JOURNAL OF MANAGEMENT AND ENTREPRENEURSHIP RESEARCH
P-ISSN 2723-1658, E-ISSN 2723-1666
Available at http://ejournal.unisnu.ac.id/jmer/
Volume 06, Issue 1, p. 31–46
DOI: https://doi.org/10.34001/jmer.2025.6.06.1-58

OVERCOMING BARRIERS TO DIGITAL PAYMENT: INSIGHTS FROM QRIS ADOPTION IN RURAL WEST SULAWESI

Gunawan Purbowo[1], Irwan Trinugroho[2*]

[1,2] Universitas Sebelas Maret, Indonesia
e-mail: [1]gunawan_purbowo@bi.go.id; [2]irwan_t@staff.uns.ac.id

Received January 16, 2025; accepted April 9, 2025; published May 17, 2025.

ABSTRACT

Objective: We examine the key factors influencing QRIS adoption in rural West Sulawesi, focusing on access to information, infrastructure availability, user perceptions, and financial literacy. **Research Design & Methods:** We applied a quantitative approach using Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze survey data from 410 respondents. Constructs were based on the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT). **Findings:** We found that QRIS adoption is significantly influenced by access to information, infrastructure, and user perceptions. While financial literacy does not have a significant direct effect. Among the control variables, age and education show significant positive relationships with adoption, whereas gender and spending levels have no direct impact. **Implications and Recommendations:** Improving ICT infrastructure and promoting targeted information campaigns can enhance QRIS adoption. Policymakers should leverage community leaders and educational programs to build trust and positive perceptions, while focusing on younger and educated demographics to act as digital ambassadors. **Contribution & Value Added:** Our research highlights the critical role of infrastructure, social influence, and user perceptions over financial literacy in driving digital payment adoption, providing actionable insights for enhancing financial inclusion in rural contexts.

Keywords: digital payment; financial literacy; QRIS adoption; TAM, UTAUT.
JEL codes: G20, O33, D83, M15
Article type: research paper

INTRODUCTION

The rapid development of mobile phone technology has catalyzed digitalization across various sectors, including financial transactions and payments (Gupta et al., 2023; Seldal & Nyhus, 2022). By expanding access to payment services, mobile payment technologies have reduced transaction barriers and fostered improved business performance (Afeti & Owusu, 2022). Moreover, mobile payment systems play a pivotal role in advancing financial inclusion, especially in underserved and remote regions (Ghouse et al., 2025). Trinugroho et al. (2017) further emphasize that accelerating the adoption of digital financial services in areas with limited access to formal financial institutions is critical for enhancing financial inclusion.

In Indonesia, Bank Indonesia has implemented several initiatives to promote financial inclusion and expand digital payment adoption. One such initiative is the introduction of the Quick Response Code Indonesian Standard (QRIS), a mobile payment solution that offers efficiency, practicality, and security. Unlike payment cards that require Electronic Data Capture (EDC) devices, QRIS facilitates transactions without additional tools, making it a cost-effective and convenient option. With the increasing

Copyright © The Author(s)
This work is licensed under a Creative Commons Attribution 4.0 International License
Corresponding author:
Trinugroho, email: irwan_t@staff.uns.ac.id

penetration of mobile phones across all demographic groups, QRIS serves as an ideal platform to boost financial inclusion and accelerate digital payment adoption.

Despite these advancements, the adoption of mobile payment technology remains limited, particularly in developing regions. For instance, in Indonesia, the use of QRIS is heavily concentrated in urban areas like Jakarta, where the user-to-population ratio reaches 0.53, compared to only 0.05 in underdeveloped regions like West Sulawesi (Asosiasi Sistem Pembayaran Indonesia (ASPI), 2024; Badan Pusat Statistik (BPS), 2024). Similarly, studies in Portugal and China reveal that mobile payment usage in sectors such as transportation is still minimal (Fontes et al., 2017). In India, efforts to expand financial inclusion and digital payment adoption through the Unified Payments Interface (UPI)—a QR code-based system similar to QRIS—have faced challenges, with user growth falling short of expectations despite the country's increasing smartphone and internet penetration (Fahad & Shahid, 2022).

Proponents of financial innovation argue that faster adoption of technology in financial intermediation correlates with higher financial inclusion. However, significant disparities in digital financial service readiness persist across individuals, regions, and countries (Trinugroho et al., 2017). Sahi et al. (2021) highlight that, although mobile payments and wallets hold vast potential, societal reluctance to adopt these technologies remains a global issue, especially in developing countries. Furthermore, existing theories fail to comprehensively address the social and cultural factors influencing mobile payment adoption, as observed in an analysis of 193 studies on digital payment adoption (León, 2021).

West Sulawesi presents a unique context for studying the adoption of the Quick Response Code Indonesian Standard (QRIS) due to its distinctive economic and technological landscape. The province has been actively promoting digitalization, even in remote areas and traditional markets, by introducing QRIS for transactions. For instance, Bank Indonesia (BI) has been encouraging the use of QRIS in Sulawesi as part of the "Proud of Made in Indonesian Products" (Gernas BBI) movement and the "Proud to Travel in Indonesia" campaign (BWI) (ANTARA, 2021). This initiative aims to enhance market access, increase financing opportunities, and boost the digitization of payment systems, which includes efforts in West Sulawesi. Additionally, the Acting Governor of West Sulawesi, Akmal Malik, has emphasized the importance of digital transformation in the region, highlighting policies that support digital entrepreneurs and the use of data-driven government policies (East Ventures, 2023). However, despite the effort, a study on the determinants of behavioral intention and use behavior of QRIS highlights that region with less developed infrastructure and lower digital literacy, such as parts of West Sulawesi, face challenges in achieving optimal adoption rates (Paramita & Cahyadi, 2024). This indicates a significant opportunity to investigate the factors influencing QRIS adoption in regions like West Sulawesi, where digital payment systems are being actively promoted but have not yet achieved widespread usage. Additionally, West Sulawesi has one of the lowest internet penetration rates in Indonesia, at approximately 0.44% (Jamilatuzzahro & Alaudin, 2024). This limited digital connectivity poses challenges to adopting digital payment systems, making it crucial to study how such constraints affect financial inclusion and to identify strategies to overcome them.

Considering the importance of mobile payment adoption—particularly QRIS—in expanding digital payment access and promoting financial inclusion in underdeveloped and rural areas, our study aims to analyze the determinants influencing QRIS adoption in such regions. Our research contributes to the existing literature by addressing the adoption of digital payment systems, specifically QRIS, in rural areas with limited ICT infrastructure and low digital financial literacy. While previous studies, such as Trinugroho et al. (2017), have explored the role of demographic factors and facilitating conditions in the adoption of financial technologies, few have provided a comprehensive analysis of multiple determinants. We integrate constructs from well-established models, including the Technology Acceptance Model (TAM) (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003, 2012), to advance understanding of how factors such as performance expectancy, effort expectancy, and habit contribute to the sustained use of QRIS in resource-constrained environments.

