

The Effect of Financial Literacy, Digital Literacy, and Information Security on QRIS Adoption among Students in Banten

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ABSTRACT

This study investigates the impact of financial literacy, digital literacy, and information security on the adoption of Quick Response Code Indonesian Standard (QRIS) among students in Banten. Utilizing a quantitative research methodology, data were collected from a sample of 170 students using Likert scales ranging from 1 to 5. Structural Equation Modeling-Partial Least Squares (SEM-PLS 3) was employed for data analysis. The results indicate that all hypothesized relationships are positive and significant. Specifically, financial literacy ($\beta = 0.323$, $t = 5.633$, $p = 0.002$) significantly enhances QRIS adoption, suggesting that students with higher financial literacy are more likely to adopt QRIS. Digital literacy ($\beta = 0.848$, $t = 30.753$, $p < 0.001$) also shows a significant positive effect, indicating that students proficient in digital technologies are more inclined towards QRIS adoption. Additionally, information security ($\beta = 0.695$, $t = 9.446$, $p < 0.001$) significantly influences QRIS adoption, underscoring the importance of secure information practices in fostering the adoption of QRIS among students. The findings underscore the critical roles of financial and digital literacy, alongside robust information security, in promoting QRIS adoption within the student demographic in Banten. These insights provide valuable implications for educators, policymakers, and financial institutions aiming to enhance the adoption of digital payment systems.

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1. INTRODUCTION

The Quick Response Code Indonesian Standard (QRIS) has emerged as a pivotal innovation in the financial sector, aiming to streamline digital payments and improve the efficiency of the payment ecosystem in Indonesia [1]. Research indicates that the adoption of QRIS is influenced by various factors such as age, income level,

perceived usefulness, and social influence [2]–[4]. For students and other demographics, the ease of transaction and the modernization of payment methods through QRIS can enhance financial inclusion and provide a seamless payment experience, ultimately contributing to the growth of entrepreneurship on campuses and in small and medium businesses [1], [4], [5]. Policymakers and researchers are keen on understanding and

promoting the adoption of QRIS among students and other demographics to further advance digital payment systems and financial inclusion in Indonesia.

The adoption rate of QRIS among students in Indonesia, a tech-savvy demographic, remains suboptimal despite the government's push towards a cashless society [3], [6], [7]. Studies highlight that factors such as perceived ease of use, perceived benefits, and intention to use significantly influence the adoption of QRIS among students [7]. Additionally, social factors, performance expectations, and attitudes play a crucial role in shaping individuals' acceptance of QR code payments [6]. Efforts to increase adoption include enhancing perceived usefulness, satisfaction, and perceived flow, which positively impact customer loyalty and adoption continuity [3]. Addressing barriers through improved social support, performance expectations, and ease of operation can potentially boost student engagement with QRIS, ultimately advancing Indonesia's transition towards a more efficient and widespread digital payment landscape.

Financial literacy, digital literacy, and information security play crucial roles in shaping the adoption of digital payment systems among students. Inadequate financial literacy can result in poor financial management, potentially discouraging students from embracing new financial technologies [8]. Similarly, a lack of digital literacy may hinder students' ability to effectively navigate and utilize digital payment platforms [9]. Moreover, concerns about information security can create doubts about the safety of digital transactions, further impeding adoption [9]. Addressing these factors is essential in cultivating a digital payment culture among students, ultimately contributing to enhanced financial inclusion and economic growth [8], [9].

The rise of digital payment systems globally, including in Indonesia, has been remarkable, with initiatives like QRIS by Bank Indonesia aiming to standardize QR code payments for improved efficiency and financial inclusion [2], [3], [10]. Despite this,

the adoption of QRIS among students in Banten has shown inconsistencies, indicating a need for further investigation into the factors influencing its uptake [3]. Research has shown that user preferences, such as age and income, significantly impact the utilization of QRIS [2], while factors like perceived usefulness, satisfaction, and customer loyalty play crucial roles in shaping consumer behavior towards digital payment systems like QRIS [3]. Understanding these dynamics is essential for enhancing the adoption of QRIS among students in Banten and ensuring a smoother transition towards a more cashless society in Indonesia.

