must continuously adapt to maintain competitiveness and sustainability in increasingly dynamic markets (Muktamar B et al., 2023). Within this context, financial performance becomes a central indicator of MSME success and long-term viability.

Financial performance, generally measured by a firm's ability to generate profits over time, serves as a key indicator of operational efficiency, risk management, and future potential (Indrawan, ., & Suharti, 2018; M, Wardhani, & Arodhiskara, 2021;

Wardoyo & Purnomo, 2018). One critical factor influencing financial performance is the adoption of financial technology (fintech), which represents innovation in financial systems that enhances products, services, and business models, while also contributing to monetary stability within payment systems (AH Munawar, A Rosyadi, & DA Rahmani, 22 C.E.; Henri Christian Pattinaja, 2021; Munawar, Subrata, & Nugraha, 2023; Rumondang, Sudirman, Effendy, Simarmata, & Agustin, 2019). Fintech has emerged as a transformative tool that reshapes how financial services are delivered, providing speed, accessibility, and efficiency (Lestari, Purnamasari, & Setiawan, 2020). According to the Indonesian Fintech Association (AFTECH), the fintech market in Indonesia continues to expand rapidly, driven primarily by millennial consumers and MSME entrepreneurs who seek digital financial solutions to streamline operations and increase market reach (Helman, 2021; Sudaryanti, Munawar, & Yuniasih, 2025; Yasin, Lailiyah, & Edris, 2021).

Among various elements influencing MSME performance, financial literacy holds a crucial position. It encompasses an individual's ability to understand, manage, and make informed decisions regarding financial resources. (Lusardi & Mitchell, 2014) emphasized that financial literacy enhances individuals' capacity to make sound financial decisions, thereby improving their overall economic well-being. This competency is particularly vital for young entrepreneurs, as it involves

skills in searching for, evaluating, and applying financial information to make strategic decisions (Maya, 2016; Zaipin, Suyanto, & Sunyoto, 2017). Furthermore, financial literacy influences entrepreneurial intentions and success, acting as a foundation for sustainable business development (Morgan & Long, 2020).

The rapid advancement of information and communication technology has further transformed financial ecosystems. One notable innovation is the payment gateway, a system that facilitates secure and seamless online financial transactions (Febrianto, 2020). Payment gateways enable businesses particularly MSMEs to conduct transactions efficiently and securely, minimizing manual processes and operational risks. (Sharma & Lijuan, 2015) found that the quality of online service significantly affects user satisfaction, which indirectly enhances organizational financial performance. For MSMEs, the adoption of payment gateways can thus represent a strategic move to optimize financial processes, improve customer experience, and strengthen competitiveness in digital markets.

The integration of payment gateways as part of the broader digital transformation agenda has created new opportunities for MSMEs to enhance accessibility, efficiency, and security in financial transactions. Simultaneously, financial literacy ensures that MSME owners can effectively manage financial information, make rational decisions, and mitigate potential risks. Studies have shown that MSMEs utilizing fintech-based tools such as payment gateways benefit from improved sales, efficiency, and marketing capabilities compared to those that rely solely on conventional systems (Lestari et al., 2020; Luckandi, 2019; Mahastanti & Utoyo, 2022). (Sugiarti, Diana, & Mawardi, 2019) demonstrated that fintech adoption enhances MSME competitiveness through improved payment services, attracting more customers and boosting financial outcomes.

(Salamah & Kusumanto, 2018) confirmed that digital payment utilization strengthens business efficiency and customer engagement, leading to better performance outcomes.

The impact of fintech on financial performance has been well documented. Studies have shown that the use of fintech applications such as Go-Pay positively affects user attitudes, adoption intentions, and ultimately, MSME financial performance (Mahastanti & Utoyo, 2022). Furthermore, research by Deka et al. (Lestari et al., 2020; Lubis, Nurbaiti, & Harahap, 2021; Mahastanti & Utoyo, 2022) all support the assertion that payment gateway utilization enhances MSME profitability and growth. (Tumanggor & Tarigan, 2020) also highlighted that fintech use, particularly Go-Pay, allows MSMEs to expand profits and achieve sustainable growth. Likewise (Maya, 2016) emphasized that customers prefer MSMEs offering digital payment options, which translates into increased sales volumes.