LITERATURE REVIEW

The adoption of digital payment systems, such as QRIS, has emerged as a critical area of research due to its role in promoting financial inclusion and enabling cashless transactions. Several theoretical frameworks have been widely utilized to analyze factors influencing technology adoption. The Technology Acceptance Model (TAM) developed by Davis (1989) highlights the importance of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) in influencing user attitudes and behavioral intentions. The Unified Theory of Acceptance and Use of Technology (UTAUT) introduced by Venkatesh et al. (2003) expands on TAM by incorporating additional constructs such as Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. These constructs have been extensively validated in various contexts, including mobile banking adoption (Baptista & Oliveira, 2015). Building on UTAUT, Venkatesh et al. (2012) proposed the UTAUT2 model, which adds Hedonic Motivation, Price Value, and Habit, enhancing its applicability to consumer-oriented technologies such as digital payments.

Infrastructure

The availability of ICT infrastructure, such as reliable internet connectivity and compatible devices, is essential for adopting digital payment systems. Zhou et al. (2019) emphasize that the availability of infrastructure in rural areas enables individuals and businesses to utilize mobile payment technologies effectively. In the context of financial technologies, Rahman et al. (2020) found that facilitating conditions, including network reliability and transaction speed, significantly predict non-cash payment adoption.

Empirical evidence from emerging economies further supports this claim. Asrani & Kar (2022) highlight how regional disparities in ICT infrastructure influence digital service adoption in India. Similarly, Sahu & Singh (2018) identify network reliability and payment security as critical success factors for digital payment adoption in India, reinforcing the argument that inadequate ICT infrastructure discourages users from embracing digital transactions. Additionally, research on digitalization and economic development suggests that internet penetration and smartphone availability are fundamental drivers of financial inclusion, especially in regions with limited access to formal banking services (Evans, 2018; Lenka & Barik, 2018; Pradhan et al., 2021).

In the context of Indonesia, despite increasing government initiatives to expand digital financial services, regions such as West Sulawesi continue to face unequal ICT infrastructure distribution, leading to low adoption rates of digital payments. According to Kemp (2024), internet penetration in Indonesia has reached 66.5%, with urban areas generally experiencing higher levels of connectivity compared to rural regions. Furthermore, internet penetration in rural areas is expected to reach 74%, whereas urban areas are projected to achieve 82.2% penetration (IntiMedia, 2024).

Based on previous studies above, we posit that the availability of ICT infrastructure positively influences QRIS adoption in rural West Sulawesi. Improved access to digital payment infrastructure reduces barriers to entry for users and businesses, fostering a more inclusive financial ecosystem. Therefore, the following hypothesis is proposed:

H1: Infrastructure availability positively influences QRIS adoption.

Access to Information

Access to information plays a fundamental role in shaping the adoption of digital payment technologies. Clear and effective communication regarding the benefits of digital payments, coupled with educational initiatives and social influence, has been recognized as a significant determinant of adoption behavior. Jocevski et al. (2020) emphasize that transparency in digital payment services, along with targeted promotional efforts, can help potential users overcome uncertainty and hesitation toward adoption. Furthermore, social networks serve as powerful channels for disseminating information, shaping consumer perceptions, and fostering trust in digital payment systems (Song et al., 2023).

The role of social influence is further reinforced in the context of technological adoption among individuals in semi-urban and rural settings. Manrai et al. (2021) highlight that communities with lower

levels of digital literacy, peer influence, family recommendations, and trust in social circles play a crucial role in technology adoption. This aligns with the unified theory of acceptance and use of technology (UTAUT), where social influence and facilitating conditions significantly shape users' behavioral intentions. Additionally, digital financial literacy campaigns, which aim to educate users about security features, transaction processes, and cost-benefit analyses of digital payments, have been shown to enhance trust and encourage sustained use of digital platforms.

Empirical findings from Asrani & Kar (2022) provide further evidence that digital payment adoption in emerging markets is highly dependent on access to relevant information. Their study on ICT diffusion in India underscores that lack of awareness and misinformation about transaction security are primary barriers to mobile payment adoption. This suggests that digital payment platforms, including QRIS, must actively engage in outreach and educational efforts to bridge knowledge gaps, particularly in rural areas where misconceptions about digital transactions persist.

Given the critical role of information accessibility in facilitating digital payment adoption, the following hypothesis is proposed:

H2: Access to information positively influences QRIS adoption.

Perception

User perception of a technology's benefits, ease of use, and security significantly shapes their adoption behavior. Studies by Pal et al. (2015) and Zhong & Moon (2022) found that perceived usefulness and ease of use are the strongest predictors of mobile payment adoption. Additionally, trust and security perceptions enhance user satisfaction and encourage continued usage (Rahman et al., 2020).

User perception of a technology's benefits, ease of use, and security plays a pivotal role in determining its adoption and sustained usage. In the context of digital payments, users are more likely to embrace new financial technologies if they perceive them as useful, simple to operate, and secure (Pal et al., 2015; Zhong & Moon, 2022). The Technology Acceptance Model (TAM) Davis (1989) supports this notion by identifying perceived usefulness (PU) and perceived ease of use (PEOU) as primary determinants of technology adoption. Users who find QRIS convenient and effective for transactions are more inclined to integrate it into their financial routines.

Moreover, trust and security concerns are crucial determinants of mobile payment adoption. As digital transactions involve financial risks, users require assurance that their transactions are protected from fraud, data breaches, and technical failures. Research by Rahman et al. (2020) confirms that users' trust in digital payment security enhances their satisfaction and encourages continued usage. Additionally, Jocevski et al. (2020) found that trust-building mechanisms—such as regulatory support, merchant credibility, and consumer protection policies—significantly impact users' willingness to adopt mobile payments.

Findings from emerging economies reinforce the importance of user perception in financial technology adoption. A study by Ullah et al. (2022) indicates that positive perceptions of convenience and security drive higher adoption rates of mobile payment solutions in developing regions. Similarly, Sahu & Singh (2018) highlight that trust in mobile payment security and a seamless user experience strongly correlate with consumer adoption.

Given the critical role of user perceptions in facilitating digital payment adoption, the following hypothesis is proposed:

H3: Positive user perceptions (benefits, ease of use, and security) positively influence QRIS adoption.

Financial Literacy

Financial literacy is a key determinant of individuals' readiness to adopt and effectively use digital financial technologies. Song et al. (2023) argue that higher financial literacy equips users with the knowledge to understand and utilize mobile payment systems, while Beck et al. (2018) demonstrate that financial literacy significantly impacts the adoption of mobile money systems.

The Theory of Technology Acceptance Model (TAM) Davis (1989) provides relevant perspectives on the role of financial literacy in digital payment adoption. TAM suggests that perceived ease of use and perceived usefulness are stronger among individuals with higher financial knowledge, as they are better equipped to navigate digital financial services with confidence.

