

Determinants of QRIS Tap Usage: A Study of Jakarta Commuters

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ABSTRACT

This study examines how perceived ease of use, perceived usefulness, and social influence affect the actual use of the QRIS Tap payment system on MRT Jakarta, with attitude toward using positioned as a mediating variable. An online survey was distributed to 162 respondents who had experience using QRIS Tap on MRT Jakarta, and the data were processed through Partial Least Squares Structural Equation Modeling (PLS-SEM) with the assistance of SmartPLS 4. The measurement model confirmed that every indicator met the required validity and reliability thresholds. The structural model showed that perceived ease of use, perceived usefulness, and social influence each had a positive and significant effect on attitude toward using, which in turn significantly influenced actual use. Mediation testing further confirmed that attitude toward using partially mediates the relationship between the three exogenous variables and actual use. These findings indicate that strengthening users' attitude is essential for sustaining the adoption of tap-based digital payment in public transportation, and the results provide practical input for MRT Jakarta and payment system providers in refining QRIS Tap services.

Keywords: Attitude Toward Using; Perceived Ease of Use; Perceived Usefulness; QRIS Tap; Social Influence

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INTRODUCTION

Indonesia's digital transformation has brought sweeping changes to how everyday transactions are conducted. Data from the Indonesian Internet Service Providers Association (APJII, 2025) show that internet users in the country reached 229 million in 2025, accounting for approximately 80.66% of the total population. This widespread connectivity has created fertile ground for the expansion of digital financial services and has accelerated a broad societal transition from cash-based toward non-cash payment methods. As Kusuma and Munawaroh (2025) observed, digital payment technologies are instrumental in bridging geographical gaps while simultaneously making transactions more efficient, affordable, and secure.

Responding to these developments, Bank Indonesia launched the Quick Response Code Indonesian Standard (QRIS) on 17 August 2019 as a unified standard to consolidate the fragmented QR payment landscape that had previously characterized the Indonesian market. The initiative has demonstrated measurable success in sustaining the growth of cashless transactions from year to year. Building on this foundation, the need for near-instantaneous payments in high-density environments gave rise to QRIS Tap, an NFC (Near Field Communication)-based solution capable of completing a transaction in fewer than two seconds. The technology gained rapid traction from the moment of its release; Akhmad (2025) documented that within a single month of launch, cumulative QRIS Tap transaction value exceeded IDR 3.24 trillion and the user base surpassed 47 million.

Among the sectors where QRIS Tap holds particular strategic significance, public transportation stands out, and MRT Jakarta has positioned itself at the forefront of its adoption. Figures from the Jakarta Provincial Statistics Agency consistently show an upward trend in monthly MRT ridership, underscoring the importance of transaction throughput at fare gates in managing congestion during rush hours. Andas et al. (2025) reinforced this point by arguing that evolving passenger transaction habits are compelling public transport operators to shift away from conventional ticketing instruments, such as paper tickets and prepaid electronic cards, toward account-based systems that offer greater flexibility.

Nevertheless, widespread enthusiasm for QRIS Tap does not automatically produce habitual use among passengers. Existing research consistently points to users' perceptions of ease of use and usefulness as primary determinants of payment technology acceptance, alongside the moderating role that social context plays in forming attitudes toward a given system. Despite this, studies examining the specific mechanism through which these perceptual factors translate into actual QRIS Tap usage at MRT Jakarta, with attitude toward using serving as the mediating pathway, remain scarce. This gap motivates the present study, which investigates how perceived ease of use, perceived usefulness, and social influence shape actual use through attitude toward using among QRIS Tap users at MRT Jakarta. The results are intended to deepen the understanding of digital payment adoption within a public transportation context and to furnish actionable insights for MRT Jakarta in its ongoing efforts to optimize the QRIS Tap experience.

