

QRIS and MSME Financial Inclusion in Indonesia's Digital Economy: Opportunities, Risks, and Transaction Trust Strategies

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Article Info	ABSTRACT
Article history: Received: April 07, 2026 Revised: May, 21, 2026 Accepted: June 20, 2026 Keywords: Digital economy, Digital payments, Financial inclusion, QRIS.	<i>This article discusses the role of the Quick Response Code Indonesian Standard (QRIS) in expanding the financial inclusion of MSMEs in Indonesia. The research uses a structured literature study and secondary data analysis from APJII, Bank Indonesia, BPS, OJK, Google-Temasek-Bain, as well as academic literature on technology adoption, digital payments, and consumer trust. The results of the study show that QRIS accelerates the digitization of transactions, lowers the barrier to receiving payments, and opens up better business recording opportunities. However, these benefits do not automatically result in quality financial inclusion if they are not accompanied by financial literacy, consumer protection, transaction security, and integration with other business services. This article proposes a framework for the MSME Digital Transaction Readiness Index which consists of six dimensions: payment access, financial literacy, transaction security, digital record-keeping, online reputation, and service integration. The novelty of the article lies in the incorporation of digital economy perspectives, MSME behavior, transaction risk, and consumer trust into an evaluation framework that can be used for empirical research, literacy programs, and policies to strengthen digital MSMEs.</i>

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1. INTRODUCTION

Indonesia's digital economy is entering a phase of growth that is increasingly evident in daily life. Transactions no longer always start from physical stores, cash, and face-to-face. Many economic activities are now moving through mobile phones, marketplaces, social media, and digital payment systems. APJII reports that the number of Indonesian internet users in 2024 will reach 221.56 million people with a penetration rate of 79.5 percent [1]. On a broader side, the e-Conomy SEA 2025 report projects Indonesia's digital economy to approach a gross merchandise value of US\$100 billion by 2025 [2]. These figures show that Indonesia's digital economy space is not just a new consumption space, but has become an economic infrastructure that affects trade, financial services, logistics, marketing, and consumer behavior.

In the midst of these changes, MSMEs have a very strategic position. MSMEs are not only providers of local goods and services, but also support employment and a source of household income. The Indonesian government has consistently placed MSMEs as the engine of national economic growth [7]. Therefore, the digitization of MSMEs cannot be read solely as a move from offline to online sales. MSME digitalization should be read as a transformation process that includes payments, record-keeping, marketing, stock management, consumer protection, and the ability to make simple data-based decisions.

One of the important instruments in this digitalization is the Quick Response Code Indonesian Standard or QRIS. QRIS brings together various QR-based payment channels so that merchants only need to provide one code to receive payments from various applications. Bank Indonesia reported that until the first semester of 2025, QRIS has reached around 57 million users and 39.3 million merchants, with 93.16 percent of merchants being MSMEs. In the same period, QRIS transactions reached 6.05 billion transactions with a value of around IDR 579 trillion [4]. This development shows that QRIS has moved from payment innovation to a national retail transaction infrastructure. However, the growth in the number of users and merchants is not automatically synonymous with quality financial inclusion. Quality inclusion not only means that a person has access to financial services, but also that they are able to use those services safely, productively, and sustainably. OJK reported that Indonesia's financial literacy index in 2024 was 65.43 percent and the financial inclusion index was 75.02 percent [6]. This gap between access and understanding presents an important challenge: people and businesses can use digital services, but they do not necessarily understand costs, risks, consumer rights, data protection, or strategies to leverage transaction data to grow their businesses. In the context of MSMEs, QRIS can present several direct benefits. First, QRIS expands payment options so that consumers don't have to carry cash. Second, QRIS can reduce the risk of counterfeit money and refund errors. Third, QRIS has the potential to help record transactions because digital payments leave a data trail. Fourth, QRIS can improve the professional image of MSMEs in the eyes of consumers. However, these benefits are only optimal if MSMEs are able to read transaction mutations, separate business and household finances, maintain account security, and manage transaction evidence in an orderly manner. A blind spot that often appears in the narrative of digitizing MSMEs is that the adoption of digital payments is the end of transformation. In fact, QRIS is more accurately understood as an entrance. Once that door opens, the more important question is: is transaction data used for business planning? Do MSMEs have digital security literacy? Do consumers believe that digital transactions are safe? Is there a strengthening of access to financing because transaction history is increasingly documented? These questions show that the QRIS issue is not only a payment