Despite these positive findings, the relationship between payment gateway integration, financial literacy, and financial performance remains underexplored. Prior research has tended to examine these factors independently, without sufficiently analyzing their combined effects (Anne, Gichuki, Njeru, & Tirimba, 2014; Fajrul Falaakh, 2023). For instance, (Anne et al., 2014) focused primarily on MSMEs' challenges in accessing credit facilities rather than the technological or literacy aspects of financial management. (Fajrul Falaakh, 2023) found that although e-payment systems improved transaction convenience for MSMEs in Makassar, their effect on financial performance remained statistically insignificant. Conversely, financial literacy and fintech adoption were found to aid business owners in monitoring and managing finances more effectively.

Existing literature thus reveals a research gap concerning the synergistic effect of digital payment integration and

financial literacy on MSME financial performance. While previous studies have validated the individual influence of fintech and literacy, few have addressed their interactive dynamics in shaping business outcomes. This gap underscores the need for empirical research to understand how these two variables jointly contribute to MSME sustainability. Additionally, prior works have shown that local contextual factors such as culture, demographics, and regulatory environments significantly influence technology adoption and financial behaviors (Tarhini, Mgbemena, Trab, & Masa'deh, 2015). However, there remains limited evidence explaining how such contextual variations shape the payment gateway literacy performance nexus within MSME settings.

Therefore, this study seeks to fill this gap by providing new empirical evidence on how payment gateway integration and financial literacy jointly affect MSME financial performance. It extends previous research by adopting a more holistic analytical approach that considers both technological and behavioral dimensions of financial management. The findings are expected to offer valuable theoretical contributions to the literature on MSME financial performance, as well as practical implications for policymakers, fintech providers, and business owners. Strengthening the integration of digital payment systems while enhancing financial literacy can serve as a dual strategy to optimize financial performance, ensure sustainability, and support inclusive economic growth among MSMEs in emerging economies.

Hypothesis development

Financial performance reflects the extent to which an enterprise achieves its financial objectives and adheres to sound financial management principles. Financial performance as the evaluation of how effectively a company operates in accordance with financial standards,

serving as both an analytical tool and a management control mechanism (Fahmi, 2014). Such analysis assists decision-makers in optimizing resource allocation and identifying areas for improvement. According to (Soetiono, 2018), enhancing financial knowledge is a key approach to improving financial performance. Financial education enables entrepreneurs to set realistic goals, utilize fintech innovations such as payment gateways effectively, and build a sustainable financial system that contributes to societal welfare. Objective and consistent criteria are essential in measuring financial performance. For MSMEs, three primary indicators are commonly used: 1) Assets, representing the resources owned by the business that can be converted into cash or used to generate income; 2) Sales turnover, indicating total revenue generated from product sales within a given period, reflecting the efficiency of sales and marketing strategies; 3) Net profit, or the residual income after deducting all operational expenses, which measures the firm's overall profitability and financial health. Collectively, these indicators provide a comprehensive view of MSME financial performance, reflecting the effectiveness of financial decision-making and the capacity to adapt to technological innovations such as fintech. Strengthening financial literacy and leveraging digital financial tools like payment gateways are therefore essential for enhancing MSME competitiveness, resilience, and long-term sustainability.

Hypothesis 1: Payment Gateway has a significant effect on Financial Performance.

Financial technology (fintech) represents the utilization of information technology to deliver digital financial services that enhance the efficiency, accessibility, and inclusivity of financial systems. According to (Soetiono, 2018) the development of fintech-based products and services constitutes a critical factor in

establishing a stable and sustainable financial ecosystem that ultimately contributes to improving social welfare. The digital transformation within the financial sector, driven by technological innovation and internet penetration, has ushered the industry into a new era that demands constant adaptability and digital readiness (Soetiono, 2018).

Fintech merges technological innovation with financial services, transforming traditional business models into more modern, technology-driven systems (Rahadjeng, Imam Mukhlis, Danardana Murwani, & Iva Khoiril Mala, 2023). As (Giglio, 2021) notes, fintech firms are typically software-based enterprises offering financial services through digital platforms. Similarly, (Sumarna et al., 2021) emphasize that fintech integrates technology and finance to restructure conventional models, leading to greater convenience and operational flexibility. Within this evolving ecosystem, e-commerce has expanded beyond retail into domains such as digital wallets and peer-to-peer (P2P) lending. Among various forms of fintech, payment gateways have become a cornerstone of financial innovation in Indonesia's digital economy.

