Journal of Economic Development and Village Building, Vol. 4 No. 1 March 2026, pp. (12-23). E-ISSN: 2986-4666
DOI: https://doi.org/10.59261/jedvb.v4i1.61

JEDVB JOURNAL OF ECONOMIC DEVELOPMENT & VILLAGE BUILDING
JOURNAL OF ECONOMIC DEVELOPMENT & VILLAGE BUILDING
Journal Homepage : http://jedvb.politeksci.ac.id/index.php/jedvb/

QRIS as a Digital Financial Infrastructure: Multidimensional Analysis of Adoption and Financial Inclusion in Indonesian MSMEs

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Article Info

Article history :
Received on:
November 10, 2025
Revised on:
January 29, 2026
Accepted on:
February 10, 2026
Available Online :
March 22, 2026

Keywords :
QRIS; financial inclusion; MSMEs; digital transformation; fintech; Indonesia

Abstract

Background: The rapid expansion of financial technology has accelerated the transition toward digital payment systems in developing economies. In Indonesia, the Quick Response Code Indonesian Standard (QRIS) unifies fragmented QR-based payment services into a single interoperable national standard. However, prior studies have predominantly focused on consumer-side behavior, leaving the systemic role of QRIS as a financial infrastructure enabling MSME inclusion and formalization underexamined.
Objective: This study aims to analyze the multidimensional role of QRIS in promoting financial inclusion and accelerating the digital transformation of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia.
Method: A qualitative descriptive design with an interpretive approach was employed. Secondary data from institutional reports, government publications, and peer-reviewed literature were selected using explicit inclusion criteria, analyzed thematically, and validated through source triangulation.
Results: QRIS expands financial access, improves transaction transparency, strengthens business record-keeping, and enhances MSME competitiveness. Adoption is driven by perceived usefulness, trust, and facilitating conditions, but is constrained by unequal digital literacy, regional infrastructure disparities, cybersecurity risks, and varying MSME readiness.
Conclusion: QRIS functions not merely as a payment instrument but as a strategic financial infrastructure supporting inclusive economic growth, requiring inclusive policy design and multi-stakeholder collaboration to reach underserved MSMEs.

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INTRODUCTION

The rapid development of financial technology has fundamentally transformed the global financial landscape over the past decade. This transformation has accelerated the transition from cash-based transactions to digital payment systems across both developed and developing economies. The shift is not merely technological. It also reflects broader economic changes related to efficiency, accessibility, transparency, and financial connectivity.

Across many countries, digital payment instruments such as mobile wallets, QR-based transactions, and integrated banking platforms are increasingly viewed as strategic tools to improve transaction speed, reduce operational costs, and expand participation in formal financial systems (Demirgüç-Kunt et al., 2022; Khera et al., 2022). Recent international studies further indicate that the emergence of digital money and faster payment infrastructure is reshaping modern financial ecosystems in fundamental ways. These changes create new opportunities for financial inclusion but also present new policy challenges for governments and central banks (Department, 2020).

Despite this remarkable progress, the benefits of digital finance are not distributed equally across populations and regions. Many developing countries continue to face structural barriers that hinder the widespread adoption of digital payment systems. These barriers include unequal internet access between urban and rural areas, limited financial literacy among the general population, weak institutional support for small businesses, and persistently low levels of trust in digital systems. Such barriers affect both consumers and business owners when they consider adopting new payment technologies.

Previous studies have found that financial inclusion depends not only on the availability of technology but also on supporting regulations, digital readiness at the community level, and user confidence in system security (Nayyar, 2022). Therefore, the expansion of digital payments should be understood as a multidimensional process. This process involves technological, social, and behavioral factors, as well as institutional factors, that must work together to create an inclusive digital financial ecosystem. Southeast Asia has emerged as one of the world's fastest-growing digital economies.

The increasing use of e-commerce platforms, ride-hailing services, online entertainment, and mobile financial services has significantly changed payment behavior across the region. Consumers now rely more heavily on e-wallets, bank transfers, and QR-based systems for their daily transactions, from buying food at street stalls to paying utility bills. Regional reports consistently show that the digital economy of Southeast Asia continues to expand rapidly, creating major opportunities for countries to strengthen their domestic payment ecosystems and support small-business competitiveness in the digital age (Google, Temasek, & Bain & Company, 2024). This regional momentum positions Indonesia to accelerate its digital payment transformation and learn from neighboring countries such as Singapore, Malaysia, Thailand, and Vietnam.