technology issue, but also a behavioral, governance, and trust issue. Theoretically, technology adoption is often explained through the Technology Acceptance Model which emphasizes perceived usefulness and perceived ease of use [9]. The UTAUT framework adds the role of performance expectations, business expectations, social influences, and supporting conditions [10]. In digital payments, these variables need to be expanded with trust factors, risk perception, and consumer protection. Pavlou points out that trust and risk play an important role in the acceptance of electronic transactions [11]. Gefen et al. also show that trust can strengthen user intent in online shopping [12]. Thus, the success of QRIS is not enough to judge by the ease of code scanning, but also by the quality of the transaction experience and the sense of security it builds.

The research problem in this article is how to formulate the relationship between QRIS, MSME financial inclusion, and transaction trust in Indonesia's digital economy ecosystem. This article aims to: (1) explain the position of QRIS as an MSME digital transaction infrastructure; (2) identify the benefits and risks of QRIS on financial inclusion; (3) compiling the framework of the MSME Digital Transaction Readiness Index; and (4) formulate recommendations for MSMEs, platforms, regulators, banks, and universities. The main contribution of this article is the preparation of an evaluation framework that connects digital payments, literacy, risk, and trust in an integrated manner.

2. METHOD

This study uses a structured literature study design with a secondary data analysis approach. The main data sources come from official reports and publications, including APJII for internet penetration, Bank Indonesia for the development of QRIS and the Indonesian Payment System Blueprint 2030, BPS for e-commerce statistics, OJK for financial literacy and inclusion, Google-Temasek-Bain for digital economy projections, as well as World Bank, OECD, UNCTAD, NIST, and ISO reports for the context of digital governance, risk, and consumer protection [1]-[8], [20]-[25]. The academic literature is used to build a theoretical basis regarding technology adoption, trust, perceived risk, and digital consumer behavior [9]-[19].

The research procedure was carried out in four stages. The first stage is the identification of literature with the keywords QRIS, digital payment, financial inclusion, MSME digitalization, technology adoption, trust, perceived risk, digital literacy, and consumer protection. The second stage is the extraction of concepts, variables, and indicators relevant to MSME digital transactions. The third stage is the preparation of the framework of the MSME Digital Transaction Readiness Index or Digital Transaction Readiness Index for MSMEs. The fourth stage is the synthesis of results in the form of conceptual models, risk matrices, indicator tables, and policy recommendations. This article does not claim to be a primary survey. Quantitative data is used as a macro context and an illustration of the preparation of the framework. Therefore, the numbers in the scorecard radar and risk matrix presented in the results section are methodological illustrations, not field measurement results. If this framework is continued as an empirical research, indicator scores can be obtained from surveys of MSME actors, simple audits of transaction practices, complaint data, QRIS usage data, financial recording data, and in-depth interviews with business owners. The MSME Digital Transaction Readiness Index is defined as a weighted composite score of several indicators that have been normalized. For example, i shows MSMEs or regions, j shows indicators, w_j shows the weight of indicators, and z_{ij} shows indicators scores that have been normalized. In general, the index can be written as follows.

$$DTPLi = \sum_{j=1}^k w_j z_{ij}, \text{ with } \sum_{j=1}^k w_j = 1. \quad (1)$$

For indicators with a positive direction, the normalization of the min-max can be written as follows.

$$z_{ij} = (x_{ij} - \min(x_j)) / (\max(x_j) - \min(x_j)). \quad (2)$$

For risk indicators, the transformation is reversed so that a higher score still indicates better conditions.