Payment gateways serve as intermediaries that facilitate secure and efficient online transactions between buyers and sellers. They enhance customer trust by providing fast, safe, and flexible payment options, which foster stronger relationships between businesses and their customers (Hassan, Shukur, & Hasan, 2020). For micro, small, and medium enterprises (MSMEs), the adoption of payment gateways enables smoother customer service processes, lower marketing expenses, quicker information updates, more efficient financial transactions, and enhanced payment notification accuracy (Kim, Choi, Park, & Yeon, 2016)

However, the use of payment gateways also carries inherent risks, particularly related to cybersecurity threats

such as identity theft, data breaches, and inadequate legal protection for consumers (OJK, 2017). To mitigate such risks, payment gateway providers must ensure robust encryption and compliance with financial security standards that safeguard sensitive personal and transactional data (Hassan et al., 2020). The proliferation of mobile payment systems further expands this landscape, allowing users to complete financial transactions and manage accounts through portable devices anytime and anywhere (Choi, Park, Kim, & Jung, 2020).

Within the context of fintech adoption, the Technology Acceptance Model (TAM) offers a theoretical foundation to analyze user behavior and attitudes toward technology use. (Hanif Ibrahim, Nisrina Khoirunnisa, & Zalfa Salsabiil, 2021) found that fintech adoption among MSMEs enhances operational effectiveness and contributes to Indonesia's post-pandemic economic recovery. Nonetheless, the optimization of payment gateway utilization among MSMEs remains incomplete, indicating a gap between technological availability and practical implementation.

Prior research has established that payment gateways positively influence MSME financial performance by improving transaction efficiency and market accessibility (Lestari et al., 2020). Financial performance, which reflects how effectively an enterprise uses its resources to generate income, is often assessed through indicators such as assets, sales revenue, and net profit (Fahmi, 2014). By facilitating faster and more reliable transactions, payment gateways can significantly enhance these indicators, leading to better financial sustainability for MSMEs.

Hypothesis 2: Financial Literacy has a significant effect on Financial Performance.

Financial literacy is defined as an individual's ability to understand basic

financial concepts, utilize financial products effectively, and manage financial resources efficiently to achieve economic well-being. It also encompasses the capacity to make informed financial decisions, manage limited resources wisely, and develop a mindset of financial sufficiency and prudence (Soetiono, 2018). Financial literacy empowers business owners to set realistic financial goals and to select appropriate financial products and services that align with their business objectives (Sanistasya, Rahardjo, & Iqbal, 2019; Trismayarni Elen & Suci Ariska, 2022).

In addition to knowledge, financial literacy integrates skills and attitudes that directly influence daily and long-term financial decisions (Purwidiyanti, Santoso, Darmawan, Rahmawati, & Setiyani, 2022). (Chaidir, Suprapti, Arini, & Ismiwati, 2020) further define financial literacy as both a cognitive and behavioral competence the confidence and ability to make sound financial decisions. This competence allows individuals to assess financial risks, understand their rights and obligations, and improve their long-term financial well-being (Desai, Bhatt, & Raval, 2023; Reyers, 2019). Conversely, individuals with low financial literacy are more vulnerable to fraud, poor investment decisions, and financial instability (Hutabarat, 2018).

For entrepreneurs, especially MSME owners, financial literacy directly affects business outcomes. Entrepreneurs with adequate financial understanding are more likely to manage business capital effectively, evaluate costs and revenues, and identify investment opportunities (Rosliyati, 2016). (Gusman, Soekarno, & Mirzanti, 2021) emphasize that MSMEs lacking sufficient financial literacy struggle to make informed financial decisions, which in turn hampers their ability to sustain profitability. Proper financial knowledge thus supports better strategic planning, cash flow management, and long-term growth.