In Indonesia, one of the most significant policy innovations in recent years is the implementation of the Quick Response Code Indonesian Standard, commonly known as QRIS. Bank Indonesia introduced this system as the national payment system authority. Before QRIS was implemented, QR payment services were fragmented across different providers. Each e-wallet and mobile banking application had its own proprietary QR code. Merchants often needed to display multiple QR codes from different payment service providers, creating inefficiency and confusion for both sellers and buyers.

QRIS was designed specifically to solve this problem. It is a unified national standard that allows users to make payments across different platforms using a single QR code. Since its implementation, QRIS has enabled faster transactions, simplified merchant onboarding, and broadened acceptance of digital payments across all economic sectors (Rafferty & Fajar, 2022). In addition, Bank Indonesia continues to strengthen the national payment system through long-term strategic roadmaps and comprehensive digital ecosystem reforms.

The relevance of QRIS is particularly strong for Micro, Small, and Medium Enterprises, or MSMEs, which remain the backbone of Indonesia's economy. MSMEs contribute substantially to employment creation, household income generation, and national economic output. According to official statistics, MSMEs account for more than 99 percent of all businesses in Indonesia and absorb the vast majority of the national workforce. However, despite their numerical dominance and economic importance, many MSMEs still operate informally. They rely heavily on cash transactions for their daily operations. They maintain weak or non-existent financial records.

They face serious difficulties in accessing formal financing channels from banks and other financial institutions. National statistics continue to show the dominant economic role of MSMEs, but policy reports also highlight persistent challenges, including low productivity, limited digital capabilities, and limited access to formal credit (Kurniasari et al., 2023). Earlier studies from other developing economies have also emphasized that limited access to finance remains a key growth constraint for small businesses (Ullah, 2020).

This condition underscores the urgency of examining how a national digital payment infrastructure can reduce the structural exclusion of MSMEs from the formal financial system, particularly as the digital economy continues to expand rapidly. From this perspective, QRIS can be seen not merely as a payment tool but as an entry point for MSME formalization and digital transformation. Through digital transactions, businesses can gradually build transaction histories that are automatically recorded. They can improve their bookkeeping practices without needing sophisticated accounting software.
They can increase their visibility in the formal financial sector by accepting digital payments. These improvements may increase their opportunities to obtain financing from banks and fintech lenders. They may help MSMEs participate in broader markets, including e-commerce platforms that require digital payment acceptance. They may also improve long-term competitiveness in an increasingly digital marketplace. International evidence from other countries suggests that digital readiness is becoming increasingly important for the resilience of small and medium enterprises in a rapidly changing global economy (Citaristi, 2022).

Previous studies have examined the adoption of digital payments through several theoretical frameworks. Each framework offers a different lens for understanding why individuals and businesses accept or reject new payment technologies. The Technology Acceptance Model, or TAM, explains that users are more likely to adopt a system when they perceive it as useful for their needs and easy to use in practice (Buchdadi et al., 2024). The Unified Theory of Acceptance and Use of Technology, or UTAUT, emphasizes the importance of facilitating conditions such as infrastructure and technical support, as well as social influence from peers and customers (Hamzah Muchtar et al., 2024).

The Theory of Planned Behavior (TPB) highlights the roles of attitudes, subjective norms, and perceived behavioral control in decision making (Ajzen, 1991). Other empirical studies have also found that trust, convenience, and perceived security significantly influence mobile payment usage behavior across different cultural contexts (Patil et al., 2020; Slade et al., 2015). While these theoretical approaches explain individual user adoption behavior reasonably well, they often pay less attention to the broader institutional role of payment systems in supporting MSME inclusion.

Most existing studies focus on consumer adoption rather than merchant adoption. Even fewer studies examine how a nationally mandated payment standard, such as QRIS, can function within a larger digital financial infrastructure that shapes inclusion outcomes at the sector level. This gap in the literature is particularly noticeable in the Indonesian context, where QRIS has been implemented at a large scale, but academic analysis of its multidimensional impact remains limited. Recent QRIS-related studies conducted between 2023 and 2025 have further enriched understanding of digital payment adoption dynamics in Indonesia. Fatmawati et al. (2024) found that QRIS use positively affects MSME business income, while Kala'lembang et al. (2024) found that perceived security and reliability were dominant predictors of sustained QRIS usage among micro-enterprise owners.