$$z_{ij}^{risk} = (\max(x_j) - x_{ij}) / (\max(x_j) - \min(x_j)). \quad (3)$$

If the study continues to be an empirical survey, the chances of active use of QRIS can be modeled with the following logistical regression.

$$\text{logit}[P(Y_i=1)] = \beta_0 + \beta_1 DTPLi + \beta_2 LKi + \beta_3 PRi + \beta_4 DUi + \varepsilon_i. \quad (4)$$

In Equation (4), Y_i stated the status of active use of QRIS, LKi stated digital financial literacy, PRi stated risk perception, and DUi stated support for service providers. The coefficients of β_1 , β_2 , and β_4 are expected to be positive, while β_3 are expected to be negative.

3. RESULTS AND DISCUSSION

This section presents a synthesis of the results of the study in the form of a conceptual framework, readiness index, risk matrix, and implications for digital economy actors. The discussion focused on how QRIS can move from a means of payment to a productive financial inclusion instrument for MSMEs.

Table 1. Key figures of the QRIS ecosystem and MSME financial inclusion. Source: synthesis of [1], [2], [4], [6].

Indicator	Key numbers	Meaning for digital MSMEs
Internet users 2024	221.56 million users	Digital consumer base is huge
Penetrating the Internet 2024	79.5 percent	Access is widespread, but literacy is not always evenly distributed
GMV projection of the digital economy 2025	Close to US\$100 billion	The scale of digital transactions is increasingly strategic
QRIS Users Semester I 2025	57 million users	Digital payments are becoming more prevalent for consumers
Merchant QRIS Semester I 2025	39.3 million merchants; 93.16% MSMEs	QRIS has become an important channel for small businesses
Financial literacy index 2024	65.43 percent	Education on the safe use of services is still needed
Financial inclusion index 2024	75.02 percent	Access is higher than literacy so the quality of use needs to be strengthened

3.1. QRIS as a Micro Infrastructure for the Digital Economy

QRIS is important because it works at the most micro point in the digital economy, namely daily transactions. Many discussions of the digital economy highlight large marketplaces, company valuations, or technology investments. However, the transformation that is closest to the community actually occurs when stalls, market traders, home culinary businesses, barbershop, laundry, and street vendors begin to accept digital payments. At this level, QRIS changes the way consumers pay and the way business actors record receipts.

For MSMEs, the initial obstacle to digitalization is often not complex technology, but rather device limitations, costs, cash transaction habits, and doubts about new systems. QRIS lowers some of these barriers because merchants do not need to provide relatively expensive electronic data capture machines. A single code can be used for multiple payment app providers. From a transaction economics perspective, QRIS reduces payment friction and lowers coordination costs between consumers, merchants, and payment service providers. The impact of QRIS on financial inclusion can be read through three channels. The first channel is access, which is the increase in MSMEs that can accept non-cash payments. The second channel is usage, which is the increasing frequency of digital transactions in business activities. The third channel is quality, namely the ability of MSMEs to utilize transaction history for recording, turnover evaluation, stock planning, and potential access to financing. This third channel is the most often forgotten, even though it actually determines whether financial inclusion has an impact on business productivity. The development of QRIS also shows that the digitization of MSMEs does not have to start from a complex application. Many MSMEs can start from digital payments, then move on to simple record-keeping, product catalogs, social media promotions, and shipping integrations. In other words, QRIS can be the first step in the process of moving up. However, the first staircase does not automatically bring business actors to the next floor. Literacy, mentoring, and incentives are needed so that transaction data is really used for business decisions.

