The Utilization of QRIS as a Digital Payment Innovation to Improve Operational Efficiency and Profitability of MSMEs with Digital Financial Literacy as a Moderating Variable

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Abstract. This study aims to analyze the effect of the usage QRIS (Quick Response Code Indonesian Standard) as a digital payment innovation, on Operational Efficiency and Profitability of Micro, Small, and Medium Enterprises (MSMEs) with digital financial literacy as a moderating variable. In this study, free and open source data was collected through a questionnaire, administered to the MSME actors who already using QRIS as part of their payment systems and has four dimensions in the used QRIS, which are: QRIS accessibility, ease of use, speed of transaction, and security of a transaction. The results show that QRIS accessibility, ease of use, speed of transaction, and security of a transaction have a significant positive effect on both the operational efficiency and profitability of MSMEs. The results also bootstrapping supports the assertion that the digital financial literacy strengthen the positive effect QRIS usage to operational efficiency and profitability. This study conclude that the adoption of digital payment innovation can improve operational efficiency and profitability for MSMEs when improved by a decent level of financial literacy. These results add to the body of research on digital transformation in MSME sectors spread points to the importance of literacy in getting relevant use of digital financial tools.

Keywords: Digital Financial Literacy, Efficiency, Profitability, QRIS.

Introduction

The rapid advancement of digital technology has significantly transformed transaction patterns within the business sector, particularly for Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. One notable innovation in this transformation is the Quick Response Code Indonesian Standard (QRIS), which facilitates fast, secure, and efficient cashless payments through a single, standardized QR code.

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The implementation of the Quick Response Code Indonesian Standard (QRIS) presents a significant opportunity to enhance the operational efficiency and profitability of micro, small, and medium enterprises (MSMEs) in Indonesia, particularly when moderated by digital financial literacy. As a digital payment innovation, QRIS serves as a practical solution that enables faster, safer, and more efficient transactions for both businesses and consumers. This innovation is critical for MSMEs, especially in an era where digitalization is increasingly essential for competitiveness in the marketplace (Jusman & Fauziah, 2024; Rudolf, 2024)

The QRIS system was launched by Bank Indonesia in 2019, with the aim of standardizing digital payment methods in Indonesia. This initiative promotes inclusivity by allowing various e-wallets to be compatible with a single QR code standard (Rudolf, 2024; (Ayuningtyas et al., 2024; Sihaloho et al., 2020). This approach not only simplifies transactions but also aids MSMEs in expanding their market reach and optimizing cash flow management through better transaction records and lower risks associated with cash handling (Ayuningtyas et al., 2024; Anggarini, 2022; Sihaloho et al., 2020). Enhanced operational efficiency results from reduced transaction times and minimized challenges related to cash payments, thereby enabling MSMEs to allocate resources more effectively (Jusman & Fauziah, 2024; Putra et al., 2023).

In the context of digital financial literacy, which acts as a moderating variable, it plays a pivotal role in determining MSMEs' adoption and effective utilization of QRIS. Research indicates a strong correlation between financial literacy and the willingness to embrace QRIS technology (Wijayanto et al., 2024). Higher levels of financial literacy equip MSME owners with the knowledge to understand the benefits of QRIS, the security measures in place, and the overall impact on their business operations (Natswa & Subagyo, 2024). Studies show that financial literacy significantly influences MSMEs' perceptions towards the ease of use and perceived benefits of adopting QRIS, leading to increased transaction volumes and improved business performances (Wardhani et al., 2023)

Moreover, the adoption of QRIS can enhance customer satisfaction due to its perceived ease of use and security. Users often report a sense of trust and satisfaction when using QRIS due to its comprehensive security features and the ease of monitoring transactions (Rudolf, 2024; Pontoh et al., 2022). The perception of these benefits can lead to a greater likelihood that MSMEs will integrate QRIS into their payment systems, further assisting in the transition to a cashless economy (Sholihah & Nurhapsari, 2022; Shintaro & Bhirawa, 2024).

Digital financial literacy not only influences the adoption rate of QRIS but also affects how effectively businesses can leverage QRIS to improve financial performance. Training programs that enhance digital financial literacy are essential for MSMEs, as they can offer practical insights into utilizing QRIS effectively to enhance service delivery, increase sales turnover, and accurately track financial metrics (Utama et al., 2023; Nada et al., 2021). Therefore, it becomes vital for stakeholders, including governmental organizations and financial institutions, to invest in education and resources that foster financial literacy among MSME actors (Asmara et al., 2023).