Nevertheless, these studies mainly examine adoption determinants or business outcomes at the level of individual users and merchants, rather than the role of QRIS within the national financial infrastructure. The novelty of this study therefore lies in its synthesis of multiple theoretical frameworks, namely TAM, UTAUT, TPB, and Diffusion of Innovation, applied specifically to QRIS as a nationally standardized financial infrastructure instrument. Unlike prior studies that focus on consumer or individual merchant adoption, this research positions QRIS within the broader landscape of MSME digital transformation and financial

inclusion policy, offering a sector-level analytical perspective that is currently underrepresented in the Indonesian digital payment literature.

Based on these gaps, this study examines QRIS not only as a technological innovation but as a multidimensional financial infrastructure that can support financial inclusion and accelerate MSME digital transformation in Indonesia. Using a qualitative approach based on secondary data from institutional reports and academic literature, this paper analyzes how regulatory support, user adoption factors, and business readiness interact in shaping the impact of QRIS on the ground. Accordingly, this study aims to analyze the role of QRIS in expanding financial inclusion and strengthening the digital transformation of MSMEs in Indonesia. By doing so, this research aims to contribute to both academic knowledge of digital payment systems in developing economies and practical policy discussions on how to make digital finance more inclusive for small businesses.

RESEARCH METHOD

This study employs a qualitative descriptive design with an interpretive approach to explore how QRIS adoption shapes financial inclusion and MSME digital transformation in Indonesia. This design is appropriate because the development of digital payment systems is not only technical but also closely related to behavioral changes, institutional dynamics, and broader socio-economic contexts that require an interpretive understanding. Accordingly, the analysis is not limited to describing existing information but also interprets the patterns and relationships that emerge from the interaction among technology, policy, and user behavior in the QRIS ecosystem.

The study relies entirely on secondary data obtained from credible institutional and academic sources. Institutional sources include Bank Indonesia, the Financial Services Authority (OJK), Statistics Indonesia (BPS), the Ministry of Cooperatives and SMEs, the Indonesian Internet Service Providers Association (APJII), the World Bank, the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OECD), and the Asian Development Bank (ADB). Academic sources comprise peer-reviewed journal articles on digital payments, financial inclusion, and MSME digital transformation, which complement and strengthen the institutional data.

Document inclusion criteria were established to ensure the rigour and credibility of the secondary data. Sources were selected based on the following criteria: (1) relevance to QRIS, digital payments, financial inclusion, or MSME digital transformation in Indonesia or comparable developing economies; (2) publication within the period of 2019 to 2025, with priority given to post-2021 publications to reflect the post-QRIS implementation landscape; (3) credibility of source, encompassing Scopus-indexed peer-reviewed journals, official government and central bank publications, and reports from internationally recognized institutions; and (4) methodological transparency, preferring sources that clearly describe their data collection and analysis procedures.

Seminal theoretical works on the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), the Theory of Planned Behavior (TPB), and Diffusion of Innovations theory were included irrespective of publication year because they constitute the analytical framework of the study. Sources failing to meet these criteria were excluded from the analysis.

Data collection was carried out through systematic document analysis in three stages: (1) identification of policy documents, statistical reports, and academic studies discussing digital payment systems and their implications for MSMEs; (2) screening of the identified documents against the inclusion criteria; and (3) full-text review of the retained documents. Relevant information from each document was extracted and recorded according to the dimension examined, the main findings, and the implications for MSMEs.

The analysis was conducted using thematic analysis within an interpretive framework through four steps: (1) familiarization with the extracted data; (2) initial coding of recurring concepts such as interoperability, transaction recording, perceived usefulness, trust, infrastructure readiness, digital literacy, and cybersecurity; (3) grouping the codes into

broader themes; and (4) interpreting the themes using TAM, UTAUT, TPB, and Diffusion of Innovations theory.

The codes were first organized into three key thematic areas, namely QRIS development, financial inclusion, and MSME digital transformation, and were subsequently refined into five analytical themes presented in the results: QRIS as an interoperable payment infrastructure, MSME formalization and financial inclusion, determinants of adoption, structural challenges, and regional comparative lessons. The synthesis is summarized in an indicator-based matrix (Table 1) and a theoretical framework mapping (Table 2).