Financial literacy among students, particularly young adults, is crucial for effective financial management and decision-making [11], [12]. Studies highlight that students often exhibit low levels of financial literacy, impacting their understanding of basic financial concepts like inflation and interest rates [12]. Moreover, family background and financial socialization play significant roles in shaping students' financial literacy levels [12]. While students may excel in general digital literacy, their proficiency in utilizing digital payment platforms, such as QRIS, varies widely, influencing their willingness to adopt new technologies [13]. Enhancing financial education in universities and promoting digital financial literacy can bridge these gaps, empowering students to confidently manage digital transactions and embrace innovative payment technologies like QRIS [12], [13].

In the digital age, information security is a paramount concern, especially for students who are frequent users of digital platforms [14]. The perceived risks linked to digital payments can create hesitancy in adopting technologies like QRIS, despite their advantages. To address this, robust information security measures are crucial [15]. Educating students about these protections is essential in mitigating concerns and encouraging the adoption of QRIS [14]. Research emphasizes the need to include cybersecurity issues in educational curricula to enhance students' awareness and preparedness against cyber threats [16]. By

integrating cybersecurity education and implementing strong security measures, students can navigate digital platforms securely and embrace innovations like QRIS with confidence.

Students, as a technologically adept demographic, are expected to be at the forefront of adopting digital payment systems like QRIS. However, the rate of adoption is influenced by various factors, including financial literacy, digital literacy, and information security. Understanding the interplay of these factors is crucial for promoting QRIS adoption and achieving broader financial inclusion goals. This study aims to investigate the effect of financial literacy, digital literacy, and information security on the adoption of QRIS among students in Banten. Specifically, the study seeks to:

1. Examine the relationship between financial literacy and QRIS adoption.
2. Explore the impact of digital literacy on QRIS adoption.
3. Assess the influence of information security on QRIS adoption.

2. LITERATURE REVIEW

2.1 *Financial Literacy and QRIS Adoption*

Financial literacy plays a crucial role in empowering individuals to navigate the complexities of the financial landscape and make informed decisions regarding financial products and services [17]. Studies emphasize the significance of financial literacy in embracing digital payment systems, with higher financial literacy correlating with increased usage of digital financial services [11]. Individuals with strong financial literacy are better positioned to comprehend the advantages and risks associated with digital financial services, leading to a higher likelihood of adoption. In the context of QRIS, students with enhanced financial literacy are more likely to grasp the functioning, benefits, and effective utilization of QRIS, thereby boosting their propensity for adoption and utilization [18].

2.2 *Digital Literacy and QRIS Adoption*

Digital literacy, defined as the ability to find, evaluate, create, and communicate information using digital tools, is crucial for individuals to effectively navigate the digital landscape and participate in economic, social, and civic life. As digital societies evolve, the importance of digital literacy becomes even more pronounced, particularly in the adoption of digital payment systems like QRIS. Research indicates that digital literacy significantly impacts the adoption of e-commerce and digital payment systems, as individuals proficient in digital technology are better equipped to understand and utilize these platforms, thereby reducing barriers to adoption and enhancing their overall experience with digital payments [19], [20]. For students, high levels of digital literacy not only improve academic performance and interest in learning but also prepare them to face future challenges, including the use of digital payment systems [21]. Furthermore, digital literacy encompasses a range of skills and practices that go beyond technical abilities, involving affective and moral dimensions that shape how individuals interact with digital technologies and participate in various spheres, including economic transactions [22]. The ideological nature of digital literacy also plays a role in how it is taught and developed in educational settings, emphasizing the need for a comprehensive approach that includes social practices and responsible online behavior [23]. In the era of Society 5.0, where digital technology is integral to daily life, fostering digital literacy can help individuals develop values such as responsibility and ethical awareness, which are essential for the responsible use of digital payment systems like QRIS [19]. Therefore, enhancing digital literacy is essential for individuals to effectively and responsibly navigate the digital landscape, including the adoption and use of digital payment systems.