According to (Gunawan, Jufrizen, & Pulungan, 2023), the overarching goals of financial literacy include increasing awareness of financial products and services, promoting their appropriate utilization, helping individuals select products aligned with their risk profiles, and safeguarding consumers through informed decision-making. (Mulyono, Sawir, Surahman, Hendrawati, & Nurhidayati, 2023) categorize financial literacy into three main dimensions: (1) financial knowledge, or the cognitive understanding of financial concepts and management practices; (2) financial behavior, which encompasses actions related to spending, saving, borrowing, and investing; and (3) financial attitude, which refers to an individual's values and dispositions toward financial management. Together, these dimensions provide a holistic measure of financial literacy that can explain variations in business performance across MSMEs.

The Theory of Reasoned Action (TRA) (Hill, Fishbein, & Ajzen, 1977) provides an important behavioral framework to analyze how financial literacy influences financial performance. TRA posits that behavior is shaped by individual attitudes, subjective norms, and intentions. In the context of MSMEs, business owners' intentions to engage in sound financial management are determined by their attitudes toward finance and their perceived control over financial outcomes. Thus, higher financial literacy not only enhances financial knowledge but also fosters positive financial behavior that contributes to improved business performance.

METHODOLOGY

This study employs the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach as the main analytical technique. PLS-SEM is a comprehensive multivariate method capable of simultaneously examining all relationships among constructs in a conceptual

framework that includes both measurement and structural components (Hair, Risher, Sarstedt, & Ringle, 2019). The choice of this method is justified by its suitability for predictive and exploratory research involving complex models with latent variables. The data analysis was conducted using SmartPLS version 3.2.7, which allows for robust computation of measurement reliability, validity, and path relationships.

Following the recommendations of (Hair et al., 2019), a two-step analytical procedure was applied. The first step involved the evaluation of the measurement model, focusing on the reliability and validity of reflective constructs. Reliability was assessed through indicator loadings and composite reliability, while validity was tested using average variance extracted (AVE) and discriminant validity criteria. The second step involved assessing the structural model, which included examining the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and path coefficients to determine the strength and significance of hypothesized relationships (Hair et al., 2019).

A purposive sampling technique was employed to ensure that the participants appropriately represented the research objectives. Data were collected using a self-administered questionnaire designed to measure constructs derived from the Technology Acceptance Model (TAM) and the Technology Readiness Index (TRI) frameworks. The questionnaire was distributed online to active MSME owners operating within the research scope. To confirm that respondents were indeed active business owners, control questions were included to filter non-eligible participants. A total of 100 valid responses were obtained for analysis.

In line with methodological guidelines for PLS-SEM, the sample size met the minimum requirement for reliable structural model estimation (Hair et al., 2019). Each construct was measured using

a five-point Likert scale, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). Additionally, the questionnaire incorporated demographic variables, including gender, education level, age, and income, as well as the frequency of digital payment application usage, to capture contextual variations among respondents.

Prior to the full-scale survey, a pre-test was conducted with 30 participants drawn from the same population to ensure clarity, validity, and internal consistency of the questionnaire items. The pre-test results indicated that no substantial modifications were required, confirming that the instrument was appropriate for main data collection.

RESULT AND DISCUSSION

RESULT

Measurement Model Evaluation

In the first stage of analysis, the measurement model was evaluated to ensure that all constructs met the required standards of reliability and validity. The reliability of each construct was first examined by assessing the indicator loadings of all items on their respective latent variables. According to (Hair et al., 2019), standardized loadings should exceed 0.708 to confirm adequate indicator reliability. Indicators with loadings below this threshold were reviewed, but the overall construct loadings remained within the acceptable range, demonstrating strong measurement consistency.

The internal consistency reliability of the constructs was then assessed using Composite Reliability (CR) and Dijkstra–Henseler’s rho (ρ_A). As recommended by (Nunnally, J.C., Bernstein, 1994), a CR value greater than 0.70 indicates satisfactory reliability. In this study, all constructs achieved CR values above this threshold. Similarly, the ρ_A coefficients for all constructs exceeded 0.70, further confirming their internal consistency and measurement stability (Hair et al., 2019).

Table 1 presents the results showing high internal reliability across all constructs included in the model.

