



The Role of Islamic Financial Literacy in Moderating the Relationship between QRIS and Financial Inclusion

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ABSTRACT

This study investigates the relationship between the effectiveness and efficiency of the Quick Response Code Indonesian Standard (QRIS) and financial inclusion, with Islamic financial literacy serving as a moderating variable. Employing a quantitative approach, data were collected from university students and analyzed using moderated regression analysis to evaluate both direct and interaction effects. The findings indicated that QRIS effectiveness and efficiency exert a positive and significant influence on financial inclusion. Furthermore, Islamic financial literacy enhances the relationship between QRIS utilization and financial inclusion, suggesting that higher literacy levels amplify the inclusive benefits of integrating digital payment systems within an Islamic financial framework. These results highlight the importance of integrating digital payment innovation with Islamic financial literacy programs to promote inclusive and sustainable financial ecosystems. Additionally, Islamic financial literacy moderates the relationship between QRIS effectiveness and financial inclusion, but does not influence the association between QRIS efficiency and financial inclusion. Overall, students' understanding of Islamic finance strengthens the impact of QRIS effectiveness in promoting financial inclusion.

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INTRODUCTION

The advancement of information and communication technology has significantly transformed human life, including the financial sector. One major innovation in digital payment systems is the Quick Response Code Indonesian Standard (QRIS), introduced by Bank Indonesia as the national QR code standard to enhance transaction efficiency, speed, and security (Salim & Nopiansyah, 2023). Beyond simplifying transactions, QRIS also aims to broaden financial inclusion, especially among underserved communities. According to data from the Indonesian Payment System Association (ASPI), as of March 2024, Central Java ranked fourth among provinces with the most QRIS merchants, totaling 3.198 million, highlighting significant digital adoption. Nationally, the number of QRIS users skyrocketed from 15 million in 2022 to 51 million by mid-2024. Financial inclusion is a strategic priority for the Indonesian government, aimed at fostering inclusive economic growth. The Financial Services Authority (OJK) defines financial inclusion as equitable and quality access to financial services for all societal groups (OJK, 2024). University students are a key target segment in this effort.

Islamic finance, based on principles such as the prohibition of *riba* (interest), *gharar* (uncertainty), and *maysir* (gambling), is gaining popularity among the Muslim population, including students. Integrating QRIS with Islamic financial services provides an innovative approach to enhancing inclusion in accordance with Islamic values. OJK data revealed a gap between financial literacy and inclusion, especially in the Islamic sector. Islamic financial literacy stands at 39.11%, well below the mainstream rate of 65.08%. Similarly, Islamic financial inclusion is only 12.88%, compared to 73.55% for mainstream services. This underscores the urgent need to enhance literacy as a foundation for broader inclusion. This study examines the impact of QRIS effectiveness and efficiency as independent variables on financial inclusion, with Islamic financial literacy as a moderating variable. Effectiveness is measured by how QRIS expands access to Islamic financial services, while efficiency focuses on transaction convenience, speed, and cost. Islamic literacy is crucial in enabling students to utilize QRIS effectively.

Previous studies have demonstrated that the effectiveness of the Quick Response Code Indonesian Standard (QRIS) has a stronger influence on financial inclusion than its efficiency (Tri Hayunda et al., 2023). Meanwhile, challenges such as limited user capability and lack of

education remain obstacles (Aman et al., 2023). However, no study has specifically investigated the moderating role of Islamic financial literacy in this relationship. Therefore, this study focuses on students as potential agents of change. Financial inclusion has become a central agenda in global and national development strategies, particularly in emerging economies where access to formal financial services remains uneven. The rapid advancement of digital financial technologies is widely recognized as a key driver in expanding financial inclusion by reducing transaction costs, improving accessibility, and enhancing efficiency. In Indonesia, the introduction of QRIS represents a major policy initiative to accelerate digital payments and foster a more inclusive financial ecosystem. By standardizing QR-based payment systems across financial institutions and merchants, QRIS is expected to simplify transactions and promote broader participation in the formal financial system.

