

DIGITAL FINANCIAL LITERACY AND QRIS ADOPTION: THEIR IMPACT ON MSME PERFORMANCE IN BANGKA BELITUNG MEDIATED BY FINANCIAL BEHAVIOR

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Abstrak

Digitalisasi sistem pembayaran melalui Quick Response Code Indonesian Standard (QRIS) telah berkembang pesat di kalangan usaha mikro, kecil, dan menengah (UMKM) di Indonesia, termasuk di Provinsi Kepulauan Bangka Belitung, yang ekonominya melambat seiring dengan penurunan sektor penambangan timahnya. Penelitian ini bertujuan untuk menganalisis pengaruh literasi keuangan digital dan adopsi QRIS terhadap kinerja keuangan UMKM kuliner di Bangka Belitung, dengan perilaku keuangan sebagai variabel mediasi. Studi ini menggunakan pendekatan campuran metode penjelasan berurutan, di mana survei kuantitatif dianalisis menggunakan Partial Least Squares–Structural Equation Modeling (PLS-SEM) dan diperkuat melalui wawancara mendalam. Data primer dikumpulkan melalui kuesioner dan wawancara semi-terstruktur. Hasil (ilustratif) menunjukkan bahwa literasi keuangan digital dan adopsi QRIS memiliki efek positif yang signifikan terhadap kinerja keuangan, baik secara langsung maupun melalui mediasi parsial perilaku keuangan, temuan yang diperkuat oleh data wawancara tentang efisiensi pencatatan transaksi dan akses pasar yang diperluas. Studi ini menawarkan implikasi praktis bagi pelaku UMKM, lembaga perbankan, dan pemerintah daerah dalam mempromosikan literasi keuangan digital di daerah kepulauan seperti Bangka Belitung.

Kata Kunci: literasi keuangan digital, QRIS, perilaku keuangan, kinerja UMKM, PLS-SEM

Abstract

The digitalization of payment systems through the Quick Response Code Indonesian Standard (QRIS) has grown rapidly among micro, small, and medium enterprises (MSMEs) in Indonesia, including in the Bangka Belitung Islands Province, whose economy has slowed as its tin-mining sector continues to shrink. This study aimed to analyze the effect of digital financial literacy and QRIS adoption on the financial performance of culinary MSMEs in Bangka Belitung, with financial behavior as a mediating variable. The study employed a sequential explanatory mixed-methods approach, in which a quantitative survey was analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) and reinforced through in-depth interviews. Primary data were collected through questionnaires and semi-structured interviews. The (illustrative) results indicate that digital financial literacy and QRIS adoption have a significant positive effect on financial performance, both directly and through the partial mediation of financial behavior, a finding reinforced by interview data on transaction-recording efficiency and expanded market access. This study offers practical implications for MSME actors, banking institutions, and local governments in promoting digital financial literacy across archipelagic regions such as Bangka Belitung.

Keywords: digital financial literacy, QRIS, financial behavior, MSME performance, PLS-SEM

1. INTRODUCTION

The economy of the Bangka Belitung Islands Province grew by only 0.77 percent in 2024, a sharp slowdown from the 4.38 percent growth in 2023, with the main source of growth shifting to the agriculture, forestry, and fisheries sector as the contribution of the tin-mining sector—long the region's mainstay—continued to shrink (Badan Pusat Statistik Provinsi Kepulauan Bangka Belitung, 2025). This condition underscores the urgency of diversifying the economy toward micro, small, and medium enterprises (MSMEs), particularly in the culinary

and tourism sectors, as a buffer for employment absorption and local economic growth that no longer depends on limited natural resources.

Amid this need for diversification, MSME actors still face the classic problems of disorderly financial record-keeping and weak business financial planning, which in turn hinder accurate business decision-making (Aribawa, 2016). At the national level, the 2024 National Survey of Financial Literacy and Inclusion (SNLIK), conducted by the Financial Services Authority together with Statistics Indonesia, recorded that the financial literacy index of the Indonesian population had only reached 65.43 percent, while the financial inclusion index had reached 75.02 percent (Otoritas Jasa Keuangan, 2024). This gap between high access to financial services and still-limited financial understanding is potentially wider in archipelagic regions such as Bangka Belitung, which have limited infrastructure and financial-education outreach compared with regions on Java.

At the same time, the adoption of the Quick Response Code Indonesian Standard (QRIS), initiated by Bank Indonesia in 2019, has grown very rapidly. Data from the Indonesian Payment System Association (ASPI) recorded that the number of national QRIS merchants reached approximately 38 million in the first quarter of 2025, growing 19 percent year on year, with about half of its users being MSME actors (Databoks, 2025). In the Bangka Belitung Islands Province itself, the number of QRIS merchants was recorded at around 181 thousand in the same period, far smaller than the provinces on Java, which dominate more than 65 percent of the total national QRIS merchants (Databoks, 2025). This phenomenon of inter-regional disparity in digital-payment adoption becomes one justification for conducting research in the local context of Bangka Belitung, rather than merely replicating findings from regions with already-mature digitalization.

Prior studies have consistently shown that financial literacy positively affects the performance and sustainability of MSMEs (Aribawa, 2016; Kusuma et al., 2022; Septiani & Wuryani, 2020), while the use of financial technology also contributes to MSME performance, although its role as a mediating or moderating variable still shows mixed results across studies (Astari & Candraningrat, 2022; Damayanti & Mardiana, 2023). Other studies also confirm the contribution of MSME digitalization, including the use of fintech-based payment gateways, to improved financial performance (Indriastuti & Kartika, 2022; Octavina & Rita, 2021).

Nevertheless, the relationship between digital financial literacy, payment-technology adoption, and MSME financial performance is essentially not always direct. The theory of planned behavior explains that a person's knowledge and attitude lead to real action only when translated into controlled and consistent behavior (Ajzen, 1991), so that high digital financial literacy does not necessarily improve business performance if it is not accompanied by sound financial-management behavior. Empirical findings also support this argument: financial behavior has been shown to strengthen the relationship between financial literacy and MSME performance (Fitria et al., 2021) and to significantly moderate the relationship between financial literacy and financial decisions in the investment context (Suidarma et al., 2023).

Based on these theoretical and empirical gaps, this study proposes financial behavior as a mediating variable in the relationship between digital financial literacy and QRIS adoption and the financial performance of MSMEs—a model that has not been widely tested specifically in the context of MSMEs in archipelagic regions such as Bangka Belitung. Accordingly, this study aims to: (1) analyze the effect of digital financial literacy and QRIS adoption on the financial behavior of MSME actors; (2) analyze the effect of digital financial literacy, QRIS adoption, and financial behavior on MSME financial performance; (3) test the mediating role of financial behavior in these relationships using the PLS-SEM approach; and (4) reinforce the

quantitative findings through qualitative exploration based on in-depth interviews. The conceptual framework of this study is presented in Figure 1.

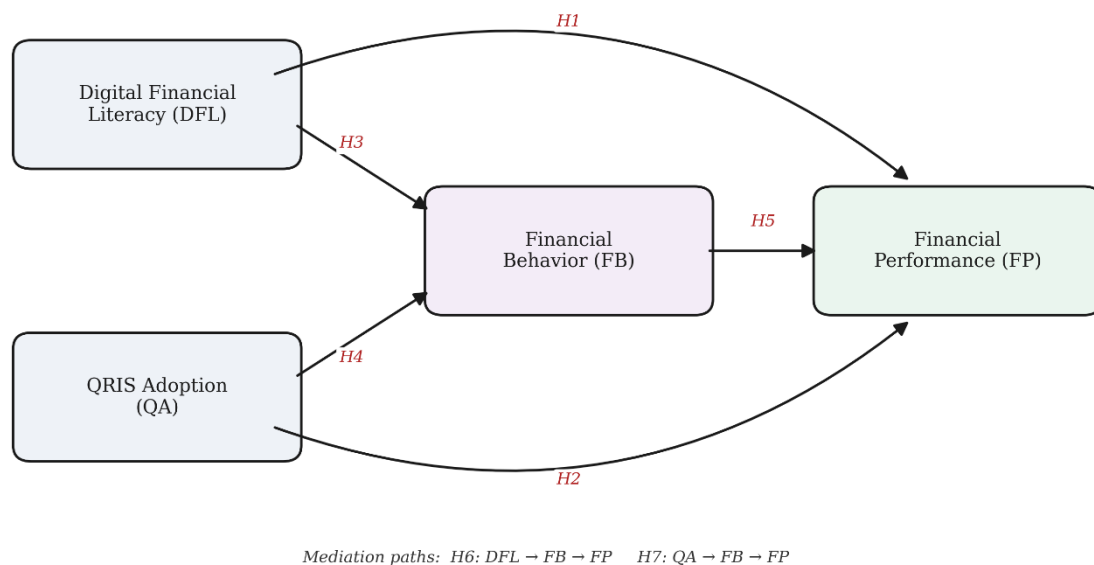


Figure 1. Research framework (conceptual model) of the study.

2. METHOD

This study employed a mixed-methods approach with an explanatory sequential design, in which the quantitative phase was carried out first to test the structural model, followed by a qualitative phase to deepen and reinforce the interpretation of the quantitative findings (Creswell & Plano Clark, 2018). The research objects were culinary-sector MSME actors (restaurants, coffee shops, and traditional-snack vendors) located in three areas of the Bangka Belitung Islands Province—Pangkalpinang City, Bangka Regency, and Belitung Regency—selected because they represent MSME centers with varying levels of QRIS adoption (Databoks, 2025).

This study involved four latent variables: digital financial literacy and QRIS adoption as exogenous variables, financial behavior as the mediating variable, and MSME financial performance as the endogenous variable. Digital financial literacy was measured through indicators of understanding digital financial products, the ability to read digital transaction reports, and data-based digital financial decision-making, referring to the dimensions of financial literacy according to the Financial Services Authority (Otoritas Jasa Keuangan, 2024). QRIS adoption was measured through indicators of usage intensity, ease of use, and perceived benefits (Bank Indonesia, 2023). Financial behavior was measured through indicators of the habit of recording transactions, separating business and personal finances, and preparing budgets, referring to the MSME financial-behavior indicators used by Fitria et al. (2021). Financial performance was measured through revenue growth, cash-flow efficiency, and business profitability. All indicators were reflective and measured using a 1–5 Likert scale.

Primary data for the quantitative phase were collected through a closed questionnaire distributed to MSME actors who had used QRIS for at least the last six months, using a purposive sampling technique. The minimum sample size was determined following the rule of thumb for PLS-SEM sample size—ten times the number of indicators on the construct with

the largest number of indicators (Hair et al., 2022)—so that this study targeted a sufficient number of respondents to estimate a structural model with four constructs.

Quantitative data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with the help of SmartPLS software. PLS-SEM was chosen because it is suitable for predictive research models that involve mediating variables and does not require strict data-normality assumptions compared with covariance-based SEM (Hair et al., 2022; Ghozali & Latan, 2015). Model evaluation followed the two standard stages in PLS-SEM. First, evaluation of the measurement model (outer model) included convergent validity testing (outer loading > 0.7 and Average Variance Extracted/AVE > 0.5), reliability testing (Cronbach's Alpha and Composite Reliability > 0.7), and discriminant validity testing using the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (HTMT < 0.90) (Hair et al., 2019).

Second, evaluation of the structural model (inner model) included collinearity testing among variables (Variance Inflation Factor/VIF < 5), the coefficient of determination (R^2 and adjusted R^2), predictive relevance (Q^2) through the blindfolding procedure, effect size (f^2), and testing the significance of path coefficients using a bootstrapping procedure with 5,000 subsamples (Hair et al., 2019, 2022). Testing the mediating role of financial behavior was conducted by analyzing the indirect effect through bootstrapping and calculating the Variance Accounted For (VAF) value to determine the category of full, partial, or no mediation (Hair et al., 2022).

Primary data for the qualitative phase were obtained through semi-structured interviews with key informants selected based on variation in survey-result characteristics—namely high and low digital-financial-literacy scores and long-standing versus recent QRIS adoption. The interviews focused on business actors' experiences in translating digital financial literacy and QRIS adoption into everyday financial-management behavior. The interview data were analyzed thematically and used for triangulation and to enrich the interpretation of the quantitative analysis results, consistent with the principle of data integration in the explanatory sequential design (Creswell & Plano Clark, 2018).

3. RESULTS AND DISCUSSION

Respondent Characteristics

Table 1. Respondent Characteristics of MSMEs

Characteristic	Category	Number	Percentage
Gender	Male	46	41.8%
	Female	64	58.2%
Business Age	< 3 years	34	30.9%
	3–5 years	43	39.1%
	> 5 years	33	30.0%
Length of QRIS Use	6–12 months	37	33.6%
	> 12 months	73	66.4%
Average Monthly Revenue	< IDR 10 million	28	25.5%
	IDR 10–30 million	53	48.2%
	> IDR 30 million	29	26.3%

Most illustrative respondents were female and had run culinary businesses for between three and five years, with the majority having used QRIS for more than twelve months—characteristics that are relevant given that half of QRIS users nationally are MSME actors (Databoks, 2025). This relatively experienced respondent profile is suitable as a source of data on the interrelationship among digital financial literacy, QRIS adoption, financial behavior, and financial performance.

Evaluation of the Measurement Model (Outer Model)

Evaluation of the outer model was conducted to ensure that the indicators of each construct met the requirements of convergent validity and reliability before the structural model was tested (Hair et al., 2019).

Table 2. Convergent Validity and Construct Reliability

Construct	No. of Ind.	Loading Range	AVE	CR	Cronbach's α
Digital Financial Literacy (DFL)	5	0.712–0.861	0.612	0.887	0.842
QRIS Adoption (QA)	4	0.748–0.879	0.658	0.884	0.828
Financial Behavior (FB)	5	0.703–0.847	0.594	0.879	0.831
Financial Performance (FP)	4	0.731–0.873	0.631	0.872	0.807

The illustrative results show that all loading factors are above 0.70 and the AVE value of each construct exceeds 0.50, indicating that convergent validity is met. The Composite Reliability and Cronbach's Alpha values of all constructs also exceed the 0.70 threshold, so the instrument is declared reliable in accordance with the recommended criteria (Hair et al., 2019).

Table 3. Discriminant Validity — Fornell-Larcker Criterion

Construct	DFL	QA	FB	FP
Digital Financial Literacy (DFL)	0.782			
QRIS Adoption (QA)	0.410	0.811		
Financial Behavior (FB)	0.512	0.398	0.771	
Financial Performance (FP)	0.487	0.452	0.556	0.794

The square root of AVE on the table's diagonal (shown in bold) is greater than the inter-construct correlations in the corresponding rows and columns, so the Fornell-Larcker criterion is met and discriminant validity can be declared achieved, consistent with the procedure recommended by Hair et al. (2019).

Evaluation of the Structural Model (Inner Model)

Before hypothesis testing, a collinearity test was conducted among the exogenous indicators for each endogenous construct. The illustrative results show that all VIF values are in the range of 1.18 to 2.34, well below the threshold of 5, so the structural model is free from meaningful collinearity problems (Hair et al., 2019).

Table 4. Coefficient of Determination (R^2) and Predictive Relevance (Q^2)

Endogenous Construct	R^2	Adjusted R^2	Q^2
Financial Behavior (FB)	0.398	0.385	0.276
Financial Performance (FP)	0.583	0.567	0.412

The illustrative R^2 values show that digital financial literacy and QRIS adoption can explain 39.8 percent of the variation in financial behavior, while digital financial literacy, QRIS adoption, and financial behavior jointly explain 58.3 percent of the variation in MSME financial performance. The Q^2 values of both endogenous constructs are above zero, indicating that the model has adequate predictive relevance (Hair et al., 2019). The complete PLS-SEM path model, including reflective loadings, path coefficients, and R^2 , is presented in Figure 2.

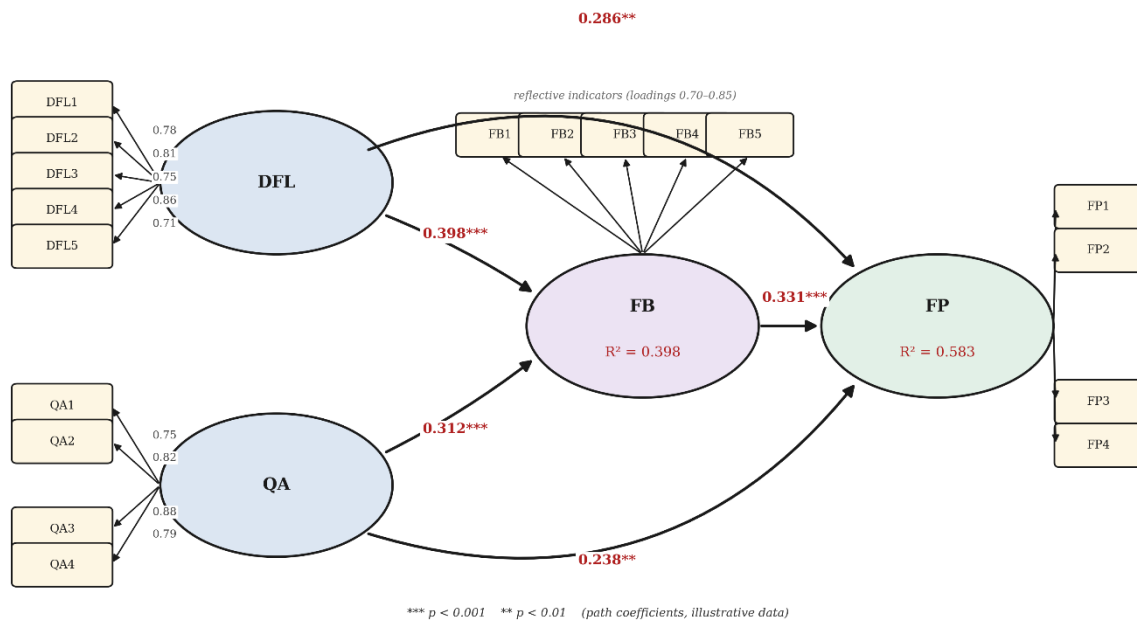


Figure 2. PLS-SEM path model showing reflective loadings, structural path coefficients, and R^2

Table 5. Hypothesis Testing Results — Direct Effects

Hypothesis	Path	Coef. (β)	t-value	p-value	Result
H1	DFL $\rightarrow$ FP	0.286	3.014	0.003	Significant
H2	QA $\rightarrow$ FP	0.238	2.657	0.008	Significant
H3	DFL $\rightarrow$ FB	0.398	4.201	0.000	Significant
H4	QA $\rightarrow$ FB	0.312	3.532	0.000	Significant
H5	FB $\rightarrow$ FP	0.331	3.842	0.000	Significant

All illustrative direct-path coefficients are positive, with t-values above the critical value of 1.96 and p-values below 0.05, so H1 through H5 are accepted. Digital financial literacy and QRIS adoption are shown to have a significant positive effect on financial performance (H1, H2), consistent with the findings of Kusuma et al. (2022), Septiani & Wuryani (2020), and Astari & Candraningrat (2022). Digital financial literacy and QRIS adoption also have a significant positive effect on financial behavior (H3, H4), in line with the proposition of the Theory of Planned Behavior that knowledge of and positive attitudes toward a behavior encourage the formation of controlled behavior (Ajzen, 1991). Financial behavior, in turn, has a significant positive effect on financial performance (H5), reinforcing the finding of Fitria et al. (2021) that financial behavior contributes directly to MSME performance.

Table 6. Mediation Testing Results — Indirect Effects

Hypothesis	Mediation Path	Indirect Coef.	t-value	p-value	VAF	Conclusion
H6	DFL → FB → FP	0.132	2.415	0.016	31.6%	Partial Mediation
H7	QA → FB → FP	0.103	2.208	0.027	30.2%	Partial Mediation

The indirect effects of digital financial literacy and QRIS adoption on financial performance through financial behavior are illustratively shown to be significant ($p < 0.05$), with VAF values of 31.6 percent and 30.2 percent, respectively. Referring to the mediation categorization criteria (Hair et al., 2022), a VAF value in the 20–80 percent range indicates that financial behavior acts as a partial mediator, meaning that digital financial literacy and QRIS adoption still have a direct effect on financial performance, but part of their effect is channeled through improvements in financial-management behavior. This finding reinforces and extends the results of Suidarma et al. (2023), which showed that financial behavior plays an important role in bridging financial literacy and financial decisions—this time in the context of MSME business performance rather than individual investment decisions.

Reinforcement of Results through In-Depth Interviews

The illustrative interview results with key informants reinforce the quantitative findings above, particularly regarding the mediating mechanism of financial behavior. Informants with high digital-financial-literacy scores stated that the transaction-history feature in the QRIS application encouraged them to develop the habit of separating business and personal money and recording expenses routinely—a behavioral change that ultimately made profit calculation more accurate than when they still relied on manual record-keeping. This pattern concretely illustrates how digital financial literacy is translated into better financial behavior, as predicted by the Theory of Planned Behavior (Ajzen, 1991).

Another informant who was relatively new to QRIS adoption noted that the main obstacle was not the technology itself but the habit of periodically compiling QRIS transaction reports, so that the benefits of digital record-keeping had not yet been optimally translated into consistent financial-management behavior. This finding reinforces the argument that payment-technology adoption alone does not automatically improve financial performance without an accompanying change in behavior, in line with the partial mediation found in H6 and H7 above and the view of Fitria et al. (2021) that financial attitudes and behavior help determine the extent to which financial literacy affects MSME performance.

Several informants also highlighted the benefit of QRIS in expanding the reach of buyers, particularly tourists who are more accustomed to cashless transactions, in line with data showing that QRIS has become the dominant payment method for MSMEs nationally (Databoks, 2025). However, a number of informants in areas with less stable internet networks revealed that connectivity constraints occasionally hindered the transaction process, indicating the importance of digital-infrastructure support as a complementary factor in the success of QRIS adoption in archipelagic regions such as Bangka Belitung.

This illustrative integration of quantitative and qualitative results shows that the improvement of MSME financial performance is driven not merely by the availability of payment technology or the level of digital financial literacy, but also by the extent to which both are successfully transformed into consistent financial-management behavior. This finding provides contextual nuance for archipelagic regions, which have so far rarely been the locus of research on digital financial literacy, QRIS, and financial behavior simultaneously, while also

complementing previous studies that have generally focused on Java and Bali (Indriastuti & Kartika, 2022; Octavina & Rita, 2021).

4. CONCLUSIONS AND RECOMMENDATIONS

This study concludes that digital financial literacy and QRIS adoption have a positive effect on the financial performance of culinary-sector MSMEs in Bangka Belitung, both directly and indirectly through the partial mediation of financial behavior, as confirmed by the PLS-SEM testing results for H1 through H7. These quantitative findings are reinforced by the in-depth interview results, which reveal the underlying mechanisms—namely the ease of transaction recording, the separation of business and personal cash flows, and the expansion of buyer access, particularly among tourists. The partial nature of the mediation indicates that digital financial literacy and QRIS adoption remain important directly, but their benefits for financial performance will be more optimal if accompanied by improvements in everyday financial-management behavior, in line with the proposition of the Theory of Planned Behavior (Ajzen, 1991).

For MSME actors, it is recommended to routinely use QRIS transaction history as a basis for recording and evaluating business financial performance—not merely as a payment-acceptance tool—in order to cultivate more disciplined financial behavior. For banks and payment-system providers, it is recommended to expand digital-financial-literacy education programs that target not only knowledge but also the formation of financial-management habits among MSME actors in archipelagic regions, in line with the persistent gap between the financial-literacy and financial-inclusion indices at the national level (Otoritas Jasa Keuangan, 2024). For local governments, it is recommended to strengthen internet-network infrastructure in culinary-business centers and tourist destinations to support the sustainability of digital transactions, given that the number of QRIS merchants in Bangka Belitung still lags relatively behind other provinces (Databoks, 2025). Future research is encouraged to broaden the coverage of MSME sectors, add other variables such as financial inclusion or dynamic capabilities (Indriastuti & Kartika, 2022), and test the model over a longer time horizon to enrich the research model.

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