To strengthen the credibility of the qualitative synthesis, source triangulation was applied across institutional reports and academic literature to verify the consistency of findings. Where discrepancies emerged, both perspectives were acknowledged and discussed. The thematic codes were also reviewed for internal coherence and alignment with the theoretical frameworks employed. In addition, the emerging interpretations were compared with the conclusions of multiple independent prior studies on related phenomena, thereby reducing the risk of idiosyncratic interpretation.

RESULT AND DISCUSSION

Results

The thematic analysis yielded five principal findings. First, QRIS functions as an interoperable payment infrastructure that reduces fragmentation in the national payment system. Second, QRIS supports MSME formalization through digitally recorded transactions and lowers entry barriers to formal financial services. Third, adoption is driven primarily by perceived usefulness, trust, and facilitating conditions. Fourth, adoption remains uneven because of digital inequality, cybersecurity risks, and varying MSME readiness. Fifth, regional experience within ASEAN indicates that policy design strongly shapes adoption outcomes. These findings are described below and synthesized in Table 1.

Table 1 summarizes the synthesized changes associated with QRIS adoption across five indicators: financial access, transaction system, financial recording, digital literacy exposure, and market participation. Because consistent time-series data on users, merchants, and transaction volume could not be presented uniformly from the available secondary sources, the table presents a qualitative comparison of conditions before and after QRIS adoption.

Table 1. Synthesized Changes in Key Indicators Before and After QRIS Adoption in Indonesia

Indicator	Before QRIS Adoption	After QRIS Adoption	Trend	Interpretation
Financial access	Limited access for unbanked population	Broader access through digital payments	Increasing inclusion	QRIS facilitates entry into formal financial system
Transaction system	Cash-based transactions dominant	Shift toward cashless payments	Strong digital shift	Improves transaction efficiency and speed
Financial recording	Manual and inconsistent records	Digital and structured records	Improved transparency	Supports MSME financial management
Digital literacy exposure	Low adoption of digital tools	Increasing exposure and usage	Gradual improvement	Encouraged by QRIS ecosystem adoption
Market participation	Limited market reach	Wider digital market integration	Expanding participation	Strengthens digital economy ecosystem

Note: The table is synthesized based on secondary data and reports from Demirgüç-Kunt et al. (2022); Rafferty & Fajar (2022); Khera et al. (2022), combined with the author's analytical interpretation of QRIS adoption impacts on financial inclusion and MSME digital transformation in Indonesia.

The findings of this study indicate that QRIS has developed beyond its original function as a payment instrument and now plays a broader role in Indonesia's digital economic transformation. As a unified national QR code standard, QRIS has simplified transactions between consumers and merchants by enabling interoperability across different banks and e-wallet providers. Before QRIS was implemented, merchants often needed to display multiple QR codes from different payment service providers, which created inefficiency and confusion for both sellers and buyers.

The introduction of one standardized system has therefore reduced fragmentation and created a more integrated payment ecosystem. This supports the view that compatibility and relative advantage are important drivers of innovation adoption (Arli & Bakpayev, 2023). From the perspective of consumers, QRIS provides practical benefits such as faster transactions, reduced reliance on physical cash, easier payment tracking, and increased convenience in everyday purchases. Consumers increasingly value contactless payment systems that are efficient and widely accepted across locations.

This trend reflects broader global shifts in consumer payment preferences, with digital methods gradually replacing cash as the primary medium for small-value transactions. Evidence from other countries also suggests that the availability of efficient digital payment channels can significantly reduce dependence on physical cash over time. In this sense, QRIS helps align Indonesian payment behavior with wider global developments. For MSMEs, the impact of QRIS is particularly significant. Many micro and small enterprises previously relied almost entirely on cash transactions, with limited bookkeeping systems and minimal transaction records. Such conditions often made it difficult for business owners to monitor sales performance, evaluate cash flow, or apply for financing from formal institutions.

Through QRIS, transactions become digitally recorded, creating a more transparent and traceable financial history. These records may help MSMEs improve internal management and increase their credibility in the eyes of banks and financial institutions. Earlier studies also found that the use of QRIS can positively affect MSME income, operational efficiency, and business sustainability (Fatmawati et al., 2024). This finding implies that the principal value of QRIS for MSMEs lies not only in payment acceptance but also in the generation of digital transaction data that can serve as an alternative basis for credit assessment, thereby addressing information asymmetry between small businesses and lenders.