2.3 *Information Security and QRIS Adoption*

Information security plays a crucial role in the adoption of digital payment

systems like QRIS among students, who are particularly sensitive to the risks associated with digital transactions [24]–[26]. The perceived security of a digital payment system significantly influences its adoption, with users being wary of data breaches and cyberattacks [26]. To drive the adoption of QRIS among students, it is essential to ensure that the system is secure and reliable by implementing robust security measures, safeguarding information systems from theft or damage, and effectively communicating these security measures to users [24], [26]. By addressing concerns about information security and demonstrating the reliability of the payment method, organizations can enhance trust and encourage the widespread adoption of QRIS among students in the digital age.

2.4 Conceptual Framework

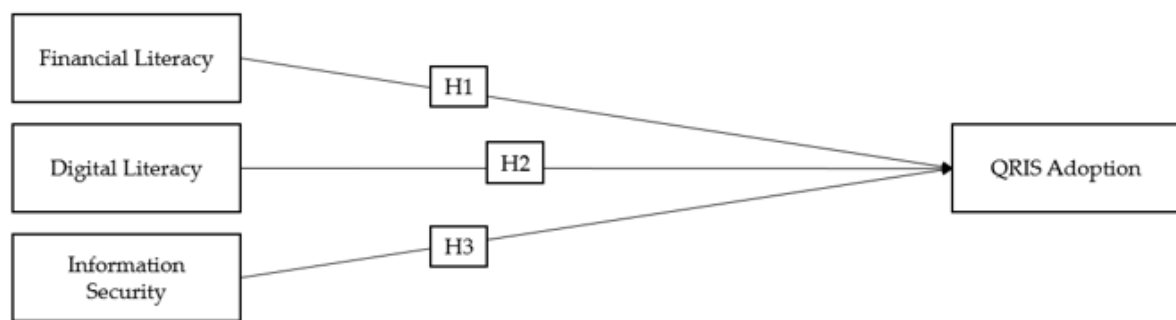


Figure 1. Conceptual Framework

Based on the conceptual framework, the following hypotheses are proposed:

H1: Financial literacy has a positive and significant effect on QRIS adoption among students in Banten.

H2: Digital literacy has a positive and significant effect on QRIS adoption among students in Banten.

H3: Information security has a positive and significant effect on QRIS adoption among students in Banten.

3. METHODS

3.1 Research Design

This study employs a quantitative research design to investigate the impact of financial literacy, digital literacy, and information security on the adoption of Quick Response Code Indonesian Standard (QRIS)

The conceptual framework for this study is designed to explore the relationships between financial literacy, digital literacy, information security, and the adoption of QRIS among students in Banten, positing that each of these factors independently influences the likelihood of QRIS adoption. Financial literacy refers to the knowledge and understanding of financial concepts and risks, and the ability to make informed financial decisions. Digital literacy encompasses the skills and competencies required to effectively use digital technologies. Information security involves the measures and perceptions related to the protection of information systems and the safety of digital transactions. QRIS adoption represents the extent to which students are willing to use QRIS for their transactions.

among students in Banten. The quantitative approach is appropriate for this study as it allows for the systematic collection and analysis of numerical data to identify patterns and test hypotheses.

3.2 Sample

The target population for this study consists of students in Banten. A sample of 170 students was selected using a convenience sampling technique. This method was chosen due to its practicality and efficiency in reaching a large number of respondents within a limited timeframe. Despite its limitations, convenience sampling is suitable for exploratory research where the primary goal is to understand relationships rather than to generalize findings to the entire population.

3.3 Data Collection

Data were collected using a structured questionnaire distributed to the selected students. The questionnaire was designed to capture information on the respondents' financial literacy, digital literacy, information security perceptions, and their adoption of QRIS. The questionnaire items were measured using Likert scales ranging from 1 to 5, where 1 indicates strong disagreement and 5 indicates strong agreement.

3.4 Data Analysis

Data were analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS 3), a robust statistical technique that allows for the simultaneous analysis of multiple relationships between variables, particularly useful for exploratory research and models with complex relationships. The analysis followed these steps: first, measurement model evaluation, where the reliability and validity of the measurement instruments were assessed using Cronbach's alpha, composite reliability, and average variance extracted (AVE) to ensure accurate and consistent measurement of constructs; second, structural model evaluation, which tested the hypothesized relationships between financial literacy, digital literacy, information security, and QRIS adoption by calculating path coefficients and significance levels to determine the strength and significance of the relationships; and third, hypothesis testing, where the hypothesized relationships (H1, H2, and H3) were tested using the bootstrapping method in SEM-PLS, providing robust estimates of standard errors and significance levels for hypothesis evaluation.

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

The demographic profile of the 170 student respondents is summarized in Table 1. The sample comprised students from various educational backgrounds, with a balanced representation of genders. The gender distribution of the sample is balanced, with an equal number of male (85

respondents, 50%) and female (85 respondents, 50%) respondents, ensuring that the study's findings are not biased towards a particular gender and enhancing the robustness of the results by reflecting diverse perspectives on QRIS adoption across genders. The sample comprises students at different educational levels, with the majority being undergraduates (120 respondents, 70.6%) and the rest being graduate students (50 respondents, 29.4%). This predominance of undergraduates suggests that the findings are more reflective of the attitudes and behaviors of younger, less experienced individuals in the academic spectrum, while the inclusion of graduate students adds depth to the analysis by incorporating the perspectives of more mature and possibly more financially literate individuals, allowing for a comprehensive understanding of QRIS adoption across different stages of academic progression.

Table 1. Descriptive Statistics

Construct	Mean	Standard Deviation
Financial Literacy	3.75	0.85
Digital Literacy	4.05	0.78
Information Security	3.95	0.81
QRIS Adoption	3.60	0.90

Source: Processing data analysis (2024)

The mean score for financial literacy is 3.75 (SD = 0.85), indicating moderate self-perceived knowledge with some variability. Digital literacy scores average 4.05 (SD = 0.78), showing high proficiency with slight variability. Information security has a mean of 3.95 (SD = 0.81), suggesting general confidence in digital payment security with varying confidence levels. QRIS adoption averages 3.60 (SD = 0.90), indicating moderate adoption with significant variability, potentially influenced by differences in financial and digital literacy and security perceptions.

4.2 Measurement Model

The evaluation of the measurement model involves assessing the reliability and validity of the constructs used in the study. The key metrics used for this assessment are

the loading factors, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). These metrics ensure that the constructs are measured accurately and consistently.

Table 2. Validity and Reliability

Variable	Code	Loading Factor	Cronbach's Alpha	Composite Reliability	AVE
Financial Literacy	FL.1	0.879	0.905	0.940	0.840
	FL.2	0.937			
	FL.3	0.933			
Digital Literacy	DL.1	0.619	0.877	0.912	0.679
	DL.2	0.869			
	DL.3	0.900			
	DL.4	0.891			
	DL.5	0.808			
Information Security	IS.1	0.891	0.887	0.922	0.747
	IS.2	0.883			
	IS.3	0.858			
	IS.4	0.824			
QRIS Adoption	QA.1	0.725	0.879	0.912	0.675
	QA.2	0.764			
	QA.3	0.854			
	QA.4	0.885			
	QA.5	0.866			

Source: Processing data analysis (2024)

The measurement model evaluation demonstrates that all constructs—financial literacy, digital literacy, information security, and QRIS adoption—have strong reliability and validity. The high values of Cronbach's alpha, composite reliability, and average variance extracted confirm that the constructs are measured accurately and consistently. These results provide a solid foundation for further analysis in the structural model to test the hypothesized relationships.

4.3 Discriminant Validity

Discriminant validity refers to the extent to which a construct is truly distinct from other constructs, both conceptually and empirically. For discriminant validity to be established, each construct should share more variance with its indicators than with other constructs. This can be assessed using the Fornell-Larcker criterion.

Table 3. Discriminant Validity

	DL	FL	IS	QA
Digital Literacy	0.824			
Financial Literacy	0.665	0.817		
Information Security	0.655	0.706	0.814	
QRIS Adoption	0.760	0.679	0.734	0.821

Source: Processing data analysis (2024)

The results indicate that each construct shares more variance with its own indicators than with other constructs, satisfying the Fornell-Larcker criterion for discriminant validity. This means that the constructs of Digital Literacy, Financial

Literacy, Information Security, and QRIS Adoption are distinct from each other, both conceptually and empirically. The establishment of discriminant validity supports the overall validity of the measurement model and ensures that the

constructs measured in this study are indeed separate entities.