Despite its promising potential, the actual contribution of QRIS to financial inclusion, especially within specific demographic groups, remains an open empirical question. While QRIS adoption has increased significantly in recent years, its effectiveness in translating technological access into meaningful financial inclusion outcomes remains uneven. This gap between technological availability and inclusive impact highlights a critical research problem: digital payment systems alone may not be sufficient to enhance financial inclusion without complementary user capabilities and financial understanding. In the context of Islamic finance, this issue becomes more complex and nuanced. Indonesia, as the country with the largest Muslim population in the world, has a dual financial system where Islamic and conventional financial services coexist. Islamic financial inclusion does not merely refer to access to financial services, but also to aligning financial behavior with Sharia principles. Consequently, the adoption of digital payment systems such as QRIS among Muslim users is influenced not only by technological factors but also by their understanding of Islamic financial concepts, values, and compliance mechanisms.

Existing studies on financial inclusion and digital payments largely emphasize technological determinants such as perceived usefulness, ease of use, system reliability, and transaction efficiency. While these factors are essential, prior research has predominantly examined financial literacy from a conventional perspective, often overlooking the distinct role of Islamic financial literacy. Islamic financial literacy encompasses knowledge of Sharia-compliant financial products, contracts, ethical principles, and prohibitions, which may

significantly shape user attitudes and behaviors toward digital financial services. The limited integration of Islamic financial literacy into empirical models of digital financial inclusion represents a substantial gap in the literature. Moreover, empirical evidence on QRIS remains fragmented and largely descriptive. Many studies focus on adoption intention, user satisfaction, or general usage patterns, without rigorously examining how QRIS effectiveness and efficiency influence financial inclusion outcomes. Even fewer studies investigate moderating mechanisms that explain why QRIS adoption leads to higher inclusion for some users but not for others. This lack of explanatory depth limits the theoretical and practical understanding of how digital payment systems can be optimized to achieve inclusive objectives, particularly within Islamic financial contexts.

University students constitute a strategically important population for examining this issue. As digital natives, students are among the most active users of digital payment systems and represent the future drivers of financial behavior and innovation. At the same time, variations in financial literacy, especially Islamic financial literacy among students, can lead to heterogeneous outcomes in financial inclusion. Islamic universities, therefore, provide a relevant and underexplored setting to analyze how digital payment systems interact with religiously grounded financial knowledge. Against this background, this study addresses a critical research question to what extent do the effectiveness and efficiency of QRIS contribute to Islamic financial inclusion and how does Islamic financial literacy shape this relationship? By positioning Islamic financial literacy as a moderating variable, this research moves beyond the dominant linear models of technology adoption and inclusion. It recognizes that the impact of digital financial infrastructure depends not only on system performance but also on users' cognitive and normative frameworks.

The novelty of this study lies in three key aspects. First, it extends the financial inclusion literature by integrating Islamic financial literacy as a moderating construct, rather than treating literacy as a direct or background variable. This approach provides a more nuanced explanation of how and why digital payment systems influence inclusive financial behavior within an Islamic framework. Second, the study offers empirical evidence on QRIS effectiveness and efficiency as dual dimensions of digital payment performance, addressing a gap in prior research that often treats QRIS as a single, undifferentiated construct. Third, by focusing on students at an Islamic university, this research provides context-specific insights

highly relevant to policymakers and financial institutions seeking to promote inclusive digital finance among young Muslim populations.

From a theoretical perspective, this study contributes to the Theory of Planned Behavior, the Technology Acceptance Model, and the Diffusion of Innovation Theory by incorporating user knowledge grounded in religious finance as a key moderating factor. It demonstrates that perceived usefulness and efficiency alone are insufficient to fully explain financial inclusion outcomes without considering users' literacy and value-based understanding. In practice, the findings are expected to inform strategies for integrating digital payment innovations with Islamic financial education to enhance sustainable and inclusive financial ecosystems. Accordingly, this study seeks to examine the impact of QRIS effectiveness and efficiency on financial inclusion and to analyze the moderating role of Islamic financial literacy in this relationship. By addressing these issues, the research aims to bridge the gap between digital financial innovation and inclusive outcomes, offering both theoretical enrichment and practical implications for the development of Islamic digital finance in Indonesia and other emerging markets.

METHOD, DATA, AND ANALYSIS

This study adopted a field research approach, collecting primary data through direct interaction with respondents (Kurniaty, 2021). Using a quantitative approach, the research collected numerical data, which was subsequently analyzed. Using specific statistical methods to explain the studied phenomenon. The study was conducted at Universitas Islam Negeri K.H. Abdurrahman Wahid Pekalongan, specifically focusing on students who use QRIS as a payment system. The study was planned to be conducted in 2025. The population included all university students who use QRIS, and the sample was selected using an incidental sampling technique, in which individuals are randomly chosen during encounters with the researcher based on set criteria. Since the population size is unknown, the Cochran formula is used to determine the appropriate sample size, yielding 97 respondents with a 10% margin of error.