Empirical studies reinforce this argument. Ullah et al. (2022) found that financial literacy enhances user confidence, reduces transaction anxiety, and encourages regular use of digital financial services. Likewise, Asrani & Kar (2022) emphasize that a lack of financial literacy hinders mobile payment adoption in emerging markets by increasing uncertainty and reluctance among potential users. Research on mobile payments in developing countries further suggests that financial literacy positively correlates with trust in financial institutions, reduced risk perception, and increased digital transaction participation (Manrai et al., 2021).

Given these insights, we propose the following hypothesis:

H4: Financial literacy positively influences QRIS adoption.

METHODS

Data and Variables

We focus on the adoption of QRIS (Quick Response Code Indonesian Standard) in rural areas of West Sulawesi, Indonesia. The sample was selected using a random sampling technique to ensure representativeness and minimize selection bias. The sample size was determined using the sample-to-item ratio approach to ensure reliability and statistical robustness in Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis (Memon et al., 2020). The data for this study were collected through an online structured questionnaire survey. A total of 600 questionnaires were distributed, and 534 responses were received. After data cleaning and screening for completeness and validity, 410 responses were deemed usable for analysis.

Dependent Variable

QRIS adoption serves as the dependent variable and is conceptualized as a latent construct measured through three indicators: daily usage of QRIS, preference for QRIS, and the likelihood of recommending QRIS to others. These indicators align with the "Actual Use" construct in the Technology Acceptance Model (TAM) (Davis, 1989), emphasizing that actual usage stems from user intentions and perceptions.

Independent Variables

Infrastructure (Infra) reflects the availability of essential resources. Indicators measure the quality and availability of these resources. This variable corresponds to the "Facilitating Conditions" construct in UTAUT and UTAUT2, highlighting the importance of a supportive environment in facilitating technology adoption (Farzin et al., 2021; Hamzah Muchtar et al., 2024; Rahim et al., 2023; Venkatesh et al., 2003).

Access to Information (Acs_Info) defined as the frequency and quality of information or encouragement individuals receive from social sources. This variable comprises two key components. The first is social influence (PS), which includes recommendations from family, friends, bank staff, or advertisements. These social connections play a critical role in shaping users' intentions and behaviors by encouraging them to adopt QRIS. The second component is hedonic motivation (MH), which refers to the emotional satisfaction and enjoyment derived from using QRIS, influenced by social support. These components align with the Unified Theory of Acceptance and Use of Technology (UTAUT/UTAUT2), which emphasizes that social influence significantly motivates individuals to adopt technology when they are driven by their social environment (Farzin et al., 2021; Hamzah Muchtar et al., 2024; Rahim et al., 2023; Venkatesh et al., 2003).

User Perceptions (Percep) is operationalized through three sub-constructs. The first is performance expectancy (EP), which captures how QRIS facilitates faster financial transactions, enhances daily convenience, and ensures reliable access for users. The second sub-construct is effort expectancy (EU),

reflecting the perceived ease of learning and using QRIS with minimal effort. The third is habit, which measures the extent to which users integrate QRIS into their daily routines due to its perceived benefits and simplicity. Together, these sub-constructs align with the concepts of "Perceived Usefulness" and "Perceived Ease of Use" in the Technology Acceptance Model (TAM) and with "Performance Expectancy," "Effort Expectancy," and "Habit" in the Unified Theory of Acceptance and Use of Technology (UTAUT/UTAUT2) (Davis, 1989; Farzin et al., 2021; Hamzah Muchtar et al., 2024; Rahim et al., 2023; Venkatesh et al., 2012).

Financial Literacy (LK) measures respondents' understanding of financial products and their ability to manage digital financial services. Indicators include comprehension of financial products, budgeting skills, and familiarity with digital tools. While not explicitly addressed in TAM or UTAUT, financial literacy is a critical factor in adopting digital financial technologies (Fernandes et al., 2014; Hasan et al., 2023).

Control Variables

Demographic factors serve as control variables, encompassing characteristics such as age, gender, education, and monthly spending, measured categorically. These factors account for individual differences that may influence QRIS adoption. Previous studies suggest that demographic attributes, particularly age and education, significantly impact readiness and behavior in technology adoption (Trinugroho et al., 2017).

Methods: Partial Least Squares Structural Equation Modeling (PLS-SEM)

Partial Least Squares Structural Equation Modeling (PLS-SEM) is a powerful statistical method designed for analyzing complex relationships between latent constructs and their indicators. Widely used in predictive and exploratory research, PLS-SEM is renowned for its ability to handle small sample sizes, non-normal data distributions, and complex models, making it a valuable tool across various disciplines, including marketing, social sciences, and business research (Hair et al., 2011, 2017).

PLS-SEM employs a component-based algorithm to estimate model parameters. The method alternates between the measurement model (outer model), which defines the relationship between latent variables and their indicators, and the structural model (inner model), which specifies the relationships among latent variables. This iterative algorithm seeks to maximize the explained variance of endogenous constructs, enhancing the model's predictive accuracy (Hair et al., 2019; Sarstedt et al., 2014).

The estimation process begins with calculating indicator weights, which reflect the relative contribution of each indicator to its latent construct. These weights are optimized using a series of ordinary least squares (OLS) regressions, iterated until convergence. The resulting latent variable scores are then used to estimate path coefficients, capturing the strength and direction of the relationships between constructs (Hair et al., 2017).

PLS-SEM rigorously evaluates the reliability and validity of both measurement and structural models to ensure robust findings. Reliability is assessed through internal consistency metrics, including composite reliability (CR) and Cronbach's alpha. Composite reliability is particularly favored for its ability to account for differing indicator loadings, providing a more accurate measure of reliability. A CR value above 0.70 is considered acceptable, ensuring that the indicators consistently measure their respective constructs (Hair et al., 2017).

Validity is examined through convergent and discriminant validity assessments. Convergent validity ensures that the indicators of a construct share a high degree of variance and is evaluated using the average variance extracted (AVE). An AVE greater than 0.50 indicates that the construct explains more than half of the variance in its indicators. Discriminant validity verifies that constructs are distinct from one another. The heterotrait-monotrait ratio (HTMT) has become the preferred method for assessing discriminant validity in PLS-SEM due to its superior sensitivity compared to traditional methods like the Fornell-Larcker criterion. HTMT values below 0.85 or 0.90 are considered indicative of sufficient discriminant validity, depending on the research context (Henseler et al., 2016).