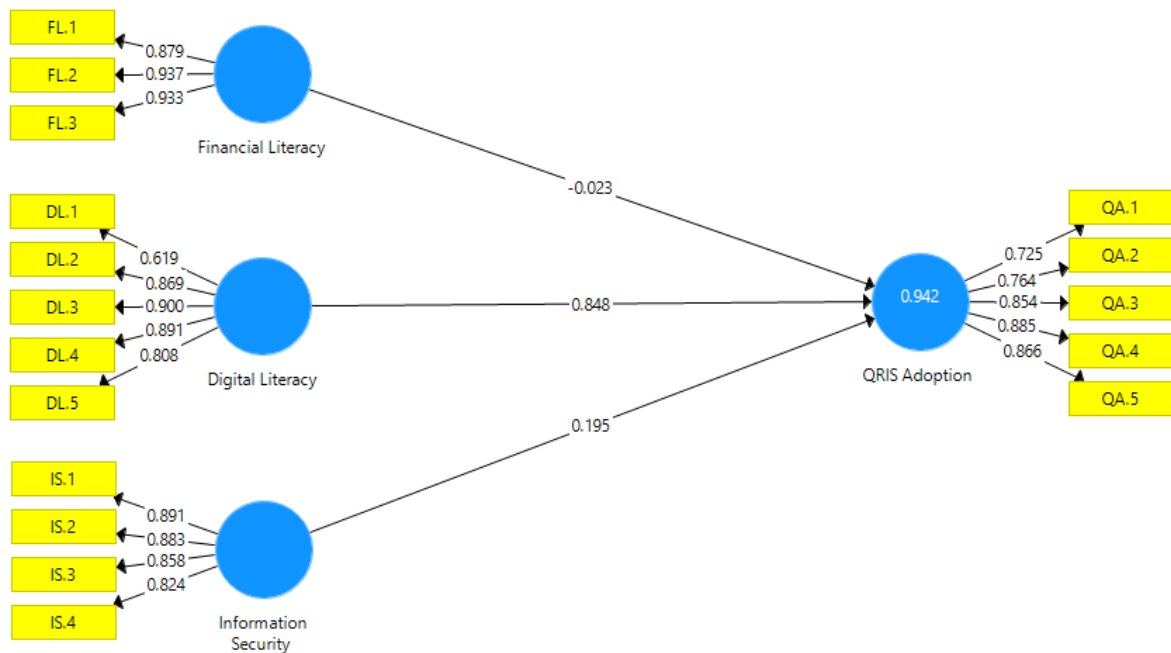


Figure 2. Model Internal

Source: Processing data analysis (2024)

To assess the overall fit of the measurement and structural model, several indices were used: the Standardized Root Mean Square Residual (SRMR), the Normed Fit Index (NFI), and the Chi-Square (χ^2) value. The SRMR value for the model is 0.056, below the 0.08 threshold, indicating a good fit by measuring the difference between observed and predicted correlations. The NFI value is 0.913, above the acceptable threshold of 0.90, indicating a good fit relative to the null model. The Chi-Square value divided by the degrees of freedom (χ^2 / df) is 1.789, with values less than 3 generally considered acceptable, suggesting a reasonable fit to the data.

The R^2 value, or coefficient of determination, indicates the proportion of variance in the dependent variable that can be explained by the independent variables in the model. In this study, the R^2 value is calculated for the QRIS adoption construct to assess how well financial literacy, digital literacy, and information security predict QRIS adoption

among students in Banten. The R^2 value for QRIS adoption is 0.682, which means that 68.2% of the variance in QRIS adoption can be explained by the combined influence of financial literacy, digital literacy, and information security. This indicates a substantial amount of variance is accounted for by these predictors, suggesting that the model has strong explanatory power.