3.2. Transaction Trust as a Bridge between Access and Use

Access to QRIS does not always result in repeated use. Consumers can see the QR code at the checkout desk, but still opt for cash if they are unsure of the transaction successfully, are afraid of having their balance cut twice, or are in doubt about the security of the code. MSMEs can also have QRIS, but rarely use it if they do not understand payment notifications, transaction reconciliation, or service fees. Therefore, transaction trust is a bridge between infrastructure availability and real use. Transaction trust is formed by some simple but repetitive experiences. Consumers need to receive payment confirmations quickly. Merchants need to be able to verify payments without waiting too long. When something goes wrong, both parties need a clear resolution mechanism. From a psychological point of view, the experience of the first transaction is decisive. If the first transaction goes smoothly, consumers are more likely to use it. If obstacles occur, users can form a negative perception that lasts for a long time. In the framework of trust-risk-benefit, QRIS provides benefits in the form of convenience, speed, and flexibility. However, users also assess risks, such as fake QRs, transfer errors, social engineering, and misuse of proof of transactions. Trust arises when the perceived benefits outweigh the perceived risks, and when those risks are considered manageable. Therefore, the QRIS adoption strategy must combine benefit promotion with honest and practical risk communication. Trust also has a social dimension. Many consumers believe in using QRIS because they see others using it, because sellers seem to understand how, or because the payment provider's brand is considered credible. For small MSMEs, the seller's reputation remains the main anchor of trust. QRIS strengthens this reputation if digital transactions run in an orderly manner. Conversely, QRIS can be a source of suspicion if the seller is unable to explain the transaction or if the proof of payment does not match.

3.3. MSME Digital Transaction Readiness Index

The MSME Digital Transaction Readiness Index was compiled to help researchers and policymakers read digital readiness not only from QRIS ownership, but from the ecosystem of practices that accompany it. The six dimensions proposed are payment access, financial literacy, transaction security, digital record-keeping, online reputation, and service integration. Payment access measures QRIS availability and payment options. Financial literacy measures the ability to understand costs, cash flow, and business financial

separation. Transaction security measures verification practices, account protection, and fraud alertness. Digital record-keeping measures the ability to use transaction history for simple reports. Online reputation measures the quality of reviews, customer responses, and consistency of information. Service integration measures the relationship between payments and promotions, logistics, inventory, and financing. Normalization of the indicator is necessary because each dimension has a different unit. For example, the number of QRIS transactions per month, the percentage of transactions recorded, literacy scores, complaint response times, and the use of two-factor authentication cannot be directly summed up. Therefore, each indicator needs to be changed to a comparable scale, for example 0 to 1 or 0 to 100. For risk indicators, the direction of the scale needs to be reversed so that higher values still mean better. The advantage of the index approach is its ability to simplify complex issues without eliminating the evaluation structure. Local governments can use this index to map sub-districts or MSME sectors that need assistance. Banks or payment service providers can use it to design merchant education. Colleges can use it for community service programs and student research. For MSMEs, this index can be a simple mirror to see areas that need improvement.

Table 2. Dimensions and indicators of the MSME Digital Transaction Readiness Index. Source: compiled by the author.

Dimensions	Example indicators	Direction of interpretation
Payment access	QRIS on, choice of payment channels, internet availability	The higher the easier it is to transact
Financial literacy	Understanding of costs, settlement, cash flow, account segregation	The higher the better, the more ready to manage business money
Transaction security	2FA, payment verification, account protection, phishing awareness	The higher the safer
Digital recording	Daily reconciliations, sales reports, transaction proof archives	The higher the the more data-driven
Consider yourself online	Reviews, Complaint Responses, Business Information Consistency	The higher the trust
Service integration	Digital catalogs, logistics, inventory, access to financing	The higher the more productive

3.4. Digital Transaction Risks in MSMEs

The main risks in using QRIS do not necessarily come from the core technology of payments, but from the surrounding behavioral environment. Fake QRs, phishing, social engineering, hijacked accounts, verification errors, and fake proof of transfer are risks that can arise when users and merchants do not have adequate security literacy. These risks need to be differentiated so that the response is appropriate. Fake QR requires visual education and merchant verification. Phishing requires being aware of fake links and messages. Hijacked accounts require strong authentication and password management. Failed refunds require clear service procedures. For MSMEs, the impact of digital risks is often heavier than large businesses because of limited recovery capacity. Losses of several hundred thousand rupiah can disrupt daily cash flow. Losing a payment account can stop transactions. Negative reviews due to transaction errors can degrade reputation. Therefore, risk mitigation for MSMEs must be simple, cheap, and easy to repeat. Overly technical recommendations will be difficult to implement if they are not translated into daily operational habits.

A risk matrix can be used to determine priorities. Risks with high probability and high confidence impact need to receive primary attention. In the context of QRIS, the risk of fake QR and phishing needs to be placed as a priority for public literacy as they both take advantage of the weakness of user attention. The risk of refund failure and unclear fees needs

to be addressed through service transparency and complaint mechanisms. The risk of accounts being hijacked needs to be addressed through account security, multi-layered verification, and separation of business devices from personal devices where possible.

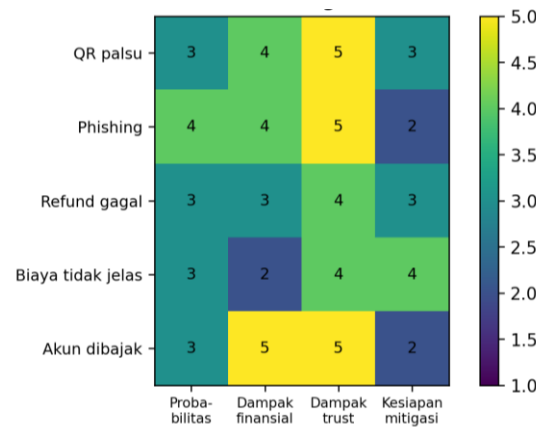


Figure 1. MSME digital transaction risk matrix based on priority scale 1-5.

Table 3. MSME digital transaction risks and their mitigation. Source: author's synthesis.

Risks	Main impact	Priority mitigation
Fake QR	Funds go to the wrong party and trust decreases	Merchant name verification, official stickers, visual education
Phishing/social engineering	Payment account or account can be taken over	Don't share OTP/PIN, use official channels, 2FA
False proof of payment	Goods are handed over before the funds are actually received	Check notifications and mutations, not just proof images
Refunds or slow disputes	Consumers and merchants are losing trust	SOP for complaints, official numbers, SLA for settlement
Cost not understood	MSMEs feel that services are not transparent	Simple cost information and cash flow simulation

3.5. QRIS, Financial Recordkeeping, and Financing Access Opportunities

One of the biggest opportunities for QRIS is the creation of a digital transaction footprint. For many MSMEs, the classic problem in accessing financing is weak business documentation. The business can run well, but it doesn't have a neat record of turnover, cash flow, or transaction history. Digital payments have the potential to help solve some of these problems because transactions are recorded automatically. However, this potential will only become an economic value if MSMEs are able to read and compile information from these records.

Transaction traces can help MSMEs in three ways. First, it helps business owners see daily and seasonal sales patterns. Second, it helps separate business money and household money. Third, it helps financial institutions assess business activities more objectively. However, the use of transaction data for financing must pay attention to data protection, consent, and the principle of fair use of data. MSMEs should not be disadvantaged by non-transparent assessment algorithms or the use of data outside of the intended purpose. In practice, digital recording does not have to directly use a complex accounting system. MSMEs can start with a simple reconciliation: matching payment notifications, account mutations, and daily sales lists. The next step is to group transactions by product, time, sales channel, and customer. From this simple data, MSMEs can estimate the best-selling products, peak hours, stock needs, and promotion strategies. Thus, QRIS can be the gateway to very simple but useful data-driven management.

Table 4. The QRIS value chain from transactions to business decisions. Source: compiled by the author.

Stages	MSME Activities	Economic benefits
Transactions	Accept QRIS payments and verify notifications	Reduce payment friction and cash risk
Reconciliation	Match mutations, notes, and sales lists	Improve cash flow order
Simple analysis	View sales patterns by time and product	Assist with stocking, promotion, and operating hours
Business documentation	Compile turnover history and proof of transaction	Increase access to financing opportunities
Evaluation	Compare turnover, costs, and customer complaints	Driving service improvement

3.6. Digital Financial Literacy as a Determinant of Inclusion Quality

Digital financial literacy is a differentiating factor between formal access and tangible benefits. MSME actors can accept digital payments, but still experience problems if they do not understand service fees, settlement times, balance management, account security, and transaction data consequences. Literacy is needed not only the knowledge of definitions, but the practical ability to make decisions in real situations. For example, when to check for mutations, how to recognize fake messages, how to store proof of transactions, and how to explain to customers if transactions are delayed.

The gap between literacy and financial inclusion reflected in OJK data shows that education programs are still an important agenda [6]. In the context of QRIS, literacy needs to be designed based on field problems. Overly general training often doesn't change behavior. MSMEs need case examples: fake QR at the cashier desk, fake proof of transfer, customers claiming to have paid, gift links from fake accounts, or service fees that are not understood. Case-based training is easier to remember because it is close to business experience. Universities have a strategic role in digital financial literacy. Community service programs can help MSMEs create simple transaction records, payment procedure posters, account security guidelines, and daily reconciliation templates. Statistics, economics, management, and information systems students can be involved to create a simple dashboard from MSME sales data. In this way, digital literacy is not just a lecture, but real problem-based mentoring.

3.7. Implications for Regulators and Payment Service Providers

For regulators, the development of QRIS shows the importance of a balance between innovation and protection. Innovation is needed to make the payment system easier, cheaper, faster, safe, and reliable. However, safeguards are necessary so that adoption does not result in losses for consumers and merchants. The Indonesian Payment System Blueprint 2030 places infrastructure, industry, innovation, international, and digital rupiah as the main initiatives in the development of payment systems [5]. Within this framework, QRIS needs to continue to be strengthened as an inclusive and resilient retail infrastructure.

Payment service providers need to see MSME merchants not only as service users, but as educational partners. Information on fees, settlement times, complaint procedures, and account security should be communicated in plain language. Transaction notifications need to be made clear so that merchants are not easily deceived by fake transfer evidence. The complaint channel must also be easily accessible, especially for MSMEs that do not have special administrative staff. Regulators and payment service providers also need to develop risk monitoring indicators. These indicators can include the number of QRIS complaints, types of fraud modes, dispute resolution times, merchant education success rates, and transaction trends by region. This data is important so that policies are not only reactive after

an incident occurs, but can be directed to prevention. A data-driven approach will make the digitization of MSMEs more measurable and accountable.

Table 5. Actor-based action recommendations

Actors	Priority agenda	Success indicators
Regulator	Merchant guidance, risk monitoring, public education	Decrease in disputes and increase in active merchants
Payment service providers	Clear notifications, complaint channels, account security	Faster response times and fewer recurring complaints
Banking/financing institutions	Utilization of transaction data with consent	Access to financing is more targeted
Local government	MSME assistance and digital readiness mapping	MSMEs actively use QRIS and record transactions
Colleges	Research, service, simple dashboard, risk literacy	Modules, publications, and measurable mentoring impact

3.8. Implications for MSMEs and Consumers

For MSMEs, the strategy of using QRIS needs to start from small, consistent habits. Merchants need to ensure that the QR code displayed is the official code, check payment notifications before handing over goods, record daily transactions, and separate business accounts from personal accounts. Merchants also need to avoid sharing OTP codes, PINs, or login links with anyone. This basic practice is simple, but it greatly determines the security of transactions. For consumers, the use of QRIS also requires vigilance. Consumers need to check the merchant's name on the application before pressing the pay button, make sure the amount is appropriate, and keep proof of transaction. If something goes wrong, consumers should use official channels instead of numbers obtained from unclear messages. Consumer literacy will strengthen the trust of the ecosystem because the risk of transactions is not only on the merchant's side. The relationship between MSMEs and consumers in QRIS transactions is mutually reinforcing. Orderly merchants increase consumer trust. Orderly consumers reduce the risk of disputes. When both parties have secure habits, digital transactions become a convenient experience. At this point, financial inclusion doesn't stop at the use of services, but evolves into a more transparent and documented transaction culture.

Table 6. Basic practices of safe QRIS transactions for MSMEs

Practice	Examples of simple actions	Purpose
QR code validation	Make sure the merchant name on the app matches the business name	Prevent fake QR
Payment verification	Check notifications or mutations before handing over items	Preventing false evidence
Account security	Enable strong PINs, 2FA, and don't share OTPs	Prevent accounts from being hijacked
Daily Record	Recap of cash and digital transactions at the end of each day	Reading the Cash flow
Customer communication	Provide payment instructions and an official complaint channel	Strengthening trust

3.9. Hypothesis Design for Empirical Research

The conceptual framework of this article can be developed into empirical research. Researchers can test whether digital financial literacy increases transaction readiness, whether transaction trust mediates the influence of QRIS on usage intensity, and whether risk perception decreases repeat adoption intentions. The unit of analysis can be in the form

of MSME actors, consumers, regions, or business sectors. Methods that can be used include logistical regression, structural equation modeling, partial least squares, panel modeling, or multilevel analysis if data is collected from multiple regions.

Outcome variables can be in the form of active use of QRIS, proportion of digital transactions, turnover growth, regularity of recording, or intention to use QRIS on an ongoing basis. Explanatory variables can include digital financial literacy, perception of convenience, perception of benefits, perception of risk, trust of transactions, support of service providers, and business characteristics. With good design, advanced research can differentiate between QRIS ownership and productive use of QRIS. One of the empirical challenges is self-report bias. Business actors can declare using QRIS, but not always using them consistently. Therefore, surveys should be supplemented with simple administrative evidence, such as transaction frequency, anonymized mutation screenshots, or sales diaries. Research ethics still need to be considered because transaction data is sensitive. The researcher must ensure the consent of the respondents, anonymization of the data, and restrictions on the use of data according to the purpose of the study.

Table 7. Design of a follow-up research hypothesis. Source: compiled by the author based on TAM, UTAUT, and trust-risk-benefit.

Code	Hipotesis	Signs of hope
H1	Digital financial literacy increases the readiness of MSME digital transactions	Positive
H2	Perception of the benefits of QRIS increases the active use of QRIS	Positive
H3	Risk perception lowers transaction confidence	Negatives
H4	Transaction trust increases the use of QRIS repeatedly	Positive
H5	Digital recording mediates the relationship between QRIS use and business performance	Positive
H6	Service provider support reinforces the influence of literacy on active use	Positive

3.10. Synthesis: From Digital Payments to Productive Inclusion

The main synthesis of this article is that QRIS is an important gateway to MSME financial inclusion, but not the final goal. Productive inclusion occurs when digital payments generate records, records generate information, information generates decisions, and decisions improve business performance. This chain can be broken at many points. If MSMEs only receive QRIS but do not record it, then the benefits of data are lost. If the transaction is recorded but not understood, then the data does not turn into a decision. If decisions are made but security risks are ignored, then trust can be damaged.

Therefore, the policy agenda needs to move from expanding adoption to deepening quality. Success indicators are not enough in the form of the number of merchants and transaction volume. Additional indicators need to include literacy, security, record-keeping, dispute resolution, and impact on business. This shift in indicators is important so that digitalization not only pursues big numbers, but also produces economic benefits that are truly felt by small business actors.

In a broader perspective, QRIS shows that a good digital transformation always has two sides: technology and trust. Technology makes transactions possible, while trust makes transactions repeated. Technology speeds up payments, while literacy makes payments more secure. Technology generates data, while governance converts data into value. Therefore, the QRIS strategy for MSMEs must be understood as an ecosystem, not just a QR code at the checkout desk.