Table 1. Variables Definition and Measurements

Variable	Indicator	Description	Source	Reference
Dependent Variable				
QRIS Adoption (AQ)	Frequency of QRIS usage, preference for QRIS, and QRIS recommendations.	This variable is measured using three main indicators: (1) Frequency of QRIS usage in daily transactions, (2) Preference for QRIS compared to other cashless payment methods, and (3) Likelihood of recommending QRIS to others. Responses are measured on a 5-point Likert scale, from strongly disagree to strongly agree.	Primary Survey Data	(Davis, 1989)
Independent Variables				
Infrastructure (Infra)	Availability of infrastructure and resources that facilitate QRIS usage.	This variable includes the following indicators: (1) Stable internet access to support QRIS, (2) Availability of smartphones among users, (3) Affordable internet costs, and (4) Ability to use QRIS at any time. Responses are measured on a 5-point Likert scale, from strongly disagree to strongly agree.	Primary Survey Data	(Farzin et al., 2021; Hamzah Muchtar et al., 2024; Rahim et al., 2023; Venkatesh et al., 2003)
Information Access (Acs_Info)	Social Influence	Includes the following indicators: (1) Important people encourage QRIS usage, (2) Family and friends support QRIS usage, and (3) QRIS is recommended by bank staff or advertisements. Responses are measured on a 5-point Likert scale, from strongly disagree to strongly agree.	Primary Survey Data	(Farzin et al., 2021; Hamzah Muchtar et al., 2024; Rahim et al., 2023; Venkatesh et al., 2003)
	Hedonic Motivation	Includes statements about how using QRIS feels enjoyable due to social support. Responses are measured on a 5-point Likert scale, from strongly disagree to strongly agree.		(Farzin et al., 2021)
Perception (Percep)	Performance Expectancy	Includes the following statements: (1) QRIS helps transactions be completed faster, (2) QRIS is useful in daily life, and (3) QRIS can be accessed anytime. Responses are measured on a 5-point Likert scale, from strongly disagree to strongly agree.	Primary Survey Data	(Davis, 1989; Farzin et al., 2021; Hamzah Muchtar et al., 2024; Rahim et al., 2023; Venkatesh et al., 2012)
	Effort Expectancy	Includes the following statements: (1) Learning to use QRIS is easy, (2) The platform is easy to understand, and (3) Using QRIS does not require much effort. Responses are measured on a 5-point Likert scale, from strongly disagree to strongly agree.		(Farzin et al., 2021; Hamzah Muchtar et al., 2024; Rahim et al., 2023)
	Habit	Includes the following statements: (1) QRIS is used routinely, (2) Using QRIS has become a habit, and (3) QRIS is chosen as the primary payment method. Responses are measured on a 5-point Likert scale, from strongly disagree to strongly agree.		(Farzin et al., 2021)
Financial Literacy (LK)	Understanding of financial products, budgeting skills, and confidence.	Includes the following statements: (1) Understanding of financial products (savings, investments, loans), (2) Ability to manage monthly budgets, (3) Ease of understanding QRIS through tutorials, (4) Digital financial knowledge encourages QRIS usage, (5) Financial literacy provides comfort, and (6) Financial literacy boosts confidence in using QRIS. Responses are measured on a 5-point Likert scale, from strongly disagree to strongly agree.	Primary Survey Data	(Affandi et al., 2024; Fernandes et al., 2014; Hasan et al., 2023)
Control Variable				
Demographics (Dem)	Gender, education, age, occupation, monthly expenditure.	This variable includes respondent characteristics such as gender, age, education level, occupation type, and average monthly expenditure.	Primary Survey Data	(Trinugroho et al., 2017)

FINDINGS

Respondent Profile

The respondent profile reflects a diverse demographic composition (see Table 2). Gender distribution is balanced, with 50.24% male and 49.76% female respondents. In terms of education, the majority hold undergraduate degrees (56.83%), followed by senior high school graduates (27.32%), diploma holders (7.80%), and graduate degree holders (7.07%), while less than 1% have limited educational backgrounds, such as no schooling or elementary and junior high education. Age distribution shows a predominance of Generation Z (48.29%), followed by Generation Y (41.22%), and Generation X (10.49%), indicating a youthful sample. Monthly spending varies, with 32.44% spending less than Rp. 1,000,000, 20% spending Rp. 1,000,000–Rp. 2,000,000, 19.51% spending Rp. 2,000,000–Rp. 4,000,000, 10.49% spending Rp. 4,000,000–Rp. 6,000,000, and 17.56% spending more than Rp. 6,000,000, reflecting diverse economic capacities.

Table 2. Respondent Profile

Demographic Respondent	N	(%)
Gender		
Male	204	49.76
Female	206	50.24
Education		
No School	1	0.24
Elementary School	2	0.49
Junior High School	1	0.24
Senior High School	112	27.32
Diploma	32	7.80
Undergraduate	233	56.83
Graduate	29	7.07
Age (Years)		
Gen Z (< 27 years old)	198	48.29
Gen Y (27 – 42 years old)	169	41.22
Gen X (43 – 58 years old)	43	10.49
Monthly Spending		
< Rp. 1.000.000	133	32.44
Rp. 1.000.000 – Rp. 2.000.000	82	20
Rp. 2.000.000 – Rp. 4.000.000	80	19.51
Rp. 4.000.000 – Rp. 6.000.000	43	10.49
> Rp. 6.000.000	72	17.56

Source: Author's Calculation, 2025

Measurement Model Evaluation

The measurement model evaluation (see Table 3) provides robust evidence of the reliability and validity of the constructs employed in our study. Indicator loadings across all constructs exceed the recommended threshold of 0.70, signifying strong relationships between the indicators and their respective latent variables. The constructs demonstrate adequate convergent validity, as evidenced by AVE values surpassing the threshold of 0.50, ranging from 0.653 for Infrastructure to 0.973 for QRIS Adoption, indicating that a substantial portion of the variance in the indicators is explained by their corresponding constructs. Additionally, the internal consistency of the constructs is well-supported, with Cronbach's Alpha and Composite Reliability values consistently above 0.70. Notably, QRIS Adoption exhibits exceptionally high reliability (Cronbach's Alpha = 0.986; Composite Reliability = 0.994), while Financial Literacy (Cronbach's Alpha = 0.907; Composite Reliability = 0.911) and Perception (Cronbach's Alpha = 0.935; Composite Reliability = 0.940) also demonstrate excellent reliability.

Furthermore, for the discriminant validity is confirmed through HTMT (Heterotrait-Monotrait) ratios, which are all below the conservative threshold of 0.85 or 0.90. This indicates that the constructs are distinct from one another. For instance, the HTMT value between QRIS Adoption and Access to Information is 0.571, while the value between Infrastructure and Access to Information is 0.663. Notably, stronger relationships are observed between certain constructs, such as Perception and

Financial Literacy (HTMT = 0.856), compared to others. These findings validate that the constructs are well-differentiated yet interconnected in meaningful ways. Overall, the measurement model demonstrates excellent reliability, convergent validity, and discriminant validity, establishing a robust foundation for structural model analysis and hypothesis testing.