Another important finding concerns financial inclusion. QRIS can lower entry barriers for small businesses that previously had limited access to digital payment infrastructure. Compared with expensive payment terminals or complex banking systems, QRIS offers a relatively simple and low-cost solution that can be adopted by street vendors, traditional market sellers, food stalls, and home-based businesses. As more MSMEs participate in digital transactions, they become increasingly connected to the formal financial ecosystem. This supports the broader objective of financial inclusion, which seeks to ensure that individuals and businesses can access affordable and useful financial services (Demirgüç-Kunt et al., 2022; Khera et al., 2022).

However, the study also shows that adoption does not occur automatically. Perceived usefulness remains one of the strongest drivers of QRIS usage. MSME owners are more likely to adopt the system when they believe it can increase sales, simplify operations, and attract more customers. This finding is consistent with the Technology Acceptance Model, which states that perceived usefulness and perceived ease of use strongly influence technology acceptance (Buchdadi et al., 2024). In practice, when merchants observe that customers prefer non-cash payments, they are more motivated to implement QRIS.

Trust is another critical factor influencing adoption. Business owners and consumers need confidence that digital transactions are secure, accurate, and reliable. Concerns about failed payments, fraud, delayed settlements, or data misuse may reduce willingness to use digital systems. Studies on QR payment adoption in emerging economies confirm that trust and service quality are among the most important determinants of continued usage intention (Ly et al., 2025). Therefore, payment providers and regulators must continuously maintain system reliability and consumer protection mechanisms.

Facilitating conditions are equally important. Many MSMEs, especially in smaller cities and rural areas, still face limited internet connectivity, outdated smartphones, and insufficient digital skills. Even when business owners are interested in using QRIS, technical barriers may delay adoption. This reflects the Unified Theory of Acceptance and Use of Technology, which emphasizes that behavioral intention alone is insufficient without adequate supporting infrastructure and resources (Hamzah Muchtar et al., 2024). As a result, policy success depends not only on the availability of technology but also on ecosystem readiness. This interpretation suggests that the adoption gap observed between urban and rural MSMEs is less a matter of unwillingness than of unequal enabling conditions.

The findings also reveal that QRIS adoption may strengthen business competitiveness. MSMEs that accept digital payments are often perceived as more modern, professional, and customer-oriented. This can improve customer satisfaction and encourage repeat transactions, particularly among younger consumers who are accustomed to mobile payments. In increasingly competitive urban markets, offering multiple payment options can become a strategic advantage. Thus, QRIS is not merely a compliance tool but a competitive instrument for business growth.

From a macroeconomic perspective, wider QRIS adoption may improve efficiency in the national payment system. Cash handling involves printing, transportation, storage, and security costs. As digital payments expand, some of these costs can be reduced. Greater transaction transparency may also support formalization, tax administration, and more accurate economic data collection. These indirect effects demonstrate that payment modernization can create benefits beyond individual users and merchants.

Indonesia's experience with QRIS also reflects broader regional developments in Southeast Asia. Countries across the region are promoting instant payments, e-wallet ecosystems, and interoperable QR systems to strengthen domestic commerce and cross-border transactions. Previous studies indicate that regulatory readiness, user trust, and system interoperability are central factors in regional mobile payment growth (Chang et al., 2023). Consequently, QRIS may position Indonesia more strongly within the ASEAN digital economy and future cross-border payment networks.

Despite these positive developments, several challenges remain. First, some MSMEs still prefer cash due to habit, fear of taxation, or unfamiliarity with digital systems. Second, digital literacy gaps continue to affect older business owners or enterprises operating in remote areas. Third, transaction fees or settlement concerns may influence perceptions among micro businesses with very small profit margins. Without inclusive policy design, the benefits of QRIS may be concentrated among already-connected businesses, while more vulnerable enterprises lag.

Digital inequality constitutes a particularly significant structural challenge for inclusive QRIS adoption in Indonesia. The country's archipelagic geography creates stark disparities in telecommunications infrastructure quality, with mobile broadband connectivity, smartphone penetration, and digital literacy levels varying substantially between Java-Bali and outer island regions. Research by the Indonesian Internet Service Providers Association APJII, (2024) indicates that internet user penetration in eastern Indonesian provinces remains considerably lower than the national average, with rural communities disproportionately affected.