Table 8. The principle of QRIS synthesis for MSME financial inclusion

Principle	Meaning	Implementation examples
Non-final access	QRIS ownership must be followed by active use	Monitor active merchants, not just registered merchants
Data becomes value	Transaction history must be converted to business information	Recap of turnover, sales products, and rush hour
Trust as an asset	Trust determines recurring transactions	Cost transparency, proof of transaction, and complaint response
Risk needs to be designed	Security should not rely on user memory alone	2FA, clear notifications, fraud case education
Inclusion must be productive	Service access must have an impact on business performance	Data-driven recording, financing, and training

3.11. Relevance of Results to Relevant Research

The results of this study are consistent with Davis who explained that the acceptance of technology is influenced by the perception of usability and ease of use [9]. In the context of QRIS, the usefulness can be seen from the ease of receiving non-cash payments, while the ease can be seen from the fast and relatively simple transaction process. However, this article expands on that framework by emphasizing that repeated use requires transaction trust, digital financial literacy, and consumer protection. This study is also in line with UTAUT which places supporting conditions and social influence as important factors of adoption [10]. In MSMEs, supporting conditions include internet access, devices, banks or payment service providers, and assistance. Social influence arises when consumers begin to get used to paying non-cash and other merchants around the business location also use QRIS. However, social influences can result in surface adoption if they are not followed by risk understanding and record-keeping.

The conceptual findings of this article support the literature of Pavlou, Gefen et al., and Kim et al. that trust and perceived risk influence electronic transaction decisions [11]-[13]. In QRIS, trust is not only given to payment applications, but also to merchants, regulators, banks, and transaction settlement systems. Thus, trust is an ecosystem. One bad experience can lower trust in multiple actors at once, while a consistently good experience can strengthen adoption in the long run. Compared to studies that only highlighted digital payment volumes, this article emphasizes the quality of inclusion. Compared to studies that only discuss financial literacy, this article includes transaction risk and trust as behavioral mechanisms. Compared to the MSME study that only discusses digital marketing, this article places payments as a source of business data. Thus, the contribution of this article lies in the unification of three perspectives: digital payments, financial inclusion, and MSME risk management.

4. CONCLUSION

QRIS has become one of the important infrastructures in Indonesia's digital economy because it is able to expand access to digital payments to MSME actors. The development of the number of users, merchants, and transaction value shows that QRIS has an increasingly large scale. However, the success of QRIS should not only be measured in terms of quantitative adoption. Quality financial inclusion demands literacy, security, recordkeeping, consumer protection, and transaction trust. This article proposes an MSME Digital Transaction Readiness Index with six dimensions, namely payment access, financial literacy, transaction security, digital record-keeping, online reputation, and service integration. This framework can be used to map the readiness of MSMEs, design mentoring programs, and

compile empirical research. For regulators and payment service providers, the results of the study confirm the importance of merchant education, cost transparency, complaint channels, and risk monitoring. For MSMEs, the main strategy is to build orderly, safe, and documented transaction habits. The next study is suggested to test this framework using a primary survey on MSMEs across sectors and regions. Follow-up research also needs to combine transaction data, complaint data, and literacy data to measure whether QRIS truly improves the quality of financial inclusion and business performance. With this approach, QRIS can be seen not only as a means of payment, but as an entrance to MSMEs that are more adaptive, secure, and data-based.

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Author Contributions Statement

Abdul Wahid Matdoan: conceptualization, methodology, data curation, formal analysis, visualization, writing-original draft, writing-review and editing. All authors discussed the results and contributed to the final manuscript.

Conflict of Interest Statement

Authors state no conflict of interest.

Informed Consent

Not applicable because this study uses secondary data and published literature without collecting personal data from human participants.

Ethical Approval

Not applicable because this study does not involve experiments with humans or animals.

Data Availability

The data supporting the findings of this study are available in the public reports and official publications listed in the References section. Derived data supporting figures and tables are available within the article.

Declaration of Generative AI and AI-assisted Technologies

Generative AI tools were used to improve drafting, language consistency, and formatting. The analytical framework, source selection, tables, figures, and conclusions must be reviewed and validated by the author before submission.

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