Table 3. Measurement Model Evaluation

Construct	Loading	AVE	Cronbach's Alpha	CR	HTMT
QRIS Adoption (AQ)		0.973	0.986	0.994	
AQ1	0.987				
AQ2	0.991				
AQ3	0.982				
Infrastructure (Infra)		0.653	0.823	0.826	
Infra1	0.805				
Infra2	0.825				
Infra3	0.824				
Infra4	0.779				
Access to Information (Acs_Info)		0.671	0.836	0.842	
MH	0.812				
PS1	0.826				
PS2	0.865				
PS3	0.770				
Perception (Percep)		0.660	0.935	0.940	
EP1	0.805				
EP2	0.868				
EP3	0.715				
EU1	0.842				
EU2	0.828				
EU3	0.773				
HB1	0.830				
HB2	0.825				
HB3	0.816				
Financial Literacy (LK)		0.687	0.907	0.911	
LK1	0.759				
LK2	0.731				
LK3	0.854				
LK4	0.865				
LK5	0.886				
LK6	0.865				
AQ ↔ Acs_Info					0.571
Infra ↔ Acs_Info					0.663
Infra ↔ AQ					0.611
LK ↔ Acs_Info					0.797
LK ↔ AQ					0.547
LK ↔ Infra					0.715
Percep ↔ Acs_Info					0.818
Percep ↔ AQ					0.581
Percep ↔ Infra					0.742
Percep ↔ LK					0.856

Source: Author's Calculation, 2025

Structural Model Evaluation

Table 4 and Figure 1, show the structural model evaluation. Access to Information (Acs_Info) positively and significantly impacts QRIS adoption in both models (Coefficient = 0.170, T-Statistic = 2.564 at 5%; Coefficient = 0.109, T-Statistic = 2.465 at 5%), indicating that better access to information facilitates adoption. Infrastructure (Infra) also demonstrates a strong positive effect in the first model (Coefficient = 0.294, T-Statistic = 4.457 at 1%), though its influence weakens in the second model but remains significant (Coefficient = 0.078, T-Statistic = 1.652 at 10%). Similarly, Perception (Percep) significantly

promotes adoption, as shown in the first model (Coefficient = 0.209, T-Statistic = 2.334 at 5%) and remains significant in the second model (Coefficient = 0.090, T-Statistic = 1.648 at 10%). Age and Education are critical demographic predictors; Age exhibits a significant negative relationship (Coefficient = -0.191, T-Statistic = 6.134 at 1%), highlighting that younger individuals are more likely to adopt QRIS, while Education has the strongest positive effect (Coefficient = 0.616, T-Statistic = 14.813 at 1%), suggesting that higher educational attainment significantly enhances QRIS adoption likelihood.

Table 4. Structural Model Evaluation

Variable	Path Coefficient			
	Coefficient	T-Statistic	Coefficient	T-Statistic
Acs_Info → AQ	0.170	2.564**	0.109	2.465**
Infra → AQ	0.294	4.457***	0.078	1.652*
LK → AQ	0.055	0.609	0.003	0.059
Percep → AQ	0.209	2.334**	0.090	1.648*
Age → AQ			-0.191	6.134***
Education → AQ			0.616	14.813***
Gender Male → AQ			0.089	1.614
Monthly Spending → AQ			0.052	1.483

Notes: * Significant at 10%; ** 5%; *** 1%
Source: Author's Calculation, 2025

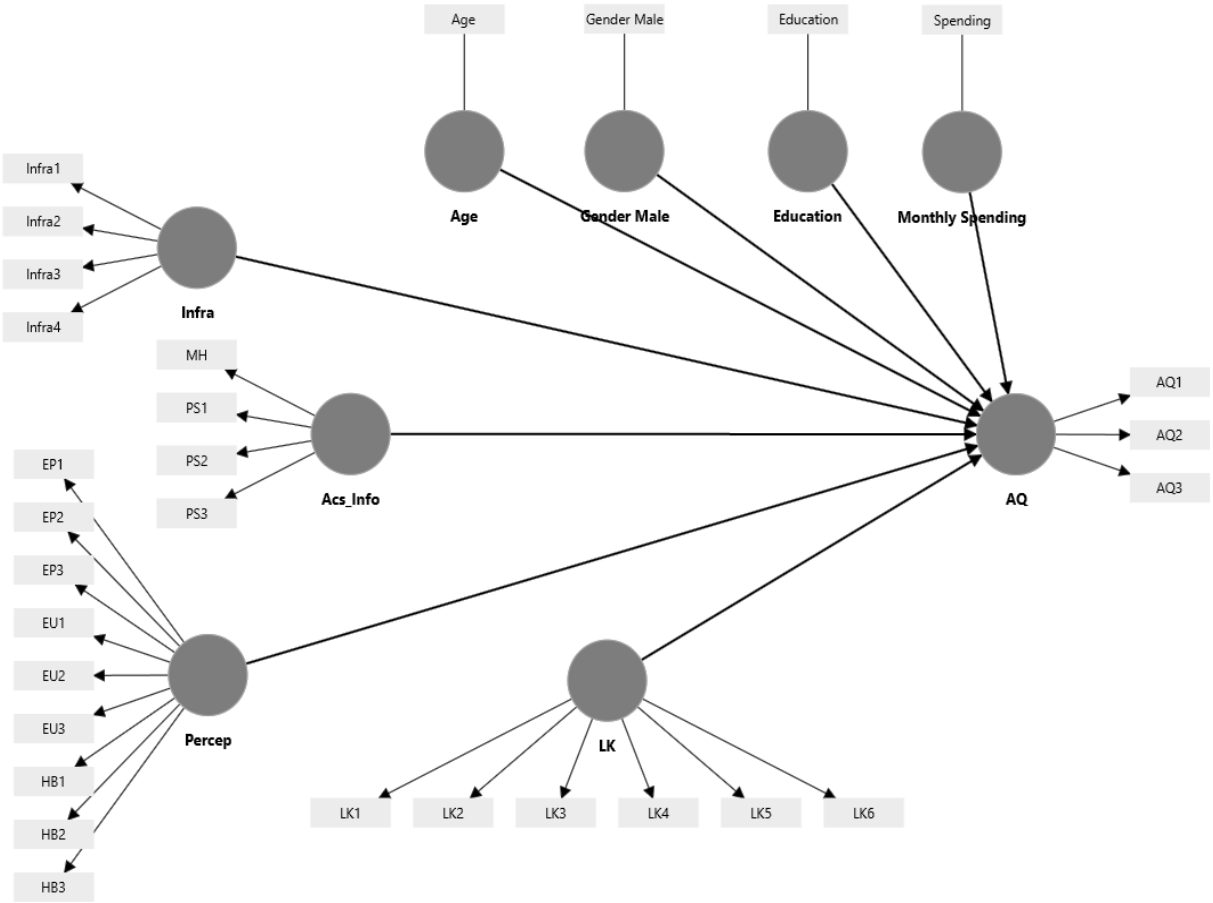

Figure 1. Structural Equation Model
Source: Author's Calculation, 2025

Conversely, Financial Literacy (LK) does not have a significant direct impact on QRIS adoption, as reflected by low and insignificant path coefficients in both models (Coefficient = 0.055, T-Statistic = 0.609; Coefficient = 0.003, T-Statistic = 0.059). Similarly, Gender (Male) and Monthly Spending are

non-significant predictors, with T-Statistics of 1.614 and 1.483, respectively, indicating no notable influence on adoption.

DISCUSSION

The findings highlight that QRIS adoption in rural West Sulawesi is significantly influenced by access to information, infrastructure availability, user perceptions, age, and education, whereas financial literacy, gender, and monthly spending do not exhibit a direct effect. These results reflect broader challenges and opportunities in fostering digital payment adoption in rural areas, where infrastructural and social factors often take precedence over individual financial knowledge.

Access to information plays a pivotal role in QRIS adoption by bridging knowledge gaps and fostering trust. Consumers often lack sufficient awareness of the benefits and functionality of digital payment systems. This aligns with studies suggesting that targeted campaigns emphasizing the ease, security, and cost-effectiveness of QRIS can enhance user trust and engagement (Jocevski et al., 2020; Song et al., 2023). In rural contexts, word-of-mouth and community influence hold considerable sway, making the involvement of local leaders or influencers a particularly effective strategy for communicating QRIS's advantages.

Infrastructure availability is a critical enabler of QRIS adoption, as it provides the foundation for seamless use of digital payment systems. In rural West Sulawesi, the positive influence of infrastructure on adoption underscores the importance of reliable internet connectivity and access to compatible devices. While some limitations in ICT infrastructure persist, the presence of stable internet access and affordable smartphones in many areas facilitates the transition from cash-based to digital payment systems. These infrastructural elements reduce barriers and enhance usability, enabling users to adopt QRIS more readily. This finding aligns with evidence that well-developed infrastructure not only supports adoption but also fosters trust and reliance on digital payment platforms (Zhou et al., 2019). Continued investment in telecommunications networks and affordable technology access will further amplify this positive impact, making QRIS even more accessible and attractive to rural consumers.

User perceptions in our study, which consist of performance expectancy, effort expectancy, and habit, significantly influence QRIS adoption. Performance expectancy reflects the extent to which users perceive QRIS as a tool that can facilitate faster financial transactions, prove useful in daily life, and provide seamless access anytime and anywhere. These perceptions resonate with prior studies (Farzin et al., 2021; Hamzah Muchtar et al., 2024; Rahim et al., 2023) emphasizing the importance of recognizing tangible benefits in promoting digital payment adoption. Effort expectancy, the perception that QRIS is easy to learn, understand, and use with minimal effort, further reinforces user confidence. When consumers find a system intuitive and straightforward, it reduces hesitation and encourages regular usage. Similarly, habit, characterized by the integration of QRIS into routine transactions due to its perceived benefits and convenience, plays a critical role in sustaining adoption over time. Consumers who view QRIS as a reliable and effortless payment method are more likely to use it consistently and recommend it within their communities. These elements collectively highlight why user perceptions are pivotal in fostering QRIS adoption in rural West Sulawesi. Designing systems that meet performance and effort expectations, while supporting the formation of positive transactional habits, creates a virtuous cycle of adoption. Furthermore, these findings align with prior research showing that perceptions of ease, usefulness, and habit formation are strong predictors of digital payment behavior (Affandi et al., 2024; Rahim et al., 2023). To sustain and expand QRIS adoption, policymakers and stakeholders should focus on enhancing these perceptions through targeted campaigns, system improvements, and user education.

While financial literacy is often viewed as a key factor in digital payment adoption, its role in rural West Sulawesi is less pronounced. Instead, infrastructural readiness, social influence, and positive user perceptions serve as the dominant drivers. Stable internet access, affordable data costs, and widespread smartphone availability allow even individuals with limited financial literacy to adopt QRIS effectively. These infrastructural factors lower barriers to entry, making the technology accessible to a broader population (Zhou et al., 2019). Social influence and information access further amplify adoption rates.

In rural areas, social influence from family, friends, community leaders, and trusted institutions like banks likely plays a significant role in encouraging QRIS adoption, even when individuals may not have a detailed understanding of its financial benefits (Nurqamarani et al., 2024). These findings align with studies emphasizing the role of social networks and clear communication in driving digital payment adoption (Jocevski et al., 2020; Song et al., 2023). Perceptions of QRIS as easy to use, convenient, and beneficial are pivotal in sustaining adoption. Even those with limited financial literacy can recognize tangible benefits, such as faster transactions, greater accessibility, and minimal effort required to use the system. Over time, these positive perceptions often lead to the integration of QRIS into daily habits, reinforcing its use. This mirrors prior research showing that perceived ease of use and usefulness are strong predictor (Pal et al., 2015; Zhong & Moon, 2022).

In the context of rural West Sulawesi, where financial literacy levels remain lower than in urban areas, practical enablers such as infrastructure, social influence, and user-friendly systems outweigh the importance of financial knowledge. According to the 2024 National Survey on Financial Literacy and Inclusion (SNLIK) conducted by Indonesia's Financial Services Authority (OJK) and Statistics Indonesia (BPS) indicates that, despite national improvements, financial literacy and inclusion disparities persist between urban and rural areas. Nationally, the financial literacy index stands at 65.43%, with the financial inclusion index at 75.02%. Urban resident exhibit higher indices (69.71% literacy and 78.41% inclusion) compared to rural residents (59.25% literacy and 70.13% inclusion). This highlights the need to focus on creating practical solutions and enabling environments that encourage adoption, rather than solely emphasizing individual financial education.

Demographic factors further contextualize these findings. The influence of age suggests that younger consumers, such as Generation Z and Millennials, are more inclined to adopt QRIS due to their familiarity with technology and preference for digital solutions. Education also plays a strong role, with higher educational attainment correlating with greater adoption rates. This underscores the importance of formal and informal education initiatives focused on improving digital literacy to empower rural consumers and enhance adoption.

CONCLUSION

The findings of our study underscore that QRIS adoption in rural West Sulawesi is primarily influenced by access to information, infrastructure availability, user perceptions, age, and education, whereas financial literacy, gender, and monthly spending do not have a direct effect. These results reveal that in rural contexts, practical enablers such as infrastructure readiness, social influence, and user-friendly systems are more critical than financial knowledge in fostering digital payment adoption. The significant role of user perceptions, particularly regarding ease of use, usefulness, and habit formation, further emphasizes the importance of designing intuitive systems and promoting awareness about QRIS's tangible benefits.

From a policy perspective, targeted interventions are necessary to address these findings and drive broader QRIS adoption. First, enhancing access to information through localized campaigns is essential. Policymakers and stakeholders should leverage community leaders, influencers, and trusted institutions to disseminate information about QRIS's advantages, such as convenience, security, and cost-effectiveness. This strategy would address knowledge gaps while building trust within the community. Second, strengthening infrastructure remains a priority. Investments in telecommunications networks to improve internet connectivity are critical to reducing technological barriers. Third, fostering positive user perceptions should be a central focus. Educational initiatives, hands-on demonstrations, and trust-building measures, such as showcasing QRIS's compliance with regulatory standards, can mitigate concerns about complexity and security. Emphasizing how QRIS simplifies financial transactions in daily life can encourage integration into routine habits. Additionally, efforts should focus on empowering younger generations and those with higher educational attainment to act as digital payment ambassadors within their communities. Formal and informal education programs designed to improve digital literacy will not only benefit individuals but also contribute to the broader goal of financial inclusion. Finally, recognizing the persistent gap in financial literacy and inclusion between urban and rural areas, as highlighted by the 2024 National Survey on Financial Literacy and Inclusion,

policymakers should adopt a holistic approach that combines infrastructure improvement, social influence, and practical digital payment education. By addressing these multifaceted challenges, stakeholders can create an enabling environment that promotes QRIS adoption, enhances financial inclusion, and reduces disparities between urban and rural regions in Indonesia.

Our study has some limitations, first, we use a cross-sectional approach, capturing data at a single point in time. This limits the ability to assess long-term trends or changes in user behavior regarding QRIS adoption. Second, in measuring the impact of financial literacy on QRIS adoption, as the approach used relies solely on a survey-based method without incorporating pre-test and post-test evaluations. Therefore, future research is recommended to employ a longitudinal approach to assess the effectiveness of financial education initiatives in enhancing QRIS adoption over time. Moreover, conducting longitudinal data can help track changes in QRIS adoption over time, assessing whether improvements in infrastructure, financial literacy, or digital campaigns lead to increased adoption rates.

CONFLICT OF INTEREST STATEMENT

The authors declare no potential conflict of interest was reported by the author.

REFERENCES

Afeti, E. Y., & Owusu, A. (2022). Impact of Mobile Payments on Micro-Business Activities: A Developing Country Experience: Impact of Mobile Payments. In *Digital Innovations, Business and Society in Africa: New Frontiers and a Shared Strategic Vision* (pp. 75–95). Springer. https://doi.org/10.1007/978-3-030-77987-0_4

Affandi, Y., Ridhwan, M. M., Trinugroho, I., & Adiwibowo, D. H. (2024). Digital Adoption, Business Performance, and Financial Literacy in Ultra-Micro, Micro, and Small Enterprises in Indonesia. *Research in International Business and Finance*, *70*(B), 102376. https://doi.org/10.1016/j.ribaf.2024.102376

ANTARA. (2021). *BI Promotes Use of QRIS in Sulawesi's BBI, BWI Movement*. ANTARA. https://en.antaranews.com/news/185874/bi-promotes-use-of-qris-in-sulawesis-bbi-bwi-movement

Asosiasi Sistem Pembayaran Indonesia (ASPI). (2024). *Berita Statistik Sistem Pembayaran Indonesia Triwulan IV – 2023*. https://aspi-indonesia.or.id/buletin-statistik-aspi-triwulan-iv-2023/

Asrani, C., & Kar, A. K. (2022). Diffusion and Adoption of Digital Communications Services in India. *Information Technology for Development*, *28*(3), 488–510. https://doi.org/10.1080/02681102.2022.2046536

Badan Pusat Statistik (BPS). (2024). *Jumlah Penduduk Menurut Provinsi di Indonesia (Ribu Jiwa), 2024*. https://sulut.bps.go.id/id/statistics-table/2/OTU4IzI%3D/jumlah-penduduk-menurut-provinsi-di-indonesia.html

Baptista, G., & Oliveira, T. (2015). Understanding Mobile Banking: The Unified Theory of Acceptance and Use of Technology Combined with Cultural Moderators. *Computers in Human Behavior*, *50*, 418–430. https://doi.org/10.1016/j.chb.2015.04.024

Beck, T., Pamuk, H., Ramrattan, R., & Uras, B. R. (2018). Payment Instruments, Finance and Development. *Journal of Development Economics*, *133*, 162–186. https://doi.org/10.1016/j.jdeveco.2018.01.005

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

East Ventures. (2023). *Data Acts as the Best "Policy Intelligence Device": Akmal Malik, Acting Governor of West Sulawesi*. East Ventures. https://east.vc/leadership/akmal-malik/

Evans, O. (2018). Connecting the Poor: The Internet, Mobile Phones and Financial Inclusion in Africa. *Digital Policy, Regulation and Governance*, *20*(6), 568–581. https://doi.org/10.1108/DPRG-04-2018-0018

Fahad, & Shahid, M. (2022). Exploring the Determinants of Adoption of Unified Payment Interface (UPI) in India: A Study Based on Diffusion of Innovation Theory. *Digital Business*, *2*(2), 100040. https://doi.org/10.1016/j.digbus.2022.100040

Farzin, M., Sadeghi, M., Kharkeshi, F. Y., Ruholahpur, H., & Fattahi, M. (2021). Extending UTAUT2 in M-Banking Adoption and Actual Use Behavior: Does WOM Communication Matter? *Asian Journal of Economics and Banking*, *5*(2), 136–157. https://doi.org/10.1108/AJEB-10-2020-0085

Fernandes, D., Jr, J. G. L., & Netemeyer, R. G. (2014). Financial Literacy, Financial Education, and Downstream Financial Behaviors. *Management Science*, *60*(8), 1861–1883. https://doi.org/10.1287/mnsc.2013.1849

Fontes, T., Costa, V., Ferreira, M. C., Shengxiao, L., Zhao, P., & Dias, T. G. (2017). Mobile Payments Adoption in Public Transport. *Transportation Research Procedia*, *24*, 410–417. https://doi.org/10.1016/j.trpro.2017.05.093

Ghouse, S. M., Shekhar, R., & Chaudhary, M. (2025). Driving Financial Inclusion: Exploring Mobile Wallet Adoption among Rural Omani Millennials. *Journal of Islamic Marketing*, *16*(4), 1229–1257. https://doi.org/10.1108/JIMA-02-2024-0073

Gupta, M., Gupta, D., & Rai, P. (2023). Digital Payment Systems and Financial Inclusion: Examine How Digital Payment Systems, Such as Mobile Wallets and Digital Currencies, Can Improve Financial Inclusion by Providing Access to Banking Services for the Unbanked and Underbanked Population. *International Conference on Computing and Communication Networks*, 725–737. https://doi.org/10.1007/978-981-97-0892-5_57

Hair, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: Updated Guidelines on Which Method to Use. *International Journal of Multivariate Data Analysis*, *1*(2), 107–123. https://doi.org/10.1504/IJMDA.2017.087624

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a Silver Bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152. https://doi.org/10.2753/MTP1069-6679190202

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to Use and How to Report the Results of PLS-SEM. *European Business Review*, *31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Hamzah Muchtar, E., Trianto, B., Maulana, I., Alim, M. N., Marasabessy, R. H., Hidayat, W., Junaedi, E., & Masrizal. (2024). Quick Response Code Indonesia Standard (QRIS) E-Payment Adoption: Customers Perspective. *Cogent Business & Management*, *11*(1), 2316044. https://doi.org/10.1080/23311975.2024.2316044

Hasan, M., Noor, T., Gao, J., Usman, M., & Abedin, M. Z. (2023). Rural Consumers' Financial Literacy and Access to FinTech Services. *Journal of the Knowledge Economy*, *14*(2), 780–804. https://doi.org/10.1007/s13132-022-00936-9