LITERATURE REVIEW

This study is grounded in the Technology Acceptance Model (TAM) developed by Davis (1989). The model explains that a person's intention and behavior in using a technology are largely determined by two key perceptions, namely perceived ease of use and perceived usefulness, which then shape an attitude before ultimately leading to actual use. Over time, many researchers have extended TAM by incorporating contextual variables such as social influence to explain the role

of the surrounding social environment in driving technology adoption, particularly for technologies that are used collectively or in public settings such as mass transportation.

Technology Acceptance Model (TAM)

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Perceived Ease of Use

Perceived ease of use refers to the extent to which users believe that a system can be operated without excessive effort. In the context of QRIS Tap, this ease is reflected in the simplicity of tapping a phone or card at the payment gate. The dimensions used in this study are Ease of Learning, Ease of Navigation, Help Availability, and Easy to Use. The dimensions of Ease of Learning, Ease of Navigation, and Help Availability were adapted from Fitriani et al. (2025), while the Easy to Use dimension was adapted from A.A. Reswari and B. Usman (2024).

Perceived Usefulness

Perceived usefulness describes users' belief that the system can enhance the effectiveness of their activities, for instance by speeding up queues and reducing the need to carry cash or physical cards. This variable was measured using four dimensions, namely Faster Work, Effectiveness, Makes Work Easier, and Job Performance. The dimensions of Faster Work, Effectiveness, and Makes Work Easier were adapted from Perwitasari (2022), while the Job Performance dimension was adapted from Santoso and Palayama, as cited in Singasatia (2022).

Social Influence

Social influence describes the pressure or encouragement from the surrounding environment, such as family, co-workers, or fellow MRT users, that leads someone to feel compelled to follow a technology usage norm that has become common within their environment. To measure this variable, three indicators were adopted: Influence of Other People, Environmental Influences, and Subjective Norms Maharani and Widiastuti (2023).

Attitude Toward Using

Attitude toward using is positioned as the mediating variable that bridges these perceptions with actual usage behavior. A positive attitude toward a payment system is believed to encourage a person's tendency to genuinely and consistently use that system. This variable was measured through two dimensions, cognitive evaluation and affective evaluation by Natasia et al., in Reswari & Usman (2024)

Actual Use

Actual use refers to the real, observable behavior of using a system in practice, rather than merely the intention to use it. According to A.A. Reswari and B. Usman (2024), this variable is operationalized using three indicators: Frequency, Routine, and Real Usage.

Based on the theoretical foundation above, the following hypotheses were formulated: H1, perceived ease of use has a positive effect on attitude toward using; H2, perceived usefulness has a positive effect on attitude toward using; H3, social influence has a positive effect on attitude toward using; H4, attitude toward using has a positive effect on actual use; H5, perceived ease of use affects actual use through attitude toward using; H6, perceived usefulness affects actual use through attitude toward using; and H7, social influence affects actual use through attitude toward using.

METHODS OF RESEARCH

A quantitative research design was adopted in this study, with data analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4. This analytical approach was selected because of its well-established capability in handling structural models that involve mediating variables and in estimating relationships among latent constructs simultaneously. The study was situated within the DKI Jakarta area, with MRT Jakarta passengers as the target population, a setting chosen because of the exceptionally high daily ridership that renders transaction speed a pressing operational concern. Data collection was carried out online via a Likert-scale questionnaire administered during April and May 2026.

Given that the number of MRT Jakarta users varies on a daily basis, the population is treated as infinite. Respondents were selected through purposive sampling, applying five inclusion criteria: being between 18 and 44 years of age, residing or working within the DKI Jakarta area, regularly using MRT Jakarta, having prior experience paying with QRIS Tap, and possessing a digital payment application compatible with the QRIS standard. A total of 162 respondents satisfied all criteria and were included in the final analysis.

The research instrument took the form of a structured, closed-ended questionnaire employing a five-point Likert scale to capture responses across all five variables: perceived ease of use, perceived usefulness, social influence, attitude toward using, and actual use. Measurement model validity was assessed through convergent validity by inspecting outer loading scores and Average Variance Extracted (AVE) values, while internal consistency was evaluated using Cronbach's Alpha and Composite Reliability. Structural path significance was determined via a bootstrapping procedure, under which a hypothesized relationship is considered statistically supported when the t-statistic exceeds 1.96 and the associated p-value falls below 0.05 (Hair et al., 2022).

RESULT AND DISCUSSION

Among the 162 respondents who took part in this study, the gender distribution was broadly even, with women comprising 51.85% of the sample and men the remaining 48.15%. Age-wise, the 18–25 year bracket represented the largest segment at 62.35%, with the 26–35 year bracket following at 30.86%. This concentration among younger age groups suggests that QRIS Tap adoption on MRT Jakarta is largely driven by digitally literate individuals in the early productive phase of their lives. With respect to educational background, more than half of the respondents had completed an undergraduate degree or its

equivalent (56.17%), and in terms of occupational status, the greatest proportion were working professionals (54.94%), with students making up a substantial secondary group (38.89%).

1) Outer Model

The convergent validity assessment revealed that all indicators belonging to the five research variables produced outer loading values in excess of 0.70 and AVE values surpassing 0.50.

Table 1. Convergent Validity (Outer Loading & AVE)

Variable	Outer Loading	AVE
Perceived Ease of Use	0.844 – 0.875	0.735
Perceived Usefulness	0.834 – 0.878	0.735
Social Influence	0.822 – 0.862	0.715
Attitude Toward Using	0.851 – 0.894	0.763
Actual Use	0.862 – 0.911	0.794

Source: processed by the author (2026).

Convergent validity was evaluated by inspecting the outer loading and AVE of each indicator, applying the cut-off values of 0.70 and 0.50 respectively as recommended by Hair et al. (2022). As presented in Table 3, all indicators exceeded both thresholds without exception. Outer loadings ranged from 0.822 to 0.911 across the five variables, and AVE values spanned from 0.715 (social influence) to 0.794 (actual use), with perceived ease of use, perceived usefulness, and attitude toward using returning intermediate AVE values of 0.735, 0.735, and 0.763 respectively. Since every AVE surpasses 0.50, each construct accounts for more than half of the variance in its own indicators, confirming that convergent validity is fully satisfied and that the measurement model provides a reliable foundation for structural analysis.

Discriminant validity examines whether indicators belonging to different constructs remain sufficiently distinct from one another, serving as a necessary complement to convergent validity. This study assessed discriminant validity through cross loading analysis, under which each indicator must load more strongly on its own construct than on any other construct in the model.

Table 2. Discriminan Validity (Cross Loading)

Indicator	PEOU	PU	SI	ATU	AU
PEOU1	0.869	0.138	0.148	0.562	0.527
PEOU2	0.853	0.157	0.122	0.573	0.490
PEOU3	0.855	0.088	0.109	0.499	0.481
PEOU4	0.854	0.137	0.150	0.499	0.497

PU1	0.176	0.865	0.181	0.547	0.446
PU2	0.126	0.830	0.285	0.527	0.436
PU3	0.150	0.852	0.282	0.512	0.422
PU4	0.068	0.883	0.277	0.509	0.404
SI1	0.154	0.262	0.850	0.300	0.311
SI2	0.137	0.276	0.835	0.342	0.324
SI3	0.097	0.222	0.852	0.316	0.234
ATU1	0.589	0.521	0.289	0.870	0.706
ATU2	0.553	0.552	0.361	0.875	0.686
ATU3	0.538	0.533	0.349	0.892	0.708
ATU4	0.491	0.526	0.316	0.857	0.678
AU1	0.552	0.398	0.331	0.707	0.910
AU2	0.529	0.493	0.270	0.749	0.893
AU3	0.473	0.437	0.313	0.668	0.870

Source: processed by the author (2026).

The results presented in table confirm that this criterion is met without exception. All four PEOU indicators load highest on perceived ease of use (0.853–0.869), all four PU indicators load highest on perceived usefulness (0.830–0.883), all three SI indicators load highest on social influence (0.835–0.852), all four ATU indicators load highest on attitude toward using (0.857–0.892), and all three AU indicators load highest on actual use (0.870–0.910). Although attitude toward using and actual use share moderately elevated cross-loadings, this is theoretically expected given the conceptual proximity between these two constructs.

Reliability testing was conducted to evaluate the internal consistency of each construct's indicators, using Cronbach's Alpha alongside Composite Reliability in its rho_a and rho_c forms. In line with Hair et al. (2022), a construct is deemed reliable when both measures exceed 0.70, provided that neither approaches 0.95, which would signal indicator redundancy.

Table 3 Reliability Test.

Variable	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)
Perceived Ease of Use	0.880	0.884	0.917
Perceived Usefulness	0.880	0.881	0.917
Social Influence	0.801	0.805	0.883
Attitude Toward Using	0.896	0.897	0.928
Actual Use	0.870	0.873	0.920

Source: processed by the author (2026)

All five variables comfortably surpassed the 0.70 minimum across all three reliability metrics. Cronbach's Alpha ranged from 0.801 (social influence) to 0.896 (attitude toward using), while Composite Reliability (rho_c) ranged from 0.883 to 0.928. Despite recording the lowest figures in the table, social influence still satisfies the reliability criterion by a considerable margin. Crucially, no variable approached the 0.95 upper bound, ruling out any concern over indicator repetitiveness.

2) Inner Model

The inner model evaluation in this study consists of three sub-tests, namely the coefficient of determination (R-Square), effect size (F-Square), and predictive relevance (Q-Square), followed by the hypothesis testing itself, which is discussed separately in the next subsection.

Coefficient of Determination (R-Square)

The R-Square value indicates how much of the variance in an endogenous variable is collectively explained by its predictors. Hair et al. (2022) suggest that values of approximately 0.75, 0.50, and 0.25 correspond to strong, moderate, and weak explanatory power respectively, though these benchmarks are context-dependent.

Table 4. R- Square Values

Variable	R-Square	Adjusted R-Square
Attitude Toward Using	0.683	0.677
Actual Use	0.634	0.632

Source: processed by the author (2026)

Attitude toward using obtained an R-Square of 0.683 (Adjusted R-Square 0.677), indicating that perceived ease of use, perceived usefulness, and social influence together account for 68.3% of the variance

in users' attitudes toward QRIS Tap, a figure that approaches the strong category. Actual use obtained an R-Square of 0.634 (Adjusted R-Square 0.632), meaning that attitude toward using alone explains 63.4% of the variance in observed usage behavior. By the standards commonly applied in PLS-SEM research within the behavioral sciences, both values are considered strong, particularly given that actual use is predicted by a single mediating variable.

Predictive Relevance (Q-Square)

Predictive relevance (Q-Square) was assessed through the blindfolding procedure in SmartPLS 4, complementing R-Square by evaluating out-of-sample rather than in-sample predictive accuracy. Hair et al. (2022) specify that a Q^2 value above zero is sufficient to confirm that the model possesses predictive relevance for a given endogenous construct.

Table 5. Predictive Relevance

Variable	Q-Square
Attitude Toward Using	0.669
Actual Use	0.514

Source: processed by the author (2026)

Both variables exceeded this threshold by a considerable margin. Attitude toward using recorded a Q^2 of 0.669, reflecting a high degree of predictive accuracy, while actual use recorded a Q^2 of 0.514, which, although somewhat lower, still indicates strong predictive relevance. Together with the R-Square and F-Square results reported earlier, these figures confirm that the structural model is not simply a good fit to the observed data but also retains meaningful predictive capability beyond the estimation sample, providing a robust foundation for the hypothesis testing that follows.

Hypothesis

Hypothesis testing was performed via bootstrapping in SmartPLS 4, evaluating each hypothesized path based on its coefficient, t-statistic, and p-value.

Table 6. Direct Hypotesis Testing Results

Hypothesis	Path	Coefficient	t-statistics	p-values	Decision
H1	Perceived Ease of Use → Attitude Toward Using	0.527	12.643	0.000	Accepted
H2	Perceived Usefulness → Attitude Toward Using	0.484	10.941	0.000	Accepted
H3	Social Influence → Attitude Toward Using	0.154	3.269	0.001	Accepted
H4	Attitude Toward Using → Actual Use	0.796	30.693	0.000	Accepted

All four direct hypotheses were accepted. The strongest relationship in the model was that between attitude toward using and actual use ($\beta = 0.796$; $t = 30.693$; $p < 0.001$), confirming that user attitude is the dominant driver of actual QRIS Tap usage. Perceived ease of use exerted a substantial effect on attitude formation ($\beta = 0.527$; $t = 12.643$; $p < 0.001$), indicating that the simplicity of tapping a phone at the fare gate without a complicated verification process is the primary catalyst for a positive attitude, consistent with TAM's foundational argument that ease of use is the gateway to technology acceptance. Perceived usefulness followed closely ($\beta = 0.484$; $t = 10.941$; $p < 0.001$), reflecting that tangible benefits such as faster transactions and reduced reliance on physical cards or cash further reinforce positive attitudes, a finding especially relevant in the high-volume MRT Jakarta context where time efficiency matters greatly to passengers. Social influence, while significant ($\beta = 0.154$; $t = 3.269$; $p = 0.001$), contributed to a considerably smaller degree, suggesting that peer and family encouragement functions as a reinforcing rather than primary factor in attitude formation.

Table 7. Mediation Testing Result

Hypothesis	Path	Indirect Effect	t-statistics	p-values	Decision
H5	Perceived Ease of Use → Attitude → Actual Use	0.419	11.591	0.000	Accepted
H6	Perceived Usefulness → Attitude → Actual Use	0.385	10.312	0.000	Accepted
H7	Social Influence → Attitude → Actual Use	0.122	3.285	0.001	Accepted

Source: processed by the author (2026)

Mediation testing through specific indirect effects, reported in Table 10, confirmed that attitude toward using partially mediates all three exogenous-to-actual-use relationships. The indirect effect of perceived ease of use was the largest ($\beta = 0.419$; $t = 11.591$; $p < 0.001$), followed by perceived usefulness ($\beta = 0.385$; $t = 10.312$; $p < 0.001$) and social influence ($\beta = 0.122$; $t = 3.285$; $p = 0.001$). Because both the direct and indirect paths were significant in each case, the mediation is classified as partial, meaning these variables retain a direct influence on actual use while also operating through attitude. This positions attitude toward using not merely as an intermediary variable but as the critical psychological mechanism through which perceptions and social encouragement are converted into real usage behavior. Accordingly, strategies aimed at increasing QRIS Tap adoption on MRT Jakarta should extend beyond technical improvements to encompass attitude-building initiatives, including usage education, community-based social campaigns among commuters, and more compelling communication of the system's practical benefits.

CONCLUSION

The findings of this study confirm that perceived ease of use, perceived usefulness, and social influence each exert a positive and significant influence on attitude toward using, which subsequently drives the actual use of QRIS Tap on MRT Jakarta. Attitude toward using was established as a partial mediator across all three relationships, functioning as the key psychological bridge through which technical perceptions and

social factors translate into real usage behavior. The model demonstrates solid explanatory power, accounting for 68.3% of the variance in attitude toward using and 63.4% of the variance in actual use.

From a practical standpoint, MRT Jakarta management and payment system providers are encouraged to move beyond purely technical enhancements and invest in attitude-oriented strategies, including in-station user education, benefit-focused communication campaigns, and initiatives that harness peer influence within the commuter community. Future studies are advised to broaden the respondent base to cover other public transportation modes and to incorporate additional constructs such as trust or perceived risk, which may further enrich the understanding of digital payment adoption in transit contexts. It should also be noted that the geographical focus on DKI Jakarta constrains the extent to which these findings can be generalized to other cities in Indonesia.

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