Following reliability verification, convergent validity was evaluated using the Average Variance Extracted (AVE) criterion proposed by Fornell and Larcker (1981). AVE values above 0.50 suggest that constructs explain more than half of the variance of their indicators. The analysis indicated that all constructs achieved AVE values between 0.670 and 0.734, confirming satisfactory convergent validity. To further verify indicator significance, a bootstrap resampling procedure with 5,000 subsamples equal in size to the original dataset was applied to compute the t-statistics (Hair, Tomas, Ringle, & Marko, 2017). The results showed that all indicator loadings were statistically significant at the 99.9% confidence level, confirming strong indicator reliability and validity.

The next step involved assessing discriminant validity, which ensures that constructs are empirically distinct from one another. The Fornell–Larcker criterion was

employed, which requires that the square root of each construct's AVE be greater than its correlations with any other latent constructs (Fornell & Larcker, 1981). The results demonstrated that this condition was satisfied across all constructs, supporting discriminant validity.

Additionally, the Heterotrait–Monotrait (HTMT) ratio of correlations was used as a complementary measure to further confirm discriminant validity. According to (Henseler, Ringle, & Sarstedt, 2015), HTMT values below 0.90 or more conservatively, below 0.85 as suggested by (Hair et al., 2019) indicate satisfactory discriminant validity. In this study, all HTMT values were well below the threshold, providing further evidence of strong construct discrimination and robust measurement properties. The complete results of these assessments are summarized in Table 2, which confirms the reliability, convergent validity, and discriminant validity of all constructs included in the model.

Table 1. *Construct Reliability and Validity*

Construct / Item	Loading	Cronbach's Alpha	Dijkstra–Henseler's rho (ρ_A)	CR	AVE
Payment Gateway		0.854	0.858	0.902	0.697
Payment Gateway simplifies transactions	0.841				
Transactions via Payment Gateway are secure	0.853				
Skills in using technology have improved	0.809				
Work productivity increases with Payment Gateway	0.769				
Financial Literacy		0.878	0.881	0.917	0.734
Having a spending budget for fund allocation	0.786				
Prioritizing essential financial needs	0.888				
Consistently following established budgets	0.895				
Having a well-prepared financial plan	0.854				
Financial Performance		0.839	0.870	0.890	0.670
Annual sales turnover has increased	0.789				
Revenue covers initial capital and generates profit	0.824				
Business income ensures enterprise welfare	0.826				

Net profit meets monthly targets	0.896				
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Source: SmartPLS 3 Output, processed data (2024)

After confirming the reliability and convergent validity of the constructs, the next step involved testing discriminant validity, which ensures that each construct is empirically distinct from others within the model. Discriminant validity was assessed using two complementary methods: the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio.

According to (Fornell & Larcker, 1981), the square root of the Average Variance Extracted (AVE) for each construct should be greater than its correlations with any other constructs in the model. This criterion verifies that each construct shares more variance with its

indicators than with other constructs. In addition, the HTMT ratio was applied to confirm discriminant validity as suggested by (Henseler et al., 2015) HTMT values below 0.90 or more conservatively, below 0.85 (Hair et al., 2019) indicate that constructs are distinct and not multicollinear.

As presented in Table 2, all constructs meet both the Fornell–Larcker and HTMT criteria, with correlation and HTMT values well below the recommended thresholds. These findings confirm that the model exhibits satisfactory discriminant validity, ensuring that each latent construct captures a unique conceptual domain within the study framework.

Table 2. Discriminant Validity

		Payment Gateway	Financial Literacy	Financial Performance
Fornell–Larcker criterion	Payment Gateway	0,818		
	Financial Literacy	0,599	0,857	
	Financial Performance	0,459	0,536	0,835
Heterotrait-monotrait (HTMT) ratio	Payment Gateway			
	Financial Literacy	0,694		
	Financial Performance	0,515	0,615	

Source: SmartPLS 3 Output, processed data (2024)

Structural Model Evaluation

Before testing the hypothesized relationships, it was necessary to examine collinearity among the predictor variables to ensure that regression results were not distorted. The Variance Inflation Factor (VIF) was used for this purpose, with a threshold value of 3.0 to maintain the integrity of the regression model (Hair et al., 2019). As shown in Table 3, all VIF values were below this limit, indicating that multicollinearity was not an issue in this study and that the structural model is statistically sound.

The next step involved assessing the structural model through a series of reliability and predictive evaluations. The

path coefficients and their significance levels were estimated using a bootstrapping procedure with 5,000 iterations (Chin, Peterson, & Brown, 2008). Prior to hypothesis testing, model quality was evaluated through the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and path coefficients (Hair et al., 2019). According to Hair et al. (2019), R^2 values of 0.75, 0.50, and 0.25 are categorized as substantial, moderate, and weak, respectively. The results revealed an R^2 value of 0.317, suggesting that the exogenous variables moderately explained the variance in the endogenous construct, financial performance.

The effect size (f^2) was calculated using benchmark values of 0.02 (small), 0.15 (medium), and 0.35 (large). The results indicated that financial literacy ($f^2 = 0.156$) exerted a medium effect, while payment gateway ($f^2 = 0.043$) exhibited a small effect on financial performance. Additionally, the

Stone–Geisser’s Q^2 test confirmed predictive relevance, as all Q^2 values were positive, indicating that the model possesses acceptable predictive power (Hair et al., 2019).

Table 3. Structural Model Evaluation

Relationships	β	t-value	Confidence Interval (95%)	Variance Explained (R^2)	R^2 Adjusted	Predictive Relevance (Q^2)	Effect Size (f^2)	VIF
$X_1 \rightarrow Y$	0.408	3.104	0.595	0.317	0.303	0.194	0.043	1.561
$X_2 \rightarrow Y$	0.214	2.021	0.407				0.156	1.561

Source: SmartPLS 3 Output, processed data (2024)

The hypothesis testing results were then evaluated using a one-tailed test, as directional hypotheses were specified (Kock, 2015). Both hypothesized relationships were found to be statistically significant, as shown in Table 4. The results

confirm that the Payment Gateway ($\beta = 0.408$, $t = 3.104$) and Financial Literacy ($\beta = 0.214$, $t = 2.021$) exert positive and significant effects on MSME Financial Performance. Therefore, both H_1 and H_2 are supported.

Table 4. Hypothesis Testing Results

Hypothesis / Relationship	β	t-value	Confidence Interval (95%)	Supported
$H_1: X_1 \rightarrow Y$	0.408	3.104	0.595	Yes
$H_2: X_2 \rightarrow Y$	0.214	2.021	0.407	Yes

Source: SmartPLS 3 Output, processed data (2024)

The results of the structural model analysis indicate that both payment gateway adoption (X_1) and financial literacy (X_2) significantly influence the financial performance (Y) of MSMEs. The path coefficient of 0.408 and t -value of 3.104 confirm the strong and positive relationship between payment gateway usage and MSME financial outcomes. This finding supports the hypothesis that digital payment integration enhances MSME financial performance, consistent with prior studies highlighting the benefits of digital payment systems in improving transaction speed, accuracy, and operational efficiency (Handayani, Amalia, & Sari, 2022; Tsai, Ye, & Wang, 2020)

Payment gateways provide MSMEs with secure and efficient platforms for conducting transactions, thereby reducing time spent on manual payment processing

and allowing entrepreneurs to focus on core business activities. (Oney, Guven, & Rizvi, 2017) found that the adoption of payment gateways significantly enhances operational efficiency, which in turn improves workforce productivity. Furthermore, secure payment transactions reduce the risk of fraud and transaction errors, fostering consumer trust and ensuring timely, accurate payments. According to (Khiaonarong & Humphrey, 2022), transaction security positively influences customer satisfaction and loyalty, ultimately boosting sales and profitability.

In addition, the use of payment gateways promotes technological competence among MSME owners and managers. As their technological proficiency improves, MSMEs are better equipped to leverage various digital tools to optimize their business processes. (Liu,

Zhou, Zhang, & Tang, 2023) demonstrated that advanced technology utilization in business operations enhances both efficiency and effectiveness, which consequently contributes to superior financial performance.

Similarly, financial literacy (X_2) also shows a significant positive influence on financial performance, with a path coefficient of 0.214 and t -value of 2.021. This indicates that higher financial literacy among MSME owners leads to better financial management and improved business outcomes. This result is in line with prior research emphasizing that financial literacy enhances entrepreneurs' ability to make effective financial decisions and manage resources efficiently (Atkinson & Messy, 2011). Key indicators of financial

literacy include the ability to plan budgets, prioritize expenditure, and allocate resources strategically.