The research variables included independent variables (X_1 = effectiveness of QRIS, X_2 = efficiency of QRIS), a dependent variable (Y = Islamic financial inclusion), and a moderating variable (M = Islamic financial literacy). Each variable was operationally defined based on relevant theoretical frameworks, including the Theory of Planned Behavior (Ajzen), the

Diffusion of Innovation (Rogers), and Social Cognitive Theory (Bandura), and indicators are measured on a Likert scale. This study used both primary and secondary data sources. Primary data was collected through a questionnaire distributed to students of UIN K.H. Abdurrahman Wahid Pekalongan who utilize QRIS for payments. The questionnaire was developed based on each variable's indicators and uses a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." Secondary data were collected from books, scientific journals, articles, and relevant websites to support the theoretical framework and analysis. The data collection techniques included the use of questionnaires as the main instrument and documentation as a supporting method to gather information from valid written sources.

The collected data was analyzed through several stages. First, instrument testing was conducted to ensure validity and reliability; an item is considered valid if the correlation coefficient exceeds the critical r-value and reliable if Cronbach's Alpha exceeds 0.6 (Sugiyono, 2013). Second, classical assumption tests were performed, including the normality test (Jarque-Bera), the linearity test (Ramsey RESET), the multicollinearity test ($VIF < 10$ and correlation < 0.8), and the heteroscedasticity test (Breusch-Pagan-Godfrey), to confirm that the regression model meets standard statistical assumptions. Third, hypothesis testing was conducted using the t-test to assess the partial effect and the F-test to assess the simultaneous effect of the independent variables on the dependent variable.

The main analysis used multiple linear regression to evaluate the relationship between QRIS effectiveness and efficiency and Islamic financial inclusion using the equation: $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \epsilon$. Furthermore, to examine the moderating role of Islamic financial literacy, the study used Moderated Regression Analysis (MRA) with the equation: $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3M + \beta_4(X_1 \times M) + \beta_5(X_2 \times M) + \epsilon$. MRA was used to determine whether Islamic financial literacy strengthens or weakens the relationship between QRIS and financial inclusion. The use of multiple linear regression allows the study to capture the independent contribution of QRIS effectiveness and efficiency to Islamic financial inclusion while controlling for other factors in the model. QRIS effectiveness reflects the extent to which the system facilitates accessibility, convenience, and reliability of digital payment services, whereas QRIS efficiency relates to transaction speed, cost reduction, and operational simplicity. By estimating the coefficients β_1 and β_2 , the model provides empirical evidence on whether improvements in QRIS performance significantly enhance Islamic financial inclusion.

This approach also enables the identification of which QRIS dimension plays a more dominant role in expanding access to Islamic financial services.

Furthermore, the application of Moderated Regression Analysis (MRA) strengthens the analytical framework by incorporating Islamic financial literacy as a moderating variable. Islamic financial literacy is expected to influence how users perceive and utilize QRIS in accordance with Islamic financial principles. The interaction terms in the MRA model reveal whether higher levels of Islamic financial literacy amplify or weaken the impact of QRIS effectiveness and efficiency on financial inclusion. A positive and significant interaction coefficient indicates that Islamic financial literacy enhances the role of QRIS in promoting inclusion, while a negative coefficient suggests a weakening effect. Thus, the MRA approach provides deeper insight into the conditional relationship between digital payment systems and Islamic financial inclusion, emphasizing the importance of financial literacy in achieving inclusive and sustainable Islamic financial development.