The utilization of QRIS is not merely about adopting technology but involves several crucial dimensions for MSMEs, including accessibility, ease of use, transaction speed, and transaction security. These four dimensions are considered key drivers in enhancing operational efficiency and profitability for MSMEs. Through QRIS, MSMEs can reduce operational costs, accelerate transactions, simplify financial reporting, and offer better customer experiences.

The objectives of this research are First, to analyze the effect of QRIS accessibility on MSMEs' operational efficiency and profitability. Second, to examine the influence of QRIS ease of use on operational efficiency and profitability. Third, to evaluate how QRIS transaction speed affects operational efficiency and profitability. Fourth, to investigate the impact of QRIS transaction security on operational efficiency and profitability. Finally, this study seeks to assess the moderating role of digital financial literacy in strengthening the relationship between QRIS utilization and MSMEs' operational efficiency and profitability.

Hypotheses Development

The first factor in this study is QRIS accessibility. According to the Technology Acceptance Model (TAM), perceived ease of access to technology is a critical determinant of technology adoption, especially in digital business environments. The Technology Acceptance Model (TAM), developed by Davis in 1989, postulates that user acceptance of technology is primarily influenced by two factors: perceived usefulness (PU) and perceived ease of use (PEOU) (Jusman & Fauziah, 2024).

The applicability of the Technology Acceptance Model has been affirmed in various empirical studies across different industries, reinforcing the model's theoretical framework. For instance, a study by Al-Ghaith et al. (2021) examining e-commerce adoption among MSMEs revealed that perceived ease of use significantly predicts users' intentions to adopt digital technologies (Utama et al., 2023). Similarly, in the context of banking applications, perceived ease of use was found to have strong direct effects on user acceptance (Nada et al., 2021).

Moreover, Lee et al. (2018) demonstrated how perceived ease of access positively correlated with intention to use mobile payment systems, further substantiating the model's applicability in rapidly evolving digital economies (Asmara et al., 2023).

This foundational model has been widely utilized to analyze how end-users adopt new technologies, particularly in digital business environments. The specific focus of this paper explores the relevance of perceived ease of access to technology as a critical determinant of technology adoption, particularly in the context of micro, small, and medium enterprises (MSMEs) (Rudolf, 2024; Ayuningtyas et al., 2024).

In the case of MSMEs, the accessibility of QRIS enables them to conduct transactions seamlessly across various digital payment platforms through a single, standardized QR code. This accessibility helps remove operational barriers, streamlines processes, and opens broader market opportunities. Additionally, from the perspective of the Resource-Based View (RBV), technology accessibility represents a valuable resource that can enhance a firm's efficiency and competitiveness. Consequently, it is expected that QRIS accessibility will improve operational efficiency and lead to better profitability outcomes for MSMEs. Therefore, the following hypotheses are proposed:

H1: QRIS accessibility positively affects the operational efficiency of MSMEs

H2: QRIS accessibility positively affects the profitability of MSMEs.

The second factor is QRIS ease of use. The Technology Acceptance Model (TAM) highlights that ease of use reduces cognitive effort and increases user acceptance. For MSMEs, a simple and user-friendly QRIS system minimizes learning curves, shortens adoption time, and reduces potential operational errors, which collectively contribute to improved efficiency. Furthermore, from a financial management perspective, technologies that reduce complexity in payment processes can lower operational costs and improve the accuracy of financial records, which supports better decision-making and enhances profitability. Hence, the following hypotheses are formulated:

H3: QRIS ease of use positively affects the operational efficiency of MSMEs

H4: QRIS ease of use positively affects the profitability of MSMEs.

The third factor is QRIS transaction speed. According to the Theory of Planned Behavior (TPB), perceived behavioral control—such as the ability to conduct fast and efficient transactions—significantly influences technology adoption. In the digital business context, transaction speed allows MSMEs to process payments more quickly, which improves workflow, reduces queuing times, and increases customer turnover. From a financial management perspective, faster transactions contribute to better cash flow management and resource allocation, directly supporting business profitability and sustainability. Based on this reasoning, the following hypotheses are proposed:

H5: QRIS transaction speed positively affects the operational efficiency of MSMEs

H6: QRIS transaction speed positively affects the profitability of MSMEs.

The fourth factor is QRIS transaction security. In digital environments, Trust Theory emphasizes the importance of security in influencing user behavior and adoption. For MSMEs, secure transaction systems reduce the risks of fraud, ensure data protection, and enhance customer trust, which is critical for maintaining smooth business operations and achieving long-term sustainability. From a financial management standpoint, security minimizes potential financial losses and operational disruptions, helping firms protect their resources and enhance profitability. Therefore, the following hypotheses are proposed:

H7: QRIS transaction security positively affects the operational efficiency of MSMEs

H8: QRIS transaction security positively affects the profitability of MSMEs.

Finally, this study examines the moderating role of digital financial literacy. Drawing from the Financial Literacy Theory, financial knowledge and the ability to apply digital tools effectively are essential for individuals and businesses to make sound financial decisions. In the context of MSMEs, digital financial literacy enhances owners' capacity to understand and optimize the use of QRIS for operational and financial benefits. This aligns with the Resource-Based View (RBV), where knowledge is considered an intangible resource that strengthens a firm's ability to leverage technology for competitive advantage. As such, higher levels of digital financial literacy are expected to strengthen the positive effects of QRIS utilization on both operational efficiency and profitability. Therefore, the following hypotheses are formulated:

H9: Digital financial literacy moderates the relationship between QRIS utilization and operational efficiency of MSMEs

H10: Digital financial literacy moderates the relationship between QRIS utilization and profitability of MSMEs.

Methods

A quantitative research design was employed to test the proposed hypotheses and model. The study uses a causal research approach to identify the relationships among the variables and to analyze the moderating role of digital financial literacy. The research was conducted through a structured survey targeting MSMEs that have adopted QRIS in their business transactions.

The population in this study consists of MSME in East Java who actively use QRIS as part of their payment systems. A purposive sampling method was applied to ensure that respondents had experience using QRIS, which is necessary for providing relevant and accurate responses related to the variables under investigation. Respondents were drawn from various business sectors, including retail, food and beverage, services, and crafts. The sample size was determined using the rule of thumb for Partial Least Squares Structural Equation Modeling (PLS-SEM), which requires a minimum of 5 to 10 times the number of indicators used in the model. As this research includes multiple constructs and indicators, a minimum of 150–250 respondents targeted to ensure the robustness of the analysis. Ultimately, 212 valid responses were collected and analyzed.

Data instrument and procedure were collected using a structured questionnaire distributed both online (via Google Forms) and offline (through MSME associations and communities). The questionnaire was developed based on validated measurement items from previous studies and adjusted to fit the context of QRIS adoption in East Java MSMEs.

Operational Variables

To support the achievement of the research objectives and ensure clarity in measuring the relationship between variables, this study establishes operational variables based on relevant theories and previous empirical studies. The operational variables are categorized into independent variables, moderating variables, and dependent variables. The independent variables consist of four dimensions of QRIS utilization: accessibility, ease of use, transaction speed, and transaction security. The moderating variable is digital financial literacy, which is expected to strengthen the influence of QRIS utilization on business performance. The dependent variables are divided into two dimensions, namely operational efficiency and profitability of MSMEs. Each variable is operationalized through specific indicators that have been adapted from prior studies and measured using a Likert scale of 1 to 5 to ensure the consistency and validity of the collected data.

Table 1: Operational Variables with Indicators and References

No	Variable	Dimension	Indicator	References
1	X1 - QRIS Accessibility	Accessibility of QRIS	Ease of access to QRIS payment facilities	Ayuningtyas et al. (2024); Jusman & Fauziah (2024)
			Availability of infrastructure supporting QRIS	Anggarini (2022); Rudolf (2024)
			Integration with various digital payment platforms	Sihaloho et al. (2020); Putra et al. (2023)

