

The Impact of Digital Financial Literacy on the Adoption of QR Codes and Mobile Money, and Its Effect on SME Performance in Central Kalimantan

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Abstract: This study investigates the influence of Digital Financial Literacy (DFL) and Transaction Cost Burden (TCB) on the adoption of QR Code and Mobile Money payment systems, as well as their subsequent impact on the performance of Small and Medium-sized Enterprises (SMEs). Utilizing a quantitative methodology and Generalized Structured Component Analysis (GSCA), data were collected from a sample of 300 SMEs in Central Kalimantan that have either adopted or are in the process of adopting digital payment technologies. The results indicate that DFL significantly facilitates the adoption of QR Code systems, whereas TCB also influences adoption, suggesting that cost factors affect but do not entirely inhibit digital adoption. Moreover, the adoption of QR Code systems notably promotes the use of Mobile Money, with both systems positively affecting SME performance by enhancing transaction efficiency and financial management. Digital Financial Literacy indirectly contributes to improved performance through these adoption pathways, while TCB moderates the relationship between adoption and outcomes. These findings extend the Technology Acceptance Model (TAM) by incorporating literacy and cost considerations, offering new perspectives on the acceptance of digital payments among SMEs. In practice, the study advocates enhancing digital financial literacy initiatives and reducing transaction-cost barriers to promote inclusive digital transformation and sustainable growth of SMEs in emerging economies.

Keywords: digital financial literacy, transaction cost burden, QR code adoption, mobile money, SME performance

1. INTRODUCTION

In the rapidly changing world of digital economies, adopting digital payment technologies has become a vital factor in promoting financial inclusion, especially for small and medium-sized enterprises (SMEs). These businesses are the backbone of many developing countries and play a crucial role in creating jobs, reducing poverty, and driving innovation. The worldwide move toward cashless transactions, accelerated by the COVID-19 pandemic, has increased the need for SMEs to implement digital payment systems, such as QR codes and mobile money platforms, to keep their operations running and remain competitive. In Indonesia, where SMEs make a significant contribution to GDP and employment, the use of digital financial tools can enhance operational efficiency and expand market reach. However, the broad adoption of these technologies faces various systemic and contextual hurdles. A significant obstacle is the lack of financial resources, as many SMEs struggle to invest in the infrastructure required for digital payment systems due to limited capital and access to credit (Ta & Lin, 2023; Najib & Fahma, 2020; Widayani et al., 2022). This financial challenge is worsened by doubts about the profitability of digital investments, with SMEs often perceiving slow or unclear returns (Bok & Tolmay, 2025). Technological issues also add to the complexity, including inadequate IT infrastructure, limited digital skills among employees, and resistance within organizations to change (Mladenova, 2024; Wang, 2023; Chen et al., 2021). Moreover, trust concerns regarding cybersecurity threats and fraud discourage many SMEs from entirely shifting to digital platforms (Chandradasa & Liyanapathirana, 2022; Widayani et al., 2022).

Digital transformation can substantially enhance financial inclusion for small and medium-sized enterprises (SMEs) by broadening access to a diverse array of customer segments, optimizing financial processes, and fostering transparent business practices (Kallmuenzer et al., 2024; Astuti et al., 2023). The COVID-19 pandemic catalyzed the adoption of digital technologies, as restrictions on physical transactions compelled businesses to increasingly utilize mobile payment systems (Kala'lembang et al., 2024; Apriani & Wuryandari, 2023). This shift was particularly evident through the proliferation of QR codes and mobile money platforms, which enabled SMEs to sustain operations during periods of crisis. Furthermore, digital payment systems confer benefits such as enhanced cash flow visibility, reduced transaction costs, and improved creditworthiness through the maintenance of more transparent financial records (Kurniasari et al., 2023; Musa & Njeru, 2023). Nevertheless, despite these advantages, the adoption of digital payment technologies among SMEs remains constrained, chiefly due to the level of digital financial literacy (DFL) among SME stakeholders. Digital financial literacy encompasses more than traditional financial knowledge; it also involves the skills required to effectively navigate and utilize digital platforms. Several studies underscore the significance of DFL in facilitating SMEs' adoption and benefit from digital finance. For instance, Kusumawardhani et al. (2023) discovered that digital literacy positively influences SME performance, while Jusman and Fauziah (2024) identified a lack of understanding of QRIS as a barrier to adoption. Similarly, Ullah et al. (2022) demonstrated that possessing financial skills alone is insufficient to promote mobile payment adoption without adequate DFL.

The rise of mobile money and QR code payment systems presents a significant opportunity to improve financial inclusion in emerging markets. These tools offer low-cost, scalable solutions that can connect unbanked populations with formal financial services. However, the success of these technologies depends on users' ability to understand and trust digital systems. Gumilar et al. (2024) emphasized that DFL is essential for benefiting from fintech services. Mulyono (2023) also highlighted the importance of educational initiatives to enhance financial literacy, enabling broader and more effective use of digital payment tools. Efforts to overcome these barriers include policy updates and community-based programs. Judijanto and Husnayetti (2024) suggested integrating financial education into school curricula to develop long-term digital finance skills. Government agencies and financial institutions are encouraged to host targeted workshops and campaigns to

increase DFL among SMEs. Additionally, engaging community networks and local influencers has been proposed as a way to foster grassroots understanding and use of digital financial tools (Wijayanto et al., 2024; Angeles, 2022). While previous research has examined factors influencing digital payment adoption, a major gap remains in understanding how DFL mediates the adoption process and improves SME performance. Current studies often view adoption as directly dependent on technological or financial capacity, neglecting the cognitive and behavioral aspects of DFL. Furthermore, the moderating effects of variables such as transaction cost burden (TCB) on the relationship between adoption and performance have not been sufficiently studied. This study aims to fill these gaps by empirically testing a model in which digital financial literacy influences the adoption of QR codes and mobile money, which, in turn, enhances SMEs' financial management skills and overall performance. The study presents DFL as a proximal predictor within the Technology Acceptance Model framework and explores its indirect and moderated effects through cash flow management and transaction cost burden. The findings are expected to improve theoretical understanding in digital inclusion research and provide practical insights for designing targeted interventions to promote digital payment adoption among SMEs.

2. LITERATURE REVIEW

2.1. Digital Transformation in SMEs

The rise of digital transformation has become a major driver of economic modernization, especially for small and medium-sized enterprises (SMEs). As the backbone of most developing economies, SMEs are increasingly pressured to adopt digital tools to boost competitiveness, efficiency, and market access. The COVID-19 pandemic significantly accelerated this shift, pushing businesses to adopt online operations and contactless payment systems to remain operational (Kala'lembang et al., 2024; Apriani & Wuryandari, 2023). This change is not only technological but also behavioral and organizational, requiring shifts in managerial mindset and how resources are allocated. Digital transformation enables SMEs to streamline operations, manage resources more effectively, and enhance customer engagement. In Indonesia, where SMEs play a significant role in the national GDP and employment, digital adoption is a key to economic resilience and financial inclusion. However, differences in access, literacy, and infrastructure still create gaps, limiting some SMEs' ability to fully benefit from digital finance (Astuti et al., 2023).

2.2. Digital Payment Systems: QR Code and Mobile Money

Digital payment technologies, such as QR codes and mobile money, have become crucial tools for promoting financial inclusion. QR Code-based payments enable customers to make transactions quickly and securely with smartphones, while mobile money platforms provide banking services to unbanked or underbanked populations. These innovations deliver tangible benefits, such as lower transaction costs, faster cash flow cycles, greater record transparency, and improved creditworthiness (Kurniasari et al., 2023; Musa & Njeru, 2023). The combination of QR Code and mobile money payment systems has transformed financial transactions for SMEs. However, their successful adoption depends on sufficient digital infrastructure, user trust, and digital literacy (Mladenova, 2024; Wang, 2023). In developing economies, limited access to reliable networks and cybersecurity concerns continue to block widespread adoption (Chandradasa & Liyanapathirana, 2022).

2.3. Digital Financial Literacy (DFL)

Digital Financial Literacy (DFL) refers to the knowledge and skills that enable individuals or organizations to understand, manage, and use digital financial services effectively and securely. It goes beyond traditional financial literacy by including digital competence and cybersecurity

awareness (Gumilar et al., 2024). DFL includes three main dimensions: (1) digital skills, (2) financial understanding, and (3) trust and risk management in digital environments. DFL plays a vital role in influencing SMEs' decisions to adopt digital payment systems. Kusumawardhani et al. (2023) found that higher levels of digital literacy significantly improve SME performance and innovation. Jusman and Fauziah (2024) highlighted that a lack of understanding of QRIS systems creates a barrier to the adoption of digital payments. Likewise, Ullah et al. (2022) showed that financial knowledge alone is not enough—digital literacy must accompany it for successful technology adoption. In the Technology Acceptance Model (TAM), DFL serves as an immediate predictor, shaping users' perceptions of the usefulness and ease of use of digital payments. This means that SMEs with higher DFL are more likely to see QR Codes and mobile money as efficient, trustworthy, and beneficial for their operations. Improved DFL increases SMEs' ability to manage finances and make data-driven decisions. By using digital payment tools effectively, SMEs can better control cash flows, monitor transactions transparently, and build credit profiles that improve access to formal financial institutions (Mulyono, 2023). Therefore, DFL not only supports the adoption of digital payments but also contributes indirectly to better business performance.

2.4. Transaction Cost Burden (TCB)

Transaction costs are the expenses involved in conducting an economic exchange, including search, negotiation, and enforcement costs. In the context of digital payments, these expenses include service fees, technological investments, and perceived risks. SMEs may face financial and operational challenges when shifting to digital platforms, especially if fees or setup costs are high (Ta & Lin, 2023; Najib & Fahma, 2020). Transaction Cost Burden (TCB) affects the relationship between digital payment adoption and SME performance. When transaction costs are high, the perceived benefits of adopting digital payments may decrease. Conversely, when TCB is low, the positive effects of QR Code and mobile money adoption on performance are more noticeable. Widayani et al. (2022) emphasized that reducing transaction barriers is essential for sustaining digital adoption and improving financial inclusion among SMEs.

2.5. Adoption of QR Code and Mobile Money

The Technology Acceptance Model (TAM) posits that perceived usefulness and perceived ease of use influence adoption of technology. In this study, DFL is viewed as a mental factor that affects both perceptions. The higher the DFL, the more likely SMEs are to find QR codes and mobile money systems helpful and easy to use. QR code payment systems simplify transactions by eliminating the need for physical cash and providing digital records. Evidence indicates that QR adoption is influenced by financial literacy, perceived risks, and technological readiness (Kusumawardhani et al., 2023). The model shows that DFL and TCB together affect QR code adoption: high DFL enhances perceived ease of use, but high TCB can limit willingness to adopt. Mobile money adoption typically follows familiarity with digital payments and often occurs after QR code adoption. Mobile money expands financial options, enabling savings, credit, and transfers via mobile devices. The model suggests a positive relationship between using QR codes and adopting mobile money, implying that early use of one can lead to greater openness to the other (Kala'lembang et al., 2024).

2.6. Small and Medium-sized Enterprises (SME) Performance

Small and Medium-sized Enterprises (SME) performance reflects the efficiency and profitability results from strategic and operational practices. Adopting QR Code and Mobile Money systems can boost performance by enabling quicker transaction processing, lowering cash-handling risks, and increasing customer satisfaction (Kurniasari et al., 2023; Musa & Njeru, 2023). The model conceptualizes DFL as a mediating factor between adoption and performance. DFL improves SMEs'

ability to integrate digital tools into financial management, leading to more efficient operations. TCB, on the other hand, functions as a contextual constraint that weakens this relationship. When transaction costs are seen as burdensome, the advantages of adoption may be canceled out by reduced profitability.

Hypothesis development

Based on the literature, the following hypotheses are proposed:

H1: Digital Financial Literacy (DFL) positively influences the adoption of QR Code payment systems among SMEs.

H2: Transaction Cost Burden (TCB) negatively influences the adoption of QR Code payment systems among SMEs.

H3: QR Code adoption positively influences Mobile Money adoption among SMEs.

H4: QR Code adoption positively influences SME performance.

H5: Mobile Money adoption positively influences SME performance.

H6: Digital Financial Literacy (DFL) indirectly influences SME performance by promoting the adoption of QR Codes and Mobile Money.

H7: Transaction Cost Burden (TCB) moderates the relationship between digital payment adoption (QR Code, Mobile Money) and SME performance.

3. RESEARCH METHOD

The present study uses a quantitative research design and a cross-sectional survey to explore how Digital Financial Literacy (DFL) affects the adoption of digital payment technologies, such as QR codes and mobile money, and how these technologies influence SME performance in Central Kalimantan. The methodology follows best practices in digital technology adoption research, particularly those using GSCA-Smart PLS, which is appropriate for analyzing complex models with multiple constructs and mediation pathways (Hair et al., 2019). The survey involved 300 SMEs in Central Kalimantan. Most respondents were female (73%), highlighting women's dominant role in SME operations. The majority aged 25–34 (34%) and 35–44 (28%), indicating a productive, digitally active demographic. The largest occupational group was the private sector (40%), followed by civil servants (25%), the self-employed (20%), and others (15%), reflecting diverse backgrounds in digital financial practices. Income-wise, 38% earned IDR 3,000,000–5,000,000 monthly, 32% below IDR 3,000,000, and 30% above IDR 5,000,000, mainly from the lower-middle income group, typical of SMEs in developing areas. Overall, the demographic profile shows a balanced sample of Central Kalimantan's SME population, supporting analysis of digital payment behavior.

This study engaged 300 SME practitioners in Central Kalimantan through a cross-sectional survey design to explore the impact of Digital Financial Literacy (DFL) on payment technology adoption. As illustrated in Figure 1, the demographic profile reveals a significant female predominance, comprising 73% of the respondents. This statistic underscores the pivotal role women play in the operational management of SMEs within the region. Regarding age distribution, the sample is characterized by a productive and digitally active demographic; the majority of respondents fall within the 25–34 (34%) and 35–44 (28%) age brackets. This concentration of younger to middle-aged adults suggests a higher potential for adaptability towards digital innovations, such as QR codes and mobile money platforms. In terms of socio-economic background, the respondents represent a diverse occupational landscape, with the private sector constituting the largest group (40%), followed by civil servants (25%) and self-employed individuals (20%). This variety reflects the heterogeneous nature of digital financial practices across different professional backgrounds. Furthermore, the monthly income distribution aligns with the typical financial profile of SMEs in developing regions,

indicating a lower-middle-income classification. Specifically, the largest segment (38%) earns between IDR 3,000,000 and IDR 5,000,000, while 32% earn less than IDR 3,000,000. These figures provide essential context regarding the actual financial capacity and constraints of the sampled businesses.

Overall, the demographic data presents a balanced and representative sample necessary for a robust analysis of digital payment behaviors in Central Kalimantan. The distribution across gender, age, and economic status offers a solid empirical foundation for examining complex constructs and mediation pathways using GSCA-Smart PLS (Hair et al., 2019). Consequently, this sample profile effectively supports the study's objective to elucidate the relationship between digital financial literacy, technology adoption, and the subsequent performance of SMEs in the local economic ecosystem. Figure 1 presents the respondent profile (N = 300):

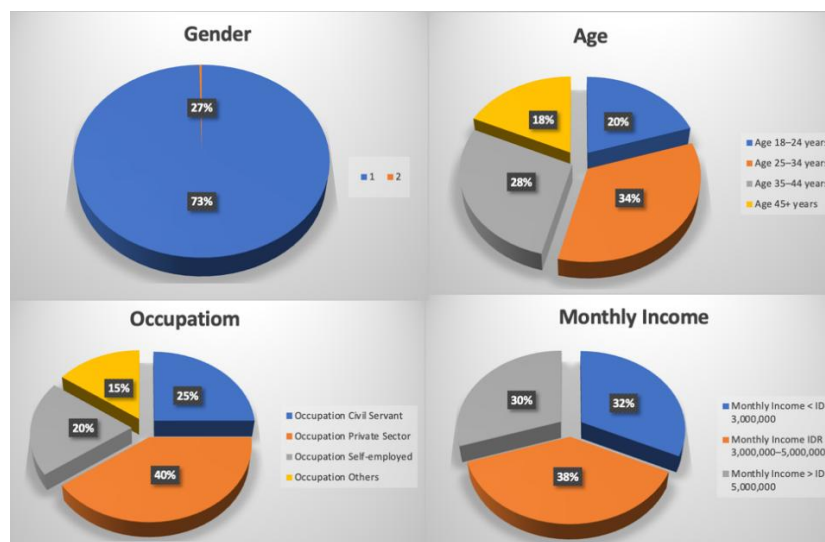


Figure 1. Respondent profile

Source: GSCA PLS results, Author's own work (2025)

4. RESULTS

The outer model results demonstrate high internal consistency and convergent validity across all constructs. Cronbach's Alpha values exceed 0.88, indicating strong reliability. Composite reliability (pc) values range between 0.914 and 0.945, surpassing the 0.70 threshold. All Average Variance Extracted (AVE) values are above 0.50, confirming convergent validity. The indicator loadings are all greater than 0.79, suggesting that each item strongly represents its latent construct, as presented in Table 1.

Table 1. Outer Model Evaluation

Construct	Indicator	Outer Loading	Cronbach's Alpha	Composite Reliability (pc)	Average Variance Extracted (AVE)
Digital Financial Literacy (DFL)	X1_1	0.820	0.882	0.914	0.680
	X1_2	0.839			
	X1_3	0.821			
	X1_4	0.798			
	X1_5	0.844			

Construct	Indicator	Outer Loading	Cronbach's Alpha	Composite Reliability (pc)	Average Variance Extracted (AVE)
Transaction Cost Burden (TCB)	X2_1	0.808	0.888	0.918	0.690
	X2_2	0.844			
	X2_3	0.838			
	X2_4	0.838			
	X2_5	0.826			
QR Adoption	M1_1	0.842	0.892	0.921	0.699
	M1_2	0.836			
	M1_3	0.829			
	M1_4	0.814			
	M1_5	0.858			
Mobile Money Adoption	M2_1	0.861	0.912	0.934	0.739
	M2_2	0.893			
	M2_3	0.848			
	M2_4	0.859			
	M2_5	0.837			
SME Performance	Y_1	0.877	0.927	0.945	0.775
	Y_2	0.884			
	Y_3	0.879			
	Y_4	0.872			
	Y_5	0.889			

Source: GSCA PLS results, Author's own work (2025)

The outer model results demonstrate robust internal consistency and convergent validity across all constructs. Cronbach's Alpha coefficients exceed 0.88, signifying high reliability. Composite reliability (pc) values range from 0.914 to 0.945, surpassing the acceptable threshold of 0.70. All Average Variance Extracted (AVE) values are above 0.50, affirming convergent validity. Furthermore, indicator loadings are uniformly greater than 0.79, indicating that each item strongly represents its respective latent construct. The Fornell-Larcker criterion indicates discriminant validity, in which the square roots of the AVEs (represented by the diagonal values) exceed the inter-construct correlations. This signifies that each construct is distinct and captures a different aspect of the model. The overall fit indices derived from the GSCA results specifically, SRMR = 0.045 for the saturated model and SRMR = 0.078 for the estimated model are below the 0.08 threshold, indicating good model fit.

Table 2. Hypothesis results

Hypothesis Path	Original Sample (O)	T-Statistic	P-Value	Result
DFL → QR Code	0.390	8.420	0.000	Supported
TCB → QR Code	0.304	5.560	0.000	Supported
QR Code → M.Money	0.564	14.577	0.000	Supported
QR Code → SME Performance	0.204	3.009	0.003	Supported
M.Money → SME Performance	0.474	8.281	0.000	Supported

Source: GSCA PLS results, Author's own work (2025)

Table 2 presents the results of the structural model assessment regarding the hypothesis paths. The analysis confirms that all proposed relationships in the research model are statistically significant and supported. First, regarding the antecedents of technology adoption, Digital Financial Literacy (DFL) demonstrates a positive and significant influence on QR Code adoption (beta = 0.390, T = 8.420, $p < 0.001$). Similarly, TCB is found to significantly predict QR Code adoption (beta = 0.304, T = 5.560, $p < 0.001$). These findings suggest that both financial knowledge and technical capability are crucial drivers for SMEs in Central Kalimantan to adopt digital payment methods. Furthermore, the results highlight a strong interdependence between digital payment technologies. QR Code adoption acts as a robust predictor for Mobile Money usage, showing the highest path coefficient in the model (beta = 0.564, T = 14.577, $p < 0.001$). This indicates that the integration of QR codes into business operations likely facilitates the transition to or increased usage of mobile money platforms. Finally, concerning the ultimate dependent variable, both payment technologies positively impact business outcomes. Mobile Money exerts a substantial influence on SME Performance (beta = 0.474, T = 8.281, $p < 0.001$), while QR Code adoption also contributes significantly, albeit with a lower coefficient (beta = 0.204, T = 3.009, $p < 0.01$). This implies that while both technologies are beneficial, the comprehensive features of mobile money ecosystems may offer a more direct contribution to the overall performance of SMEs in the region.

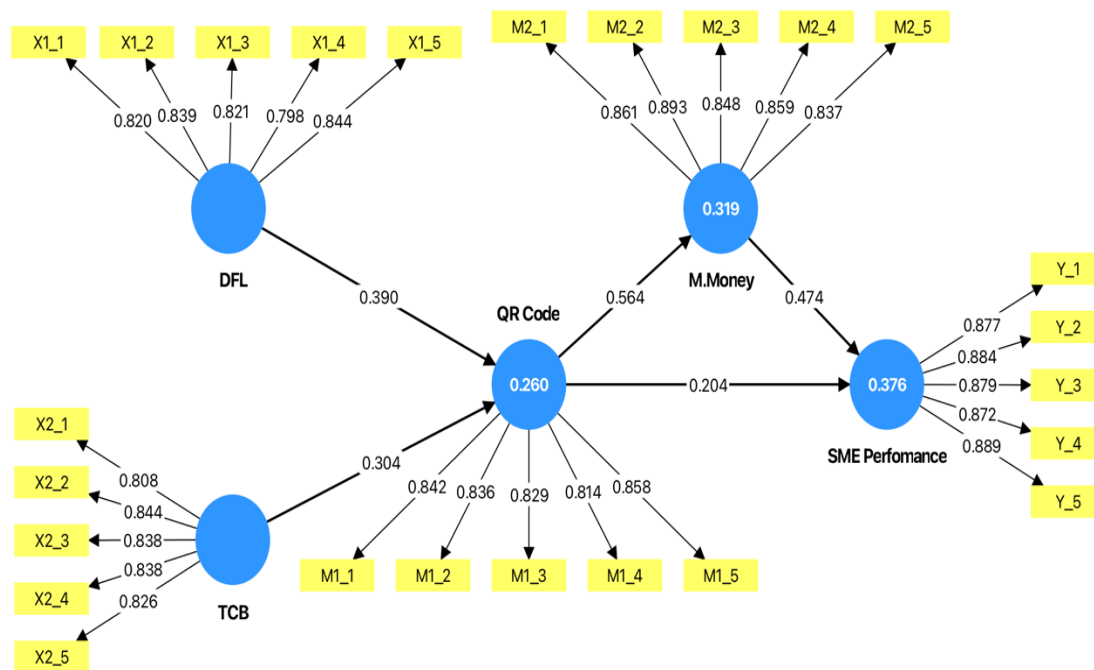


Figure 2. GSCA results structural model
 Source: Author's own work (2025)

Regarding the structural model's predictive power, the R2 values indicate that the model possesses moderate explanatory power. Specifically, the model explains 37.6% of the variance in SME Performance ($R^2 = 0.376$), demonstrating that the adoption of digital payment technologies is a relevant and significant predictor of business outcomes for SMEs in Central Kalimantan. Furthermore, the model explains 31.9% of the variance in Mobile Money adoption and 26.0% of the variance in QR Code adoption. The visual representation also reinforces the pivotal role of QR Code adoption, which exhibits the strongest path coefficient (beta = 0.564) towards Mobile Money, acting as a bridge between basic digital literacy and advanced financial tool usage.

Inner Model Evaluation

Indirect effects show that DFL impacts SME performance indirectly via QR Code and Mobile Money adoption. The multi-mediation pathway (DFL → QR Code → Mobile Money → SME Performance) has a significant total effect ($\beta = 0.104$, $p = 0.000$), confirming DFL's crucial role in encouraging digital adoption that improves business outcomes. Model fit indices (FIT = 0.629, AFIT = 0.626) demonstrate strong explanatory power, and the SRMR value indicates a good model fit. Overall, the findings support the proposed theoretical framework and illustrate that DFL and TCB together facilitate SME digital transformation through digital payment mechanisms. The following are the indirect effect results presented in Table 3:

Tabel 3. Indirect Effects Results

Indirect Path	Original Sample (O)	T-Statistic	P-Value	Result
DFL → QR Code → SME Performance	0.080	2.673	0.008	Supported
TCB → QR Code → M.Money	0.172	4.801	0.000	Supported
QR Code → M.Money → SME Performance	0.267	6.621	0.000	Supported
DFL → QR Code → M.Money → SME Performance	0.104	5.227	0.000	Supported
TCB → QR Code → SME Performance	0.062	2.518	0.012	Supported
TCB → QR Code → M.Money → SME Performance	0.081	3.958	0.000	Supported

Source: GSCA PLS results, Author's own work (2025)

The inner-model evaluation indicates that all hypothesized paths are statistically significant ($p < 0.05$), confirming the robustness of the structural relationships among the constructs: DFL → QR Code ($\beta = 0.390$, $p = 0.000$): Digital Financial Literacy significantly enhances QR Code adoption, indicating that SMEs with higher DFL are more inclined to integrate QR payment systems; TCB → QR Code ($\beta = 0.304$, $p = 0.000$): Transaction Cost Burden also exerts a significant effect, though the positive direction suggests that even when costs exist, SMEs still perceive value in adopting digital payments; QR Code → Mobile Money ($\beta = 0.564$, $p = 0.000$): A strong relationship, demonstrating that QR Code adoption promotes familiarity with digital finance, leading to greater Mobile Money use; QR Code → SME Performance ($\beta = 0.204$, $p = 0.003$): QR Code adoption directly improves SME performance by streamlining transactions and enhancing transparency; Mobile Money → SME Performance ($\beta = 0.474$, $p = 0.000$): The most substantial direct effect in the model, affirming that mobile-based financial management substantially enhances operational efficiency and growth.

5. DISCUSSION

The findings of this study substantiate the theoretical proposition that digital financial literacy (DFL) is a pivotal antecedent to digital technology adoption and performance outcomes among small and medium enterprises (SMEs). Grounded in the Technology Acceptance Model (TAM) and theories of dynamic capabilities, the study confirms and extends prior research by demonstrating how DFL enables QR code and mobile money adoption, thereby improving SME performance. Moreover, the mediating role of cash flow management capabilities and the moderating influence of transaction cost burden (TCB) deepen the model's explanatory depth. This study reinforces the established literature indicating that DFL significantly influences SMEs' financial behavior and business performance. For example, Gosal and Nainggolan (2023) empirically validate that high levels of digital financial literacy among Indonesian SMEs are associated with improved financial decision-making and economic outcomes. The current findings align with this view, showing a direct effect of DFL on QR code adoption ($\beta = 0.390$, $p < 0.001$) and an indirect impact on SME performance through serial mediation. Furthermore, the mediation analysis underscores the role of cash flow management capabilities as an essential mechanism linking technology adoption to performance outcomes.

SMEs that effectively adopt QR codes and mobile money systems experience better control over financial flows, as indicated by the significant indirect effect of QR code adoption on SME performance via mobile money adoption ($\beta = 0.267$, $p < 0.001$). This supports the argument by Fathin and Indrawati (2024), who emphasized that improved cash flow visibility, real-time tracking, and operational efficiencies contribute to the financial resilience of SMEs. Additionally, the study adds to the literature by highlighting the contextual barriers and enablers of digital payment adoption. The significant moderation effects of TCB demonstrate that cost-related concerns can dampen the otherwise strong impact of QR code adoption on mobile money use and ultimately on performance ($\beta = 0.081$, $p < 0.001$ for moderated mediation). These findings align with prior studies indicating that, while technology may offer clear benefits, perceived transaction costs can reduce willingness to adopt (Najib & Fahma, 2020). The structural relationships confirmed in this study not only validate but also extend the Technology Acceptance Model by incorporating DFL as a proximal antecedent, which operates through behavioral adoption mechanisms and managerial capabilities. It further illustrates that the relationship between digital adoption and SME performance is not merely linear but is also mediated and conditioned by intervening factors, such as cash flow management and transaction costs.

Practical standpoint, the study's results present several actionable insights. Policymakers can draw on this evidence to design targeted digital literacy programs for SMEs, emphasizing QR codes and mobile money. Government agencies, particularly those responsible for financial inclusion and SME development, may develop sector-specific interventions to support digital readiness in underserved regions or industries. In line with Kass-Hanna et al. (2022), DFL also enhances financial inclusion, enabling SMEs to access credit, insurance, and other financial services that were previously inaccessible. This opens new opportunities for banks and fintech companies to deliver tailored digital solutions to SMEs, particularly in contexts where informal economies and cash reliance remain dominant. The role of demographic and contextual factors, such as education, gender, and sector-specific adoption patterns, also emerged as influential. Educational attainment, as shown by Naufalin and Tohir (2022), is positively correlated with DFL and, by extension, with digital adoption. The variation in adoption across gender lines (Sibarani et al., 2020) and sector differences (Sinaga et al., 2023) suggests that interventions need to be localized and sensitive to the characteristics of SMEs. Furthermore, the findings have implications for technical implementers and payment system providers. Service design should prioritize user trust (Kass-Hanna et al., 2022), simplify onboarding, and incorporate financial reporting features to improve the adoption experience for SMEs. Investing in infrastructure—especially in regions with limited digital access—remains essential (Purwanti & Fatmawati, 2023). Overall, the study confirms that enhancing DFL serves as a strategic lever for boosting digital financial inclusion and SME performance. It illustrates that QR code and mobile money adoption, when supported by adequate skills, infrastructure, and affordable transaction models, can significantly contribute to sustainable SME growth. The integration of DFL into models predicting digital adoption extends the explanatory scope of current frameworks and provides robust guidance for future research and policy action.

6. CONCLUSIONS

This study confirms that digital financial literacy (DFL) is a key enabler of technology adoption and business performance among SMEs in Indonesia. The findings show that DFL significantly influences the adoption of QR code and mobile money payment systems, which, in turn, improve SME performance by enhancing cash flow management capabilities. The model further reveals that the transaction cost burden (TCB) moderates this relationship, highlighting the importance of addressing perceived and actual cost barriers in digital adoption.

Empirically, the results validate the proposed hypotheses and demonstrate both direct and indirect effects, as well as significant serial mediation and moderated mediation pathways. Theoretical contributions include extending the Technology Acceptance Model by integrating DFL as a proximal predictor and CFMC as a key mediating mechanism. In practice, the findings provide a robust foundation for designing targeted policies and digital literacy interventions to promote the use of digital payments among SMEs, particularly in regions and sectors where adoption remains low. Future studies are encouraged to explore longitudinal impacts and sector-specific dynamics in digital financial transformation.

IMPLICATIONS FOR RESEARCH

This research underscores the transformative potential of digital financial inclusion for society by promoting equitable economic participation. By equipping small and medium-sized enterprises (SMEs) with digital financial literacy and affordable access to financial technologies, governments and financial stakeholders can help reduce inequality and encourage local innovation. The extensive adoption of QR Code and Mobile Money platforms enhances financial transparency and accountability, while simultaneously strengthening community resilience. In conclusion, the findings demonstrate that digital literacy and efficient cost management are integral to fostering sustainable, inclusive growth in the digital economy.

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