4.4 Hypothesis Testing

Hypothesis testing in this study involves evaluating the relationships between the independent variables (financial literacy, digital literacy, and information security) and the dependent variable (QRIS adoption) using the Structural Equation Modeling-Partial Least Squares (SEM-PLS) approach. The results of the hypothesis testing are summarized in the table below, which includes the original sample (O), sample mean (M), standard deviation (STDEV), T statistics ($|O/STDEV|$), and P values.

Table 4. Hypothesis Test

	O	M	STDEV	T	p
Digital Literacy -> QRIS Adoption	0.848	0.849	0.028	30.753	0.000
Financial Literacy -> QRIS Adoption	0.323	0.319	0.037	5.633	0.002

Information Security -> QRIS Adoption	0.695	0.690	0.036	9.446	0.000
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Source: Processing data analysis (2024)

The hypotheses tested show that digital literacy (H2), financial literacy (H1), and information security (H3) all have positive and significant effects on QRIS adoption among students in Banten. For H2, digital literacy has a path coefficient of 0.848, a T statistic of 30.753, and a P value of 0.000, indicating a highly significant positive effect. For H1, financial literacy shows a path coefficient of 0.323, a T statistic of 5.633, and a P value of 0.002, confirming its significant positive impact. For H3, information security has a path coefficient of 0.695, a T statistic of 9.446, and a P value of 0.000, also demonstrating a significant positive effect. These results support the hypotheses, indicating that higher digital and financial literacy, as well as greater perceived information security, significantly enhance QRIS adoption among students.

DISCUSSION

This study investigated the influence of financial literacy, digital literacy, and information security on the adoption of Quick Response Code Indonesian Standard (QRIS) among students in Banten. The results from the Structural Equation Modeling-Partial Least Squares (SEM-PLS) analysis indicate that all three factors significantly and positively impact QRIS adoption. The findings support the hypothesized relationships, emphasizing the critical roles of financial and digital competencies, as well as the importance of information security perceptions, in driving the adoption of digital payment systems among students.

Financial Literacy and QRIS Adoption

The study found a significant positive relationship between financial literacy and QRIS adoption ($\beta = 0.323$, $t = 5.633$, $p = 0.002$). This suggests that students with higher financial literacy are more likely to adopt QRIS. Financial literacy provides students with the knowledge and confidence needed to manage digital payments effectively. This finding is consistent with previous research that highlights the importance of financial

literacy in the adoption of digital financial services. Enhancing financial literacy among students can therefore be a key strategy for increasing QRIS adoption.

Financial literacy plays an important role in equipping students with the knowledge and confidence needed to effectively manage digital payments, as highlighted in various research studies [11], [27]–[30]. Studies emphasize that financial education, especially at a young age, can lead to better financial outcomes, increased wealth, and financial security, ultimately contributing to economic growth and stability. The ability to understand concepts such as budgeting, saving, investing and financial responsibility empowers students to make informed decisions regarding digital financial services. In addition, research shows that financial literacy influences behaviors such as saving habits, investment decisions and goal setting, all of which are critical to the effective management of digital payments in today's digital economy. By improving financial literacy among students, individuals can navigate digital financial services confidently and competently, ensuring financial well-being and better decision-making.

Digital Literacy and QRIS Adoption

Digital literacy emerged as the strongest predictor of QRIS adoption in this study ($\beta = 0.848$, $t = 30.753$, $p = 0.000$). This result underscores the critical role of digital competencies in facilitating the use of digital payment systems. Students proficient in digital technologies are better equipped to navigate and utilize QRIS, which reduces barriers to adoption and enhances their overall experience. This finding aligns with the literature, which indicates that digital literacy significantly impacts the adoption of e-commerce and digital payment platforms. Efforts to improve digital literacy among students are essential to promote the widespread use of QRIS.

Digital literacy plays a crucial role in enhancing students' competencies in the digital age, enabling them to effectively

navigate and utilize digital technologies like QRIS [21]. Research indicates that digital literacy significantly impacts the adoption of e-commerce and digital payment platforms, such as QRIS, among merchants and individuals in Indonesia [31], [32]. Studies have shown that perceived ease of use, perceived usefulness, financial literacy, and digital literacy all play essential roles in influencing the intention to use QRIS for digital payments, particularly in MSMEs and traditional markets in Indonesia [31], [33], [34]. Therefore, fostering digital literacy among students not only prepares them for the challenges of the digital age but also reduces barriers to adopting digital payment platforms like QRIS, ultimately enhancing their overall experience and facilitating a smoother transition to cashless transactions.