RESULT AND DISCUSSION

Table 1. Table of Validity Test Results

Variabel	Item	r_Calculated	r_table	Description
(X1) QRIS Effectiveness	X1_1	0.842201	0.1996	Valid
	X1_2	0.819094	0.1996	Valid
	X1_3	0.708459	0.1996	Valid
	X1_4	0.769357	0.1996	Valid
(X2) QRIS Efficiency	X2_1	0.721356	0.1996	Valid
	X2_2	0.755211	0.1996	Valid
	X2_3	0.777444	0.1996	Valid
	X2_4	0.739250	0.1996	Valid
(Y) Financial Inclusion	Y1	0.646279	0.1996	Valid
	Y2	0.763226	0.1996	Valid
	Y3	0.834880	0.1996	Valid
	Y4	0.692102	0.1996	Valid
(M) Islamic Financial Literacy	M1	0.854012	0.1996	Valid
	M2	0.861999	0.1996	Valid
	M3	0.892398	0.1996	Valid
	M4	0.785105	0.1996	Valid

Source: Primary data processed in 2025

Table 1 presents the results of the validity test for all research variables, including QRIS effectiveness (X1), QRIS efficiency (X2), financial inclusion (Y), and Islamic financial literacy (M). The results showed that all measurement items have calculated correlation coefficients

($r_{\text{calculated}}$) exceeding the critical r -table value of 0.1996. Specifically, the $r_{\text{calculated}}$ values for QRIS effectiveness range from 0.708 to 0.842, while those for QRIS efficiency range from 0.721 to 0.777. Similarly, the indicators of financial inclusion and Islamic financial literacy demonstrated strong correlation values, with $r_{\text{calculated}}$ scores consistently above the required threshold. These findings indicate that each item accurately measures its respective construct.

Furthermore, the consistently high $r_{\text{calculated}}$ values across all variables suggested that the measurement instruments used in this study possess strong construct validity. This implies that the questionnaire items are well-aligned with the theoretical dimensions of QRIS effectiveness, QRIS efficiency, financial inclusion, and Islamic financial literacy. Consequently, all indicators are deemed valid and suitable for further statistical analysis, including regression and moderation testing. The robustness of the validity results enhances the credibility of the empirical findings and ensures that subsequent analyses are based on reliable and conceptually sound measurement instruments.

Table 2. Table of Reliability Test Results

Variabel	Cronbach Alpha	Standar Reability	Description
X1	2,8345	0,60	Reliability
X2	2,4048	0,60	Reliability
Y	2,6101	0,60	Reliability
M	4,6701	0,60	Reliability

Source: Primary data processed in 2025

Table 2 indicates that each variable (X1, X2, Y, and M) has a Cronbach's Alpha value greater than the reliability standard of 0.60, demonstrating that all variables in this study are highly reliable for measuring data consistency.

Normality Test

To test validity, the Jarque-Bera test was used. The criterion is that residuals are considered normally distributed if the p -value (Prob) is greater than 0.05 and not normal if the p -value (Prob) is less than 0.05 (Sugiyono, 2012).

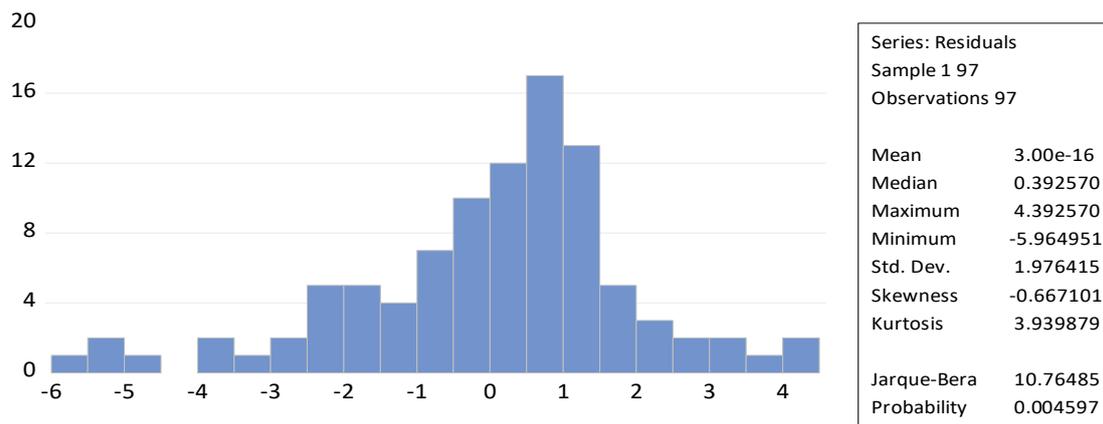


Figure 1. Normality Test Chart

Source: Primary data processed in 2025

Figure 1 presents the results of the normality test using the Jarque–Bera statistic to examine the distribution of the research data. The test yields a Jarque–Bera value of 10.76485 with a p-value of 0.004597, which is lower than the conventional significance level of 0.05. These results indicate that the null hypothesis of normality is rejected, suggesting that the model residuals do not follow a normal distribution. Although the normality assumption is not met, this condition does not necessarily invalidate the regression analysis, particularly in studies with sufficiently large sample sizes. According to the central limit theorem, parameter estimates in regression models remain consistent and reliable even when the normality assumption is violated. Moreover, this study focuses on hypothesis testing and the relationships among variables rather than strict distributional properties, allowing the analysis to proceed.

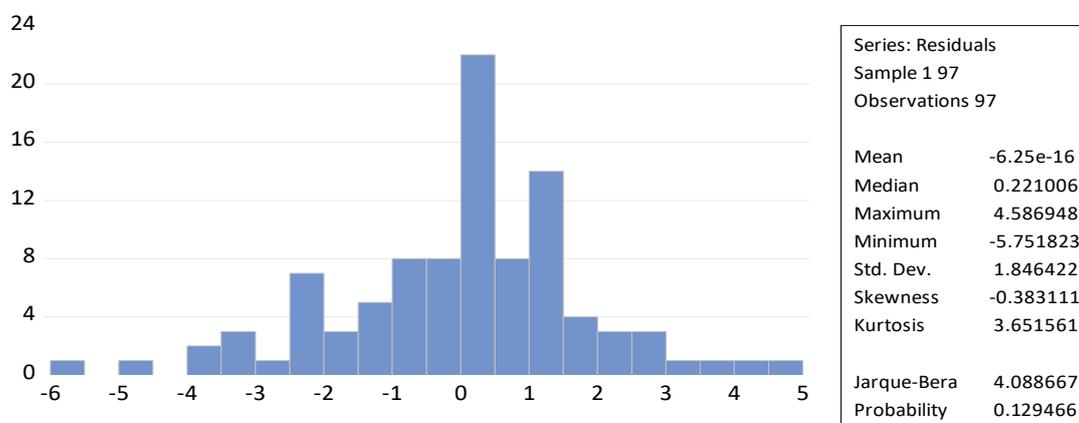


Figure 2. Normality Test Chart with Moderating Variable

Source: Primary data processed in 2025

Figure 2 shows that when adding moderating variables, the Jarque-Bera value is 4.088667 with a p-value of 0.129466, which is greater than 0.05. This indicates that the data is more normally distributed.

Linearity Test

The linearity test applied was the Ramsey RESET Test in EViews 12, with the criterion that the regression model is considered linear if the p-value (Prob) > 0.05 (Ichsan, 2019).

Table 3. Linearity Test Table

	Value	df	Probability
t-statistic	0.328321	93	0.7434
F-statistic	0.107795	(1, 93)	0.7434
Likelihood ratio	0.112366	1	0.7375

Source: Primary data processed in 2025

Based on Table 3, the results of the Ramsey RESET Test indicate that the p-values for the t-statistic, F-statistic, and likelihood ratio are 0.7434, 0.7375, and 0.7375, respectively. Since all p-values are greater than 0.05, it can be concluded that there is no strong evidence of model specification error.

Table 4. Linearity Test Table with Moderating Variable

	Value	df	Probability
t-statistic	1.714697	92	0.0898
F-statistic	2.940184	(1, 92)	0.0898
Likelihood ratio	3.051472	1	0.0807

Source: Primary data processed in 2025

After the moderating variable is included, based on Table 4, the results of the Ramsey RESET Test show p-values of 0.0898 for the t-statistic and the F-statistic, and 0.0807 for the likelihood ratio. Since all p-values are > 0.05, the relationship between the independent and dependent variables remains linear, as the linearity assumption of the regression model remains valid. Furthermore, the fulfillment of the linearity assumption implies that the estimated coefficients in the moderated regression model can be interpreted reliably. A linear relationship suggests that changes in QRIS effectiveness, QRIS efficiency, and Islamic financial literacy affect Islamic financial inclusion in a proportional and consistent manner within the observed data range. Consequently, the use of Moderated Regression Analysis (MRA) is

methodologically justified, and the model is deemed suitable for further hypothesis testing and inference. This finding strengthens the robustness of the empirical results and supports the validity of the conclusions drawn from the regression analysis.

Multicollinearity Test

To test for multicollinearity, the Variance Inflation Factor (VIF) or the correlation between independent variables was examined. If the VIF value < 10 and the correlation between independent variables < 0.8 , then there is no multicollinearity (Girsang, 2019).

Table 5. Multicollinearity Test Table

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	2.278302	55.39665	NA
X1	0.014140	94.78202	2.287300
X2	0.017025	122.2135	2.287300

Source: Primary data processed in 2025

Based on Table 5, the results of the multicollinearity test indicate that the VIF values for variables X1 and X2 are 2.287300, which remain below the threshold of 10. This indicates that there is no multicollinearity in the regression model, so the relationship among the independent variables is not too strong, and the model remains valid for further analysis. Furthermore, the low-centered VIF values for both QRIS effectiveness (X1) and QRIS efficiency (X2) indicate that each independent variable contributes unique explanatory power to the regression model without causing redundancy or instability in the coefficient estimates.

This suggests that the two variables capture distinct aspects of QRIS performance and do not excessively overlap in explaining variations in financial inclusion. As a result, the estimated coefficients can be interpreted reliably, and the regression model provides a robust basis for examining both direct and moderating effects in subsequent analyses. This indicates that there is no serious multicollinearity problem among the independent variables in the regression model. Although the uncentered VIF values appear relatively high, this condition is common in models that include a constant term and does not indicate multicollinearity when the centered VIF values are within acceptable limits. Therefore, it can be concluded that the

independent variables are not highly correlated with each other, and the regression coefficients can be estimated reliably without bias arising from multicollinearity.

Table 6. Multicollinearity Test Table with Moderating Variable

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	2.009928	55.39899	NA
X1	0.013125	99.72647	2.406621
X2	0.015870	129.1365	2.416868
M	0.003909	24.04173	1.435447

Source: Primary data processed in 2025

Based on Table 6, after the moderating variable (M) was added, the VIF values for all variables remained below 10: X1 (2.406621), X2 (2.416868), and M (1.435447). This shows that the model does not experience multicollinearity, and the relationships between the independent variables can still be used for regression analysis.

Heteroscedasticity Test

The method applied for the Heteroscedasticity test was the Breusch-Pagan-Godfrey test, with the criterion: There is no heteroscedasticity if the p-value (Prob) > 0.05, while if the p-value (Prob) < 0.05, there is heteroscedasticity (Ulfa, 2017).

Table 7. Heteroscedasticity Test Table

F-statistic	1.197043	Prob. F (2,94)	0.3066
Obs*R-squared	2.409135	Prob. Chi-Square (2)	0.2998
Scaled explained SS	3.325621	Prob. Chi-Square (2)	0.1896

Based on Table 7, the results of the heteroscedasticity test indicate that the p-value Prob. F(2,94) is 0.3066, which is greater than 0.05. This indicates that there is no heteroscedasticity in the model, so the residual variance is constant and the regression model meets the homoscedasticity assumption.

Table 8. Heteroscedasticity Test Table with Moderating Variable

F-statistic	1.295286	Prob. F (3,93)	0.2807
Obs*R-squared	3.890435	Prob. Chi-Square (3)	0.2735
Scaled explained SS	4.741244	Prob. Chi-Square (3)	0.1918

Source: Primary data processed in 2025

Based on Table 8, the results of the heteroscedasticity test show that the p-value Prob. F(3,93) is 0.2807, which is greater than 0.05. This indicates that there is no heteroscedasticity in the model, so the residual variance is constant and the regression model meets the homoscedasticity assumption.

Table 9. Regression Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.282531	1.509405	0.849693	0.3977
X1	0.425933	0.118912	3.581933	0.0005
X2	0.469373	0.130481	3.597265	0.0005
R-squared	0.523243	Mean dependent var		16.25773
Adjusted R-squared	0.513099	S.D. dependent var		2.862394
S.E. of regression	1.997330	Akaike info criterion		4.251939
Sum squared resid	374.9967	Schwarz criterion		4.331569
Log likelihood	-203.2190	Hannan-Quinn criter.		4.284138
F-statistic	51.58264	Durbin-Watson stat		1.904486
Prob(F-statistic)	0.000000			

Source: Primary data processed in 2025

From Table 9, Hypothesis Test Results, the regression model output obtained is:

$$Y = 1.282531 + 0.425933X_1 + 0.469373X_2 + \varepsilon$$

In this model, the intercept (β_0) is 1.282531 with a p-value of 0.3977, indicating it is statistically insignificant at the 5% significance level. This means that if X_1 and X_2 are zero, the predicted value of Y from this model is not significantly different from zero. After adjusting for the number of independent variables, the model still explains 57.05% of the variation in financial inclusion, as indicated by an Adjusted R-squared value of 0.570472. This shows that the regression model has a sufficiently high explanatory power for the relationship between Islamic financial literacy, QRIS efficiency, and effectiveness in financial inclusion among students of UIN K.H. Abdurrahman Wahid Pekalongan.

Furthermore, the overall goodness-of-fit of the model is reflected in an R-squared value of 0.523243, meaning that approximately 52.32% of the variation in the dependent variable can be explained by the independent variables included in the model. The F-statistic of 51.58264 with a probability value of 0.000000 indicates that the model is statistically significant and jointly explains the dependent variable well. In addition, the Durbin–Watson

statistic of 1.904486 suggests the absence of serious autocorrelation in the residuals, supporting the reliability of the regression estimates. Overall, these findings demonstrate that the regression model is robust and appropriate for further interpretation and policy implications.

Table 10. MRA Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.316494	1.417719	0.928600	0.3555
X1	0.332013	0.114562	2.898103	0.0047
X2	0.361981	0.125975	2.873428	0.0050
M	0.230203	0.062524	3.681818	0.0004
R-squared	0.583895	Mean dependent var		16.25773
Adjusted R-squared	0.570472	S.D. dependent var		2.862394
S.E. of regression	1.875967	Akaike info criterion		4.136488
Sum squared resid	327.2905	Schwarz criterion		4.242662
Log likelihood	-196.6197	Hannan-Quinn criter.		4.179420
F-statistic	43.50036	Durbin-Watson stat		1.674562
Prob(F-statistic)	0.000000			

Source: primary data processed in 2025

From the table 10 regression output, the model obtained is:

$$Y = 1.316494 + 0.332013X1 + 0.361981X2 + 0.230203M + \varepsilon$$

In this model, the intercept (β_0) is 1.316494 with a p-value of 0.3555, indicating it is statistically insignificant at the 5% significance level. This means that if all independent variables are zero, the predicted value of Y from this model is not significantly different from zero.

Discussion

The results of the regression analysis indicate that the effectiveness of QRIS has a significant impact on students' financial inclusion at UIN K.H. Abdurrahman Wahid Pekalongan (t-statistic = 3.581 > t-table = 1.98; p-value = 0.0005 < 0.05). This finding confirms the Theory of Planned Behavior (TPB), which posits that perceived ease of use and perceived usefulness play critical roles in shaping the intention to adopt digital financial technologies such as QRIS.

An interpretation of this finding suggests that students do not merely consider the availability of technology, but they also assess the success of QRIS in addressing their actual

needs, such as transaction convenience and integration with the broader digital ecosystem. Therefore, it is essential for governments, financial institutions, and universities to optimize QRIS effectiveness to align with students' expectations as active participants in the digital economy. A truly effective QRIS system is not merely a payment tool, but a transformational instrument for inclusive finance among the younger generation. The analysis also shows that QRIS efficiency significantly influences financial inclusion ($t\text{-statistic} = 3.597 > t\text{-table} = 1.98$; $p\text{-value} = 0.0005 < 0.05$). According to Steers' Efficiency Theory, a system is deemed efficient when it achieves its goals optimally through speed, accuracy, low cost, and ease of access.

This result implies that students, as digital natives, have high expectations for fast, frictionless financial services. An efficient QRIS system effectively meets these demands. Hence, service providers must continuously simplify the use of QRIS and ensure affordable transaction fees. In this context, efficiency is not merely a technical measure but serves as a bridge to more democratic and participatory financial access. The simultaneous analysis confirms that the combined effectiveness and efficiency of QRIS significantly influence financial inclusion ($F\text{-statistic} = 51.5 > F\text{-table} = 3.09$; $p\text{-value} = 0.000 < 0.05$). This strengthens the integration of TPB and Innovation Diffusion Theory, both of which highlight that technology adoption is driven by perceived usefulness and ease of use.

The opinion that emerges here is that the synergy between effectiveness and efficiency creates an ecosystem that encourages active student participation in the formal financial system. Improving only one of these aspects may result in suboptimal outcomes. Therefore, digital financial policies must strike a balance between both dimensions to foster sustainable change. The results further reveal that Islamic financial literacy significantly moderates the relationship between QRIS effectiveness and financial inclusion ($t\text{-statistic} = 2.89 > t\text{-table} = 1.98$; $p\text{-value} = 0.0047 < 0.05$). According to the Technology Acceptance Model (TAM), external factors such as knowledge strengthen the intention to adopt new technologies.

In this context, the opinion is that students' trust in QRIS as a transaction tool aligns with Islamic principles, depending strongly on their understanding of Islamic finance. Thus, the effectiveness of QRIS cannot reach its full potential without concerted efforts to enhance financial literacy. Collaboration between financial institutions and universities is crucial to promoting Islamic financial education and encouraging broader acceptance of digital financial technologies, particularly in Islamic academic environments. Islamic financial literacy also

significantly moderates the relationship between QRIS efficiency and financial inclusion (t-statistic = 2.87 > t-table = 1.98; p-value = 0.0050 < 0.05). Innovation Diffusion Theory underscores that user characteristics influence the rate of technology adoption.

The opinion derived from this finding is that perceptions of QRIS efficiency become more positive when students possess sufficient knowledge of Sharia-compliant finance. Hence, efficiency is not only a matter of system performance but also of user perceptions regarding compliance with Islamic values, benefits, and ethical alignment. Adequate Islamic financial literacy acts as a *catalyst* that reinforces trust in sharia-based digital systems such as QRIS. Simultaneously, the effectiveness and efficiency of QRIS, moderated by Islamic financial literacy, significantly affect financial inclusion (F-statistic = 43.5 > F-table = 3.09; p-value = 0.000 < 0.05). This highlights that the synergy between system quality (effectiveness and efficiency) and user capability (literacy) is the key to driving digital financial inclusion. The scholarly insight drawn from this finding is that the development of QRIS systems should not occur in isolation from efforts to increase financial literacy, particularly in Islamic finance. As agents of change, students need not only advanced technology but also tools that align with their values and knowledge base. Therefore, integrating technology and education has become a strategic imperative to drive a digital transformation rooted in inclusivity and sustainability.

CONCLUSION AND SUGGESTIONS

The empirical results confirm that QRIS effectiveness and efficiency, both individually and simultaneously, have a positive and statistically significant influence on financial inclusion. These findings indicate that digital payment systems such as QRIS play a crucial role in enhancing students' access to and utilization of financial services when they function effectively and efficiently.

Specifically, the results show that QRIS effectiveness significantly improves financial inclusion, suggesting that ease of use, reliability, and functionality are key determinants of inclusive financial behavior. Similarly, QRIS efficiency exerts a strong positive effect, indicating that time-saving features, transaction speed, and cost efficiency are critical in encouraging broader financial participation. Simultaneous testing further confirms that the combined

effect of QRIS effectiveness and efficiency significantly contributes to Islamic financial inclusion, underscoring their complementary nature. Importantly, this study finds that Islamic financial literacy significantly strengthens the relationship between QRIS utilization and financial inclusion. The moderating effect of Islamic financial literacy indicates that students with a stronger understanding of Islamic financial principles are better able to leverage digital payment systems to enhance their financial engagement. This result underscores the importance of integrating digital financial innovation with literacy development to maximize inclusive outcomes within an Islamic financial framework.

From a theoretical perspective, the findings reinforce the Theory of Planned Behavior, the Technology Acceptance Model, and the Diffusion of Innovation Theory by confirming that perceived usefulness, efficiency, and user knowledge are critical factors in digital financial adoption. Practically, the results suggest that policymakers, educational institutions, and financial service providers should not only improve the technical performance of QRIS but also strengthen Islamic financial literacy programs, particularly within academic environments, to promote sustainable financial inclusion among youth. Despite its contributions, this study has limitations. The sample is restricted to students from a single Islamic university, which may limit the generalizability of the findings. In addition, external factors such as institutional support, merchant readiness, and regulatory environments were not incorporated into the analysis. Future research is encouraged to expand its scope to diverse demographic groups, adopt longitudinal designs, and integrate qualitative approaches to capture the behavioral, cultural, and institutional dynamics that influence digital financial inclusion.

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