No	Variable	Dimension	Indicator	References
2	X2 - QRIS Ease of Use	Ease of Use of QRIS	Ease of understanding QRIS system	Davis (1989) - TAM; Pontoh et al. (2022)
			Simplicity of use in daily transactions	Jusman & Fauziah (2024); Wardhani et al. (2023)
			Ease of registration and maintenance	Putra et al. (2023); Sholihah & Nurhapsari (2022)
3	X3 - QRIS Transaction Speed	Transaction Speed	Speed of payment completion	Jusman & Fauziah (2024); Wardhani et al. (2023)
			Speed of fund settlement to account	Natswa & Subagyo (2024); Putra et al. (2023)
			QRIS contribution to reducing queue time	Ayuningtyas et al. (2024); Rudolf (2024)
4	X4 - QRIS Security	Transaction Security	QRIS security in protecting data	Pontoh et al. (2022); Sihaloho et al. (2020)
			Security in preventing fraud	Shintaro & Bhirawa (2024); Putra et al. (2023)
			Confidence in safety of QRIS transactions	Rudolf (2024); Jusman & Fauziah (2024)
5	Y1 - Operational Efficiency	Operational Efficiency	Reduction in transaction processing time	Putra et al. (2023); Jusman & Fauziah (2024)
			Reduction in operational costs through QRIS	Anggarini (2022); Wardhani et al. (2023)
			Improvement in resource management	Sihaloho et al. (2020); Pontoh et al. (2022)
6	Y2 - Profitability	Profitability	Increase in sales volume after QRIS	Ayuningtyas et al. (2024); Rudolf (2024)
			Increase in operational profit after QRIS	Wardhani et al. (2023); Putra et al. (2023)
			Growth in financial performance	Jusman & Fauziah (2024); Natswa & Subagyo (2024)
7	Z - Digital Financial Literacy	Digital Financial Literacy	Ability to understand digital financial tools	Huston (2010); Wijayanto et al. (2024)
			Ability to manage digital transactions safely	Wardhani et al. (2023); Asmara et al. (2023)
			Skills to utilize digital financial data	Nada et al. (2021); Utama et al. (2023)

Result and Discussion

Ultimately, 212 valid responses from MSMEs were successfully collected and analyzed in this study. These MSMEs operate in various business sectors, with the majority engaged in the culinary sector (35%), followed by retail (30%), services (20%), and creative industries (15%). In terms of QRIS usage duration, most respondents indicated they had been utilizing QRIS for more than 1 year (63%), while the remaining 37% had been using QRIS for less than 1 year. Regarding business scale, the distribution showed that 70% of respondents were micro-enterprises, while 30% were classified as small and medium-sized enterprises (SMEs). These demographic characteristics reflect the growing adoption of QRIS among smaller-scale businesses and their increasing participation in the digital payment ecosystem as can be seen at table 2.

Table 2: Respondent Profile

Category	Sub-Category	Percentage (%)
Business Sector	Culinary	35
	Retail	30
	Services	20
	Creative Industries	15
Duration of QRIS usage	Less than 1 Year	37
	More than 1 Year	63
Business Scale	Micro – Enterprise	70
	Small and Medium Enterprise	30

The evaluation process of the outer model focused on indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. The results indicate that all construct indicators have standardized factor loadings greater than 0.70, confirming adequate indicator reliability.

Furthermore, the Cronbach's Alpha values for each construct ranged between 0.802 and 0.913, exceeding the

minimum threshold of 0.70, which indicates good internal consistency among the indicators within each variable. Similarly, the Composite Reliability (CR) values ranged from 0.854 to 0.936, reinforcing the conclusion that the measurement instruments are reliable. In terms of convergent validity, the Average Variance Extracted (AVE) values were found between 0.591 and 0.745, all surpassing the required minimum of 0.50, indicating that each construct explains more than half of the variance of its indicators. Discriminant validity was confirmed through both the Fornell-Larcker criterion and cross-loading assessments, ensuring that each construct is empirically distinct from the others in the model as seen at table 3.

Table 3: Measurement Model Results

Criteria	Threshold	Results
Loading Factors	>0,70	0,701 – 0,902
Cronbach's Alpha	>0,70	0,802 – 0,913
Composite Reliability	>0,70	0,854 – 0,936
AVE	>0,50	0,591 – 0,745
Discriminant Validity	Fornell-Larcker, Cross Loading	Validated

The results of the measurement model evaluation presented in Table 3 demonstrate that all constructs in this study meet the recommended criteria for reliability and validity. The high values of Cronbach's Alpha and Composite Reliability indicate that the measurement instruments consistently capture the intended constructs with minimal measurement error. The AVE values exceeding 0.50 confirm that the constructs possess satisfactory convergent validity, suggesting that the indicators share a sufficient proportion of variance. Furthermore, the validation of discriminant validity through Fornell-Larcker and cross-loading confirms that each construct is distinct and measures a unique aspect of the QRIS utilization, digital financial literacy, operational efficiency, and profitability constructs examined in this study. These results affirm that the data is robust and appropriate for further hypothesis testing in the structural model analysis.

After confirming the reliability and validity of the measurement model, the next step was to evaluate the structural model (inner model) to assess the predictive strength of the research model. The evaluation focused on the R^2 (coefficient of determination) and Q^2 (predictive relevance) values of the endogenous variables. Based on the analysis of 212 valid responses, the results show that the R^2 value for Operational Efficiency (Y1) is 0.632, which indicates a substantial level of explanatory power. This means that 63.2% of the variance in operational efficiency can be explained by the independent variables included in the model (QRIS Accessibility, Ease of Use, Transaction Speed, and Security, as well as Digital Financial Literacy).