Moreover, consistency in adhering to budgets and having comprehensive financial planning are crucial elements of financial literacy. As shown by (Lusardi & Mitchell, 2014), MSMEs that maintain disciplined financial planning tend to perform better financially because they can anticipate risks and manage their finances more effectively. Overall, these findings highlight that strengthening financial literacy and embracing fintech solutions such as payment gateways can synergistically improve MSME financial performance, leading to greater sustainability and competitiveness in the digital economy.

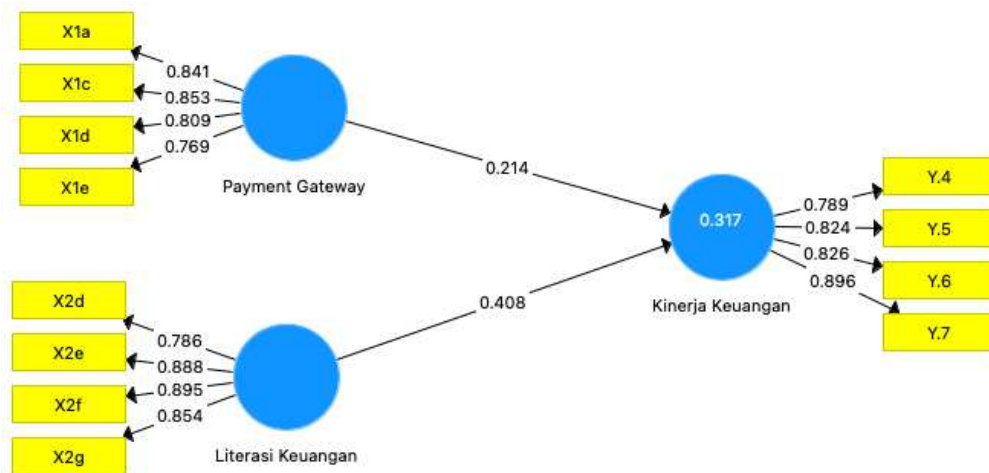


Figure 1. Structural Model (Data Processed with SmartPLS 3, 2024)

Discussion

The findings of this study provide new empirical insights into the role of financial technology integration and financial literacy in strengthening the financial performance of micro, small, and medium enterprises (MSMEs). Rather than merely confirming the statistical influence of payment gateways and financial literacy, the results extend existing theoretical discussions by illustrating how technological adoption and cognitive financial capability jointly function as complementary enablers of MSME

competitiveness. This dual mechanism reflects a broader transformation in how digitalization and financial knowledge interact to foster sustainable entrepreneurial ecosystems in developing regions.

From a theoretical perspective, the findings reinforce the Technology Acceptance Model (TAM) and Theory of Reasoned Action (TRA) frameworks, suggesting that technological utility and user confidence play critical roles in shaping behavioral intentions toward digital finance adoption. MSME owners who perceive payment gateways as reliable and

convenient are more likely to integrate them into daily transactions, thereby improving operational efficiency and liquidity management. However, the effectiveness of such integration is largely mediated by financial literacy the ability to interpret financial data, assess transaction risks, and make informed economic decisions. This interplay between technology-driven efficiency and knowledge-driven prudence demonstrates that digital tools alone are insufficient without the corresponding cognitive readiness to manage them effectively.

These results contribute to the broader discourse on financial inclusion and digital transformation in emerging economies. In Indonesia, where MSMEs account for the majority of employment and GDP, the adoption of digital payment systems such as payment gateways represents not only a technological shift but also an economic imperative. Enhanced transaction transparency and traceability can improve access to credit, formalize informal businesses, and strengthen the digital financial infrastructure. Similarly, strengthening financial literacy ensures that MSME owners utilize financial resources strategically, reducing the likelihood of liquidity mismanagement and overleveraging (Atkinson & Messy, 2011; Lusardi & Mitchell, 2014).

From a managerial standpoint, the implications are both practical and strategic. First, MSME managers should institutionalize payment gateway systems as part of their financial management architecture. Doing so will enable faster cash flow cycles, minimize transaction errors, and enhance customer confidence through secure and traceable payment channels. This integration not only boosts short-term efficiency but also establishes long-term digital credibility, a factor increasingly valued in modern supply chains and customer networks.