These infrastructural gaps translate directly into unequal QRIS adoption rates: micro-enterprises operating in underserved areas face compounded disadvantages due to poor

connectivity, limited access to digital literacy training, and reduced exposure to digital payment ecosystems. Without targeted intervention, the risk is that QRIS may inadvertently deepen existing economic inequalities by primarily benefiting already-connected urban businesses while leaving more vulnerable rural enterprises behind.

Cybersecurity and digital trust concerns represent another critical dimension requiring expanded analytical attention. As QR-based transactions become more prevalent, they also attract increasing interest from malicious actors. Common threats in QR payment environments include QR code substitution fraud, phishing schemes exploiting payment notifications, and unauthorized merchant account registration. In the Indonesian context, reports from the Financial Services Authority (OJK) have documented a rise in digital financial fraud incidents correlating with increased digital payment adoption, including QRIS-related scams targeting unsophisticated users (Kala'lembang et al., 2024).

Addressing these threats requires not only technical solutions such as transaction authentication and anomaly detection systems but also sustained consumer education campaigns and a robust legal framework for digital payment dispute resolution. The long-term sustainability of QRIS adoption therefore critically depends on the ability of Bank Indonesia, payment service providers, and law enforcement agencies to maintain system integrity and user confidence in the face of evolving cybersecurity risks.

A regional comparative perspective further enriches the analysis of QRIS and its potential trajectory. Within ASEAN, several peer economies have developed analogous national QR payment standards: Thailand's PromptPay, Malaysia's DuitNow QR, Singapore's PayNow, and Vietnam's VietQR all represent government-supported interoperable payment infrastructures pursuing similar financial inclusion and digital economy objectives.

Comparative evidence suggests that countries achieving the most rapid adoption have combined strong regulatory mandates with active public education campaigns, low or zero merchant transaction fees during initial rollout phases, and integration with social protection and government disbursement systems (Chang et al., 2023). Thailand's experience with PromptPay is particularly instructive: its integration with the national identification system and government subsidy disbursements created a strong use-case ecosystem that accelerated merchant and consumer adoption even in rural areas. Indonesia may draw valuable lessons from these regional experiences to optimize QRIS policy design, particularly in expanding adoption among underserved MSMEs and bridging the urban-rural digital divide.

Discussion

The findings of this study are consistent with, and extend, previous research. The finding that QRIS reduces fragmentation and accelerates acceptance through compatibility and relative advantage aligns with Diffusion of Innovations theory (Arli & Bakpayev, 2023). The positive role of digitally recorded transactions in improving MSME management corroborates Fatmawati et al. (2024), who reported that QRIS use positively affects MSME business income. At the macro level, the results are in line with the Global Findex evidence that digital payments serve as a gateway to broader use of formal financial services (Demirgüç-Kunt et al., 2022).

This study extends these findings by showing that the inclusion effect of QRIS operates at the sector level, as a nationally mandated standard that connects previously cash-based enterprises to the formal financial ecosystem. Regarding adoption determinants, the central role of perceived usefulness supports the Technology Acceptance Model (Buchdadi et al., 2024), while the importance of infrastructure and technical support confirms the facilitating conditions construct of UTAUT (Hamzah Muchtar et al., 2024).

The prominence of trust and perceived security is consistent with Patil et al. (2020), who extended the Meta-UTAUT model with trust and grievance redressal in the Indian mobile payment context, and with Slade et al. (2015), who identified perceived risk as a determinant of proximity mobile payment adoption. In contrast to these studies, which focus

mainly on consumers, the present study shows that similar determinants also shape merchant-side adoption among MSMEs, where perceived business benefits and settlement reliability are decisive. The structural challenges identified in this study also mirror earlier evidence.

The persistent digital divide among small enterprises is consistent with Kurniasari et al. (2023), who documented that SMEs lag behind larger firms in digital adoption, and with Nayyar (2022), who highlighted the importance of digital infrastructure and services for economic integration in Asia. Likewise, the finding that limited access to finance constrains MSME development corroborates Ullah (2020). Nonetheless, this study adds that QRIS may partially mitigate this constraint by generating transaction histories usable in credit assessment, provided that digital literacy and connectivity gaps are addressed.

Without such measures, QRIS risks reproducing existing inequalities between connected urban businesses and underserved rural enterprises. Table 2 maps key concepts from each theory to their relevance in the context of QRIS, particularly regarding user acceptance, the diffusion of innovation, and the digital transformation of MSMEs. This synthesis provides an integrated analytical lens to understand QRIS not only as a technological innovation but also as a socio-economic phenomenon shaped by behavioral, institutional, and infrastructural factors.