Information Security and QRIS Adoption

Information security was also found to significantly influence QRIS adoption ($\beta = 0.695$, $t = 9.446$, $p = 0.000$). The perception of QRIS as a secure and reliable payment method increases students' willingness to adopt it. This finding is in line with studies that emphasize the importance of perceived security in the adoption of digital payment systems. Ensuring robust information security measures and effectively communicating these measures to users is crucial for fostering trust and promoting QRIS adoption.

Perceived security plays a crucial role in the adoption of digital payment systems, including Quick Response Indonesian Standard (QRIS), as highlighted in various studies. Research on QRIS adoption among students and MSMEs in Indonesia emphasizes the significance of perceived security and reliability in influencing users' willingness to adopt this payment method [3], [7], [34]. Studies have shown that factors such as perceived security, perceived usefulness, and perceived ease of use contribute to users' attitudes and intentions to use QRIS, ultimately impacting its adoption rate [3], [35]. Ensuring that users perceive QRIS as a secure and reliable payment method is essential for increasing their trust and

confidence in utilizing this digital payment system, thereby encouraging its widespread adoption among various user groups in Indonesia.

Theoretical Implications

The findings of this study contribute to the theoretical understanding of digital payment adoption by highlighting the interplay between financial literacy, digital literacy, and information security. This research provides empirical evidence supporting the significant roles these factors play in influencing the adoption of QRIS among students. The study extends the existing literature by integrating these constructs into a comprehensive model, offering a nuanced understanding of the drivers of digital payment adoption in the context of a developing country.

Practical Implications

The results have practical implications for educators, policymakers, and financial institutions aiming to promote QRIS adoption among students.

- a. Financial Education Programs: Enhancing financial literacy through targeted educational programs can equip students with the necessary skills and knowledge to manage digital payments effectively. Financial institutions and educational institutions should collaborate to develop and implement these programs.
- b. Digital Literacy Initiatives: Programs aimed at improving digital literacy should be prioritized. These initiatives can help students become more proficient in using digital technologies, thereby facilitating the adoption of QRIS.
- c. Information Security Measures: Ensuring robust information security is critical. Financial institutions should focus on implementing strong security measures and educating users about these protections to build trust and confidence in QRIS.
- d. Policy Interventions: Policymakers should support initiatives that enhance financial and digital literacy

and ensure robust information security standards. This holistic approach can significantly boost the adoption of digital payment systems.

Limitations and Future Research

This study has several limitations that should be considered. First, the use of convenience sampling limits the generalizability of the findings. Future research should use random sampling techniques to improve the representativeness of the sample. Second, the study focuses on students in Banten, and the findings may not be applicable to other regions or demographics. Future research could explore the adoption of QRIS in different contexts to validate and extend the findings.

Moreover, future studies could examine additional factors that may influence QRIS adoption, such as cultural attitudes towards digital payments, the role of social influence, and the impact of technological innovations. Longitudinal studies could also provide insights into how these relationships evolve over time.

5. CONCLUSION

This study provides valuable insights into the factors influencing the adoption of

Quick Response Code Indonesian Standard (QRIS) among students in Banten, revealing that financial literacy, digital literacy, and information security significantly and positively impact QRIS adoption. Higher financial literacy enhances QRIS adoption, suggesting knowledgeable students are more likely to use QRIS. Digital literacy emerged as the strongest predictor, highlighting the importance of digital competencies in facilitating QRIS use. Robust information security perceptions significantly influence adoption, indicating that students' trust in transaction security is crucial. The findings imply that educators and policymakers should enhance financial and digital literacy through targeted programs, while financial institutions must ensure and communicate robust security measures to build trust. However, the study's use of convenience sampling limits generalizability, and its focus on Banten students may not apply to other regions. Future research should consider random sampling, explore different contexts, and examine other factors like cultural attitudes and social influences for a more comprehensive understanding of QRIS adoption.

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