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS Path Modeling in New Technology Research: Updated Guidelines. *Industrial Management & Data System*, *116*(1), 2–20. https://doi.org/10.1108/imds-09-2015-0382

IntiMedia. (2024). Internet User Penetration in Rural and Urban Areas of Indonesia in 2024. *Intimedia.Id*. https://intimedia.id/read/internet-user-penetration-in-rural-and-urban-areas-of-indonesia-in-2024

Jamilatuzzahro, & Alaudin, F. G. (2024). *Leveraging Digital Technology for Greater Inclusion in Indonesia*. Equitas FEB UGM. https://equitas.feb.ugm.ac.id/2024/11/18/leveraging-digital-technology-for-greater-inclusion-in-indonesia/

Jocevski, M., Ghezzi, A., & Arvidsson, N. (2020). Exploring the Growth Challenge of Mobile Payment Platforms: A Business Model Perspective. *Electronic Commerce Research and Applications*, *40*, 100908. https://doi.org/10.1016/j.elerap.2019.100908

Kemp, S. (2024). *Digital 2024: Indonesia*. DataReportal. https://datareportal.com/reports/digital-2024-indonesia

Lenka, S. K., & Barik, R. (2018). Has Expansion of Mobile Phone and Internet Use Spurred Financial Inclusion in the SAARC Countries? *Financial Innovation*, *4*(1), 1–19. https://doi.org/10.1186/s40854-018-0089-x

León, C. (2021). The Adoption of a Mobile Payment System: The User Perspective. *Latin American Journal of Central Banking*, *2*(4), 100042. https://doi.org/10.1016/j.latcb.2021.100042

Manrai, R., Goel, U., & Yadav, P. D. (2021). Factors Affecting Adoption of Digital Payments by Semi-Rural Indian Women: Extension of UTAUT-2 with Self-Determination Theory and Perceived Credibility. *Aslib Journal of Information Management*, *73*(6), 814–838.

https://doi.org/10.1108/AJIM-12-2020-0396

Memon, M. A., Ting, H., Cheah, J.-H., Thurasamy, R., Chuah, F., & Cham, T. H. (2020). Sample Size fro Survey Research: Review and Recommendations. *Journal of Applied Structural Equation Modeling*, *4*(2), 1–20. https://doi.org/10.47263/jasem.4(2)01

Nurqamarani, A. S., Fadilla, S., & Juliana, A. (2024). Revolutionizing Payment Systems: The Integration of TRAM and Trust in QRIS Adoption for Micro, Small, and Medium Enterprises in Indonesia. *Journal of Information Systems Engineering & Business Intelligence*, *10*(3), 314–327. https://doi.org/10.20473/jisebi.10.3.314-327

Pal, D., Vanijja, V., & Papasratorn, B. (2015). An Empirical Analysis towards the Adoption of NFC Mobile Payment System by the End User. *Procedia Computer Science*, *69*, 13–25. https://doi.org/10.1016/j.procs.2015.10.002

Paramita, E. D., & Cahyadi, E. R. (2024). The Determinants of Behavioral Intention and Use Behavior of QRIS as Digital Payment Method Using Extended UTAUT Model. *Journal of Business and Entrepreneurship (IJBE)*, *10*(1), 132. https://doi.org/10.17358/ijbe.10.1.132

Pradhan, R. P., Arvin, M. B., Nair, M. S., Hall, J. H., & Bennett, S. E. (2021). Sustainable Economic Development in India: The Dynamics between Financial Inclusion, ICT Development, and Economic Growth. *Technological Forecasting and Social Change*, *169*, 120758. https://doi.org/10.1016/j.techfore.2021.120758

Rahim, N. @ F., Bakri, M. H., Fianto, B. A., Zainal, N., & Hussein Al Shami, S. A. (2023). Measurement and Structural Modelling on Factors of Islamic Fintech Adoption among Millennials in Malaysia. *Journal of Islamic Marketing*, *14*(6), 1463–1487. https://doi.org/10.1108/JIMA-09-2020-0279

Rahman, M., Ismail, I., & Bahri, S. (2020). Analysing Consumer Adoption of Cashless Payment in Malaysia. *Digital Business*, *1*(1), 100004. https://doi.org/10.1016/j.digbus.2021.100004

Sahi, A. M., Khalid, H., Abbas, A. F., & Khatib, S. F. A. (2021). The Evolving Research of Customer Adoption of Digital Payment: Learning from Content and Statistical Analysis of the Literature. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(4), 230. https://doi.org/10.3390/joitmc7040230

Sahu, G. P., & Singh, N. K. (2018). Identifying Critical Success Factor (CSFs) for the Adoption of Digital Payment Systems: A Study of Indian National Banks. In *Emerging Markets from a Multidisciplinary Perspective: Challenges, Opportunities and Research Agenda* (pp. 61–73). Springer. https://doi.org/10.1007/978-3-319-75013-2_6

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2014). PLS-SEM: Looking Back and Moving Forward. *Long Range Planning*, *47*(3), 132–137. https://doi.org/10.1016/j.lrp.2014.02.008

Seldal, M. N., & Nyhus, E. K. (2022). Financial Vulnerability, Financial Literacy, and the Use of Digital Payment Technologies. *Journal of Consumer Policy*, *45*(2), 281–306. https://doi.org/10.1007/s10603-022-09512-9

Song, K., Wu, P., & Zou, S. (2023). The Adoption and Use of Mobile Payment: Determinants and Relationship with Bank Access. *China Economic Review*, *77*, 101907. https://doi.org/10.1016/j.chieco.2022.101907

Trinugroho, I., Sawitri, H. S. R., Toro, M. J. S., Khoiriyah, S., & Santoso, A. B. (2017). How Ready Are People for Cashless Society? *Jurnal Keuangan Dan Perbankan*, *21*(1), 105–112. https://doi.org/10.26905/jkdp.v21i1.1231

Ullah, S., Kiani, U. S., Raza, B., & Mustafa, A. (2022). Consumers' Intention to Adopt M-Payment/M-Banking: The Role of Their Financial Skills and Digital Literacy. *Frontiers in Psychology*, *33*, 873708. https://doi.org/10.3389/fpsyg.2022.873708

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, *27*(3), 425–478. https://doi.org/10.2307/30036540

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, *36*(1), 157–178. https://doi.org/10.2307/41410412

Zhong, Y., & Moon, H.-C. (2022). Investigating Customer Behavior of Using Contactless Payment in China: A Comparative Study of Facial Recognition Payment and Mobile QR-Code Payment. *Sustainability*, *14*(12), 7150. https://doi.org/10.3390/su14127150

Zhou, Q., Gao, P., & Chimhowu, A. (2019). ICTs in the Transformation of Rural Enterprises in China: A Multi-Layer Perspective. *Technological Forecasting and Social Change*, *145*, 12–23. https://doi.org/10.1016/j.techfore.2019.04.026