Table 2. Theoretical Framework Mapping of QRIS Adoption

Theory	Core Concept	QRIS Interpretation	Implication
TAM (Davis)	Perceived usefulness & ease of use	QRIS simplifies transactions	Drives adoption among MSMEs
UTAUT	Performance expectancy & facilitating conditions	Infrastructure + ecosystem support	Determines regional adoption gap
TPB	Attitude, subjective norm, control	Social pressure & habit formation	Influences behavioral intention
Rogers	Diffusion attributes	Relative advantage & compatibility	Accelerates market penetration
OECD/ADB	Digital infrastructure	SME digital transformation	Improves productivity & access

Note: The table is developed based on a synthesis of established theoretical frameworks, including the Technology Acceptance Model (Buchdadi et al., 2024), Unified Theory of Acceptance and Use of Technology (Hamzah Muchtar et al., 2024), Theory of Planned Behavior (Ajzen, 1991), Diffusion of Innovations Theory (Arli & Bakpayev, 2023), as well as insights from Kurniasari et al. (2023) and Nayyar, (2022) on digital transformation and SME development. The mapping represents the author's analytical interpretation of their relevance to QRIS adoption in Indonesia.

To address these issues, a multi-stakeholder approach is necessary. Regulators should continue improving payment security, reducing operational friction, and expanding digital infrastructure. Financial institutions can support MSMEs through onboarding assistance, merchant education, and financing products linked to transaction histories. Local governments and business associations may also play a role in digital literacy campaigns and targeted training for traditional market merchants. Such collaborative efforts would increase the long-term effectiveness of QRIS adoption.

Overall, the results demonstrate that QRIS should be understood as a multidimensional policy innovation that combines technological efficiency, business modernization, and financial inclusion. While user perceptions such as usefulness, trust, and convenience remain central, structural factors such as infrastructure, literacy, and institutional support are equally decisive. Therefore, the long-term success of QRIS will depend not only on how

many users adopt it, but on how effectively the surrounding ecosystem enables sustainable and inclusive participation.

CONCLUSION

This study concludes that QRIS has emerged as a strategic financial infrastructure that simultaneously supports financial inclusion and accelerates the digital transformation of MSMEs in Indonesia. By unifying fragmented QR payment services under a single national standard, QRIS improves transaction efficiency, strengthens transaction traceability and record-keeping, and expands MSME participation in the formal financial ecosystem. Its adoption is shaped by perceived usefulness, trust, infrastructure readiness, and institutional support, confirming that digital payment adoption is a multidimensional process.

Theoretically, integrating TAM, UTAUT, TPB, and Diffusion of Innovations theory provides a more comprehensive lens than any single framework. Practically, regulators, financial institutions, and local governments should strengthen digital literacy, connectivity, and cybersecurity so that QRIS benefits reach underserved MSMEs. Future research should validate these findings quantitatively across ASEAN payment systems.

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. The study was carried out using the authors' own resources and relied entirely on publicly available secondary data obtained from institutional reports and peer-reviewed literature.

CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article. The authors have no affiliation with, and received no compensation from, Bank Indonesia, the Financial Services Authority (OJK), any QRIS payment service provider, or any other institution whose data or reports were analyzed in this study.

AUTHOR CONTRIBUTION

Viola Wangsa Yudianto: Conceptualization, Methodology, Formal analysis, Writing – original draft, and correspondence with the journal. Nadia Sri Rezeki: Data curation, Investigation (identification and screening of institutional reports and academic literature), Validation (source triangulation), and Writing review & editing. Nelly Astuti: Conceptualization (theoretical framework integrating TAM, UTAUT, TPB, and Diffusion of Innovations), Supervision, and Writing – review & editing. All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

GENERATIVE ARTIFICIAL INTELLIGENCE USAGE STATEMENT

The authors used generative artificial intelligence (AI) tools, during the preparation of this manuscript to improve language clarity and grammatical structure and to assist in identifying relevant peer-reviewed literature and formatting citations. The AI tools were not used to formulate the research problem, analyze the data, or interpret the findings. Every source suggested with AI assistance was checked by the authors against the original publication, and all AI-assisted text was reviewed and edited by the authors. The use of AI complies with applicable ethical guidelines on the use and disclosure of generative AI in scientific research. The authors take full responsibility for the accuracy, originality, and integrity of the content of this manuscript.

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