Second, MSME leaders must prioritize financial literacy development

among business owners and employees. Financial literacy is not limited to bookkeeping skills; it encompasses budgeting, risk assessment, investment decision-making, and financial forecasting. Training programs, workshops, and digital literacy initiatives should therefore be embedded within local business support programs to equip MSME actors with practical financial management skills. Evidence suggests that firms with well-trained financial managers exhibit greater resilience to market volatility and are better positioned to leverage financial technologies effectively (Gusman et al., 2021).

Third, policymakers and financial institutions should facilitate ecosystem collaboration between fintech providers and MSMEs. This includes designing inclusive financial platforms tailored to small business needs, simplifying onboarding procedures, and offering incentives for digital payment adoption. Local governments, particularly in secondary cities like Banjar, can amplify the impact by promoting public private partnerships aimed at integrating financial literacy education with digital transformation agendas.

While the model demonstrates satisfactory explanatory and predictive power, the moderate R^2 value implies that MSME financial performance is shaped by multifaceted influences. Future research should incorporate contextual factors such as innovation capacity, entrepreneurial orientation, and institutional support to capture a more holistic view of MSME digital resilience. Integrating qualitative perspectives such as behavioral attitudes toward technology or cultural perceptions of financial management could also enhance understanding of the socio-economic dynamics underlying MSME digitalization.

In summary, this study emphasizes that technology adoption and financial literacy are not parallel constructs but

interdependent catalysts for MSME financial growth. Effective synergy between digital payment systems and informed financial management can drive inclusive economic development, particularly in emerging regions where MSMEs serve as the backbone of local economies. Strengthening both technological and cognitive capabilities is therefore not only a managerial necessity but also a strategic pathway toward sustainable and equitable financial ecosystems.

CONCLUSION

This study provides empirical evidence that the integration of payment gateways and financial literacy plays a pivotal role in enhancing the financial performance of micro, small, and medium enterprises (MSMEs). By employing the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach, the research confirms that both factors exert positive and significant effects on financial outcomes, contributing to the overall competitiveness and sustainability of MSMEs in the digital economy. The findings highlight that digital technology adoption alone is insufficient unless accompanied by adequate financial literacy that enables MSME owners to manage and optimize financial resources effectively.

From a theoretical standpoint, the study extends prior frameworks of the Technology Acceptance Model (TAM) and the Theory of Reasoned Action (TRA) by demonstrating that technological readiness and financial capability jointly influence entrepreneurial performance. Payment gateways facilitate efficiency and transactional security, while financial literacy provides the cognitive foundation for sound decision-making and financial discipline. Together, these two constructs form a synergistic model that enhances MSME resilience and promotes inclusive

economic participation in developing regions.

Practically, this research underscores the necessity for integrated digital and financial capability programs tailored to MSMEs. Entrepreneurs and business managers are encouraged to adopt secure digital payment solutions as part of their business operations to improve cash flow efficiency and customer trust. At the same time, targeted financial education and training initiatives should be implemented to strengthen managerial decision-making, budgeting accuracy, and risk mitigation strategies. Policymakers, financial institutions, and fintech companies are advised to collaborate in creating enabling environments that support both technological adoption and financial empowerment two pillars that jointly drive sustainable MSME growth.

Beyond its empirical contributions, this study also offers several implications for future research. The moderate explanatory power ($R^2 = 0.317$) suggests that other determinants such as innovation capability, digital marketing, institutional support, or access to financing may further shape MSME financial performance. Future investigations could adopt a mixed-methods approach, combining quantitative modeling with qualitative insights to capture behavioral, cultural, and contextual nuances influencing MSME digital transformation. Cross-regional or cross-country comparisons may also enrich understanding of how local ecosystems mediate the effectiveness of fintech adoption and financial literacy programs.

In conclusion, the research affirms that the synergy between digital technology and financial literacy is a critical catalyst for MSME competitiveness. Strengthening both dimensions not only enhances financial outcomes but also contributes to broader goals of financial inclusion, economic equity, and digital transformation. By fostering collaboration among entrepreneurs, policymakers, and

financial institutions, emerging economies can create a more resilient and adaptive MSME sector one that thrives in the evolving landscape of the global digital economy.

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