Table 4: Structural Model Results (Inner Model)

Endogenous Variable	R² Value	Category
Operational Efficiency (Y1)	0,632	Subtantial
Profitability (Y2)	0,587	Moderate
Q² Predictive Relevance	>0	Confirmed

As presented in Table 4, the structural model evaluation results indicate that the research model has strong explanatory power, particularly for operational efficiency, where more than 60% of the variance is explained by the independent and moderating variables. This confirms that the utilization of QRIS in terms of accessibility, ease of use, transaction speed, and security, along with digital financial literacy, is highly relevant in enhancing the operational performance of MSMEs. For profitability, the explanatory power is categorized as moderate but still meaningful, implying that while QRIS utilization plays a significant role in improving MSMEs' financial performance, other external factors such as market conditions, competition, and consumer behavior may also influence profitability beyond this model. The positive Q^2 values further validate the model's predictive relevance, reinforcing that this research offers a reliable framework for understanding how digital payment innovations impact MSME performance.

Table 5: Hyphothesis Test Results

Hyphothesis	Path	t-stat	p-value	Result
H1	QRIS Accessibility → Operational Efficiency	4,122	0,000	Supported
H2	QRIS Accessibility → Profitability	3,987	0,000	Supported
H3	QRIS Ease of Use → Operational Efficiency	5,213	0,000	Supported
H4	QRIS Ease of Use → Profitability	4,765	0,001	Supported
H5	QRIS Transaction Speed → Operational Efficiency	4,945	0,000	Supported
H6	QRIS Transaction Speed → Profitability	4,188	0,001	Supported
H7	QRIS Security → Operational Efficiency	3,652	0,000	Supported
H8	QRIS Security → Profitability	3,425	0,002	Supported
H9	Digital Financial Literacy moderates X → Y1	3,215	0,001	Supported
H10	Digital Financial Literacy moderates X → Y2	3,547	0,001	Supported

The results in Table 5 indicated that all proposed hypotheses were supported based on the criteria of t-statistics > 1.96 and p-values < 0.05. Specifically, QRIS accessibility (H1, H2) has a significant positive effect on both operational efficiency and profitability. QRIS ease of use (H3, H4) also significantly enhances operational efficiency and profitability, suggesting that user-friendly payment technologies

contribute to business performance. Furthermore, QRIS transaction speed (H5, H6) positively impacts operational efficiency and profitability, highlighting the importance of fast transactions in MSMEs' daily operations. Likewise, QRIS security (H7, H8) demonstrates a significant positive effect on both operational efficiency and profitability, confirming that transaction security is a critical factor in digital payment adoption. Finally, the moderating role of digital financial literacy (H9, H10) is also proven, strengthening the relationship between QRIS utilization and MSMEs' operational and financial performance.

The results of hypothesis testing demonstrate that all relationships proposed in the research model are statistically significant and supported. These findings emphasize the importance of the four QRIS dimensions — accessibility, ease of use, transaction speed, and security — in improving both operational efficiency and profitability among MSMEs. The positive and significant moderation effects of digital financial literacy further strengthen the argument that MSMEs with higher levels of financial literacy are better positioned to optimize the benefits of QRIS for their business performance.

These results reinforce previous research findings on the role of digital payment systems and financial literacy in enhancing business performance, aligning with theories such as Technology Acceptance Model (TAM) and Resource-Based View (RBV). In practice, this highlights the need for MSMEs and policymakers to not only adopt digital payment solutions like QRIS but also to continuously improve digital financial literacy to achieve maximum operational and financial benefits.

Conclusion

This study concludes that the utilization of QRIS as a digital payment innovation—through its dimensions of accessibility, ease of use, transaction speed, and security—positively and significantly enhances the operational efficiency and profitability of MSMEs. Moreover, digital financial literacy plays a crucial moderating role, strengthening the positive relationship between QRIS utilization and MSME business performance outcomes. The findings provide empirical support for the argument that digital payment systems such as QRIS not only simplify transaction processes but also contribute to improving financial performance when MSME actors possess adequate literacy in digital finance. This research reinforces the importance of both technological adoption and digital capability development as key strategies for MSMEs striving for greater efficiency and sustainability in a rapidly evolving digital economy.

Future research is encouraged to explore other external factors such as competitive pressure, consumer behavior, and technological readiness that may further influence the effectiveness of QRIS adoption in enhancing MSMEs' business performance.

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