



Service Reliability Beats Convenience: Explaining QRIS Satisfaction and Usage Intensity in South Sulawesi MSMEs

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Abstract. This study examines whether service reliability or perceived convenience matters more for sustaining QRIS usage among MSME merchants in South Sulawesi. Using a cross-sectional survey of 130 owner/managers (QRIS active ≥ 3 months), we estimate a mediation-only model with PLS-SEM: Service Reliability and Perceived Convenience influence merchant satisfaction, which then explains usage intensity (monthly frequency and average value). Service Reliability is modeled as a second-order formative construct built from authorization success ratio, stability/uptime, performance consistency, and incident recovery; other constructs are reflective. Results show Service Reliability relates strongly to Satisfaction ($\beta = .52$), while Perceived Convenience is positive but smaller ($\beta = .21$). Satisfaction exhibits a robust association with Usage Intensity ($\beta = .67$). As specified, direct links to Usage Intensity are constrained to zero; both antecedents act exclusively through Satisfaction. Indirect effects are significant, with the reliability–satisfaction–usage route ($\beta_{ind} = .35$) exceeding the convenience–satisfaction–usage route ($\beta_{ind} = .14$). Measurement quality meets recommended thresholds, the model explains substantial variance ($R^2_{Satisfaction} = .68$; $R^2_{Usage} = .45$), and PLS-predict indicates meaningful out-of-sample relevance. The findings refine post-adoption theory for real-time payments by establishing outcome assurance as the primary lever of sustained QRIS engagement and direct managerial attention to uptime, success ratio, and recoverability as first-order performance KPIs.

Keywords: QRIS, Service Reliability, Perceived Convenience, Merchant Satisfaction, Usage Intensity.

1 Introduction

Indonesia's nationwide rollout of the Quick Response Code Indonesian Standard (QRIS) has transformed payment practices among micro, small, and medium-sized enterprises (MSMEs), making QR-based transactions increasingly mainstream across retail and services. Recent empirical work on QRIS and related fintech adoption underscores how perceived usefulness, ease of use, trust, security, and perceived costs shape merchants' and customers' intentions to adopt and continue using QR payments [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]. Yet, despite strong diffusion, the post-adoption experience

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especially merchant satisfaction and usage intensity remains comparatively under-specified relative to the large body of pre-adoption (intention) studies.

A key conceptual blind spot is the tendency to conflate convenience (e.g., interface simplicity, reduced steps, time savings) with service reliability (e.g., stable connectivity, successful authorization, minimal downtime, and effective incident recovery). Research on digital payments often summarizes quality via broad service or technology acceptance dimensions (e.g., ease, usefulness, trust, security) without isolating the performance mechanics that merchants experience at the point of sale [3, 4, 5]. Related work documents security and risk perceptions in QRIS or e-wallet contexts [8, 11] and applies generic service-quality frames (e.g., SERVQUAL) to digital service settings [12], but few studies explicitly separate and compare the effects of reliability versus convenience on merchant satisfaction and ongoing use. This distinction matters because intermittent failures, latency spikes, and error-prone transactions can disproportionately erode satisfaction even when interfaces are simple potentially depressing repeat use more than marginal gains in convenience.

Grounded in the Expectation–Confirmation Model (ECM) of continuance where satisfaction is the proximal driver of ongoing use [13] and leveraging Technology Acceptance Model (TAM) elements as controls [14], this study proposes and tests a post-adoption model in which Service Reliability and Perceived Convenience are treated as distinct antecedents of Satisfaction, which in turn predicts Usage Intensity (frequency and/or value of transactions). We argue that, in real-time retail payment rails like QRIS, “service reliability beats convenience” as the dominant pathway to sustaining merchant engagement. Evidence on continuance and actual use in adjacent QR/QRIS contexts motivates this focus on downstream outcomes beyond intention [15, 16].

In particular, we conceptualize Service Reliability as a higher-order construct capturing success ratio, stability/uptime, consistency, and recovery quality. Because these reflect complementary facets rather than interchangeable items, we specify reliability via a hierarchical component model (HCM) using formative aggregation of first-order reflective dimensions and evaluate indicator weights and multicollinearity accordingly [17]. To strengthen the study’s practical relevance, we will also assess predictive performance and report model diagnostics recommended in contemporary PLS-SEM practice [18, 19, 20].

Building on this gap, we treat service reliability and perceived convenience as theoretically distinct antecedents of merchant satisfaction, and we examine usage intensity as the key post-adoption behavioral consequence. Specifically, we investigate how far and how decisively reliability in day-to-day QRIS operations (e.g., successful authorization, network stability/uptime, consistent performance, and incident recovery) outweighs interface convenience and procedural simplicity in shaping merchants’ satisfaction. We then trace how satisfaction translates into deeper usage captured by transaction frequency and average value thereby explaining sustained engagement beyond initial adoption. Because infrastructure conditions and business profiles can differ meaningfully across contexts, we also explore whether the strength and direction of these mechanisms vary across subgroups, contrasting merchants in Makassar versus non-Makassar areas and micro-merchants (UMi) versus non-UMi. In doing so, the

study not only tests direct relationships but also assesses the relative dominance of reliability over convenience and maps cross-group differences that carry clear managerial and policy relevance.

By disentangling reliability from convenience and anchoring continuance in satisfaction, this study advances merchant-side post-adoption theory for QR payments. The results aim to redirect managerial and policy attention from front-end simplicity alone toward stable, error-free transaction performance as the primary lever for sustaining MSME engagement with QRIS.

2 Literature Review

2.1 From adoption antecedents to post-adoption outcomes in QRIS

Most QRIS and adjacent QR/mobile payment studies emphasize pre-adoption drivers perceived usefulness and ease of use (TAM), trust and security, perceived cost, and facilitating conditions as proximal determinants of intention [1, 3, 4, 5, 7, 8, 9, 10]. A smaller stream begins to examine actual/continuance use in merchant settings, indicating that experience with system/service performance relates to ongoing behavior [15, 16]. However, relative to this large adoption-centric corpus, the post-adoption layer specifically merchant satisfaction and usage intensity (frequency/value) remains under-specified in QRIS MSMEs.

To address this gap, we isolate two performance-relevant antecedents service reliability (success ratio, stability/uptime, consistency, recovery) and perceived convenience (procedural simplicity, time saving, channel flexibility) and model their effects only through satisfaction to explain usage intensity. Anchored in ECM, satisfaction is treated as the proximal conduit of post-adoption behavior, while TAM-consistent beliefs function as controls rather than focal predictors [13, 14].

2.2 Distinguishing service reliability from perceived convenience

In real-time retail payments, service reliability and perceived convenience are closely related yet conceptually distinct. We define service reliability as the rail's ability to execute transactions correctly and consistently under day-to-day operating conditions captured by indicators such as authorization success ratio, network stability/uptime, latency containment, and incident recovery quality. By contrast, perceived convenience refers to the interactional ease experienced by merchants: fewer steps to complete a sale, reduced cognitive/operational effort, time savings, and channel flexibility (e.g., offline–online use, device interoperability). While both constructs are valued by MSMEs, their psychological routes to evaluation differ: reliability reduces uncertainty and protects outcomes at the point of sale; convenience reduces effort in getting there.

QRIS studies frequently operationalize “quality” in broad composites (e.g., service/system quality, SERVQUAL-type dimensions), which risk blending reliability and convenience into a single index [12, 4, 5, 9]. Merchant-experience evidence, however, suggests that performance breakdowns timeouts, failed authorizations, unstable connectivity disproportionately erode evaluations, even when the interface is

simple or familiar [6, 15, 11]. In other words, convenience cannot compensate for unreliability: an easy flow that frequently fails is remembered as frustrating, not convenient. This asymmetry motivates treating reliability and convenience as separate antecedents of post-adoption satisfaction rather than collapsing them.

Separating the constructs also clarifies measurement. Reliability naturally lends itself to a multifaceted specification: success ratio, stability/uptime, consistency of performance across time, and recovery responsiveness are complementary rather than interchangeable facets. Accordingly, we model service reliability as a higher-order construct formed by first-order reflective dimensions so that changes in any facet can alter the overall reliability perception. By contrast, perceived convenience is well represented as a reflective construct, where its indicators (simplicity, time saving, flexibility) share a common theme of effort reduction typically emphasized in QRIS/TAM-aligned work [1, 3, 4, 5, 8].

Positioning reliability and convenience side-by-side allows us to examine their distinct contributions to satisfaction, the proximal determinant of continuance outcomes in the ECM stream. Given the merchant-critical nature of successful, low-friction checkout, we expect both constructs to improve satisfaction, with reliability operating through outcome assurance and convenience through effort reduction. This yields the study's first two hypotheses:

- H1. Service reliability positively influences satisfaction among MSME QRIS merchants.
- H2. Perceived convenience positively influences satisfaction among MSME QRIS merchants.

2.3 Satisfaction as the proximal driver of ongoing use (ECM)

Within the Expectation–Confirmation Model (ECM), satisfaction is the most immediate attitudinal driver of continued system use because it synthesizes users' post-consumption evaluations of performance relative to expectations [13]. In payment settings like QRIS, merchants repeatedly confront performance outcomes at the point of sale; these outcomes cumulate into a satisfaction judgment that, in turn, governs whether QRIS becomes a relied-on rail or a fallback option. Recent QR/QRIS evidence is consistent with this mechanism: studies connecting system/service experience to continuance/actual use indicate that post-use evaluations, rather than pre-use beliefs alone, better explain sustained behavior in merchant contexts [15, 16].

Building on this logic, we specify satisfaction as the sole conduit from the two focal antecedents service reliability and perceived convenience to usage intensity (frequency and/or value). This mediation-only design is theoretically parsimonious and empirically testable: if reliability or convenience improves the day-to-day experience of executing QRIS transactions, merchants' satisfaction should increase; and higher satisfaction should translate into deeper usage. Conversely, if dissatisfaction arises (e.g., recurrent failures), intensification of use is unlikely even when interfaces are simple. By constraining direct paths from reliability and convenience to usage to zero, the model

isolates the affective–behavioral pathway central to ECM and avoids conflating performance mechanics with behavioral frequency.

- H3. Satisfaction positively influences usage intensity of QRIS transactions.
- H4. Service reliability has a positive indirect effect on usage intensity via satisfaction.
- H5. Perceived convenience has a positive indirect effect on usage intensity via satisfaction.
- H6. The indirect effect of service reliability on usage intensity via satisfaction is stronger than the corresponding indirect effect of perceived convenience.

3 Method

We implemented a cross-sectional survey of QRIS-accepting MSME merchants in South Sulawesi using stratified quota sampling by location (Makassar and non-Makassar districts) and sector, recruiting through associations and municipal MSME registries; the final analytic sample comprised $N = 130$ owner/managers (≥ 18 years; QRIS active ≥ 3 months). Constructs were measured on 5-point Likert scales adapted from QRIS/digital-payment literature [1, 3, 4, 5, 8, 9]. Service Reliability was modeled as a hierarchical component model (second-order formative) formed by four first-order reflective dimensions authorization success ratio, stability/uptime, performance consistency across time/peaks, and incident recovery quality following formative measurement guidance for higher-order composites [17, 19]. Perceived Convenience and Satisfaction were specified reflectively, and Usage Intensity was modeled as a reflective composite of monthly transaction frequency and average transaction value (log-transformed when skewed), consistent with post-adoption usage operationalizations in QR/QRIS contexts [15, 16]. To limit omitted-variable bias, Perceived Usefulness/Ease of Use (TAM), Trust/Security, Perceived Cost, and Facilitating Conditions were included as covariates into Satisfaction [14, 1, 4, 5, 8, 9]. The instrument underwent expert review and a pilot test (~20–30 cases). Data were collected through field-assisted and online administration with informed consent; responses were anonymized and stored securely. Procedural remedies for common-method bias were applied (neutral instructions, counter-balanced blocks, anonymity) and statistical checks included screening for missingness/outliers and full-collinearity VIF [19]. The mediation-only structural model (relationships among Service Reliability, Perceived Convenience, Satisfaction, and Usage Intensity, with direct links from Service Reliability and Perceived Convenience to Usage Intensity constrained to zero) was estimated in SmartPLS with bias-corrected bootstrapping (5,000 resamples), following prediction-oriented PLS-SEM practice [19, 20]. Reflective blocks were evaluated via indicator loadings (target $\geq .70$), composite reliability, ρ_A , AVE, and HTMT $< .85$, while the formative second-order construct was assessed via indicator weights, VIF < 3.3 , and redundancy analysis against a global item [17, 18]. Predictive relevance was assessed with PLSpredict (RMSE/MAE versus a linear benchmark) to evidence out-of-sample performance [19, 20].

4 Results

4.1 Sample characteristics

The demographic and business characteristics of the MSME merchants included in this study are presented in Table 1. The table summarizes respondents' location, business sector, merchant category, and QRIS usage tenure to provide an overview of the sample composition. The analytic sample includes 130 MSME merchants distributed across key South Sulawesi localities, with Makassar representing just over half of respondents. The non-Makassar cohort spans Gowa, Maros, Pangkep, Barru, Bone, Soppeng, Wajo, Pinrang, Enrekang, Sidrap (Sidenreng Rappang), Parepare, and Palopo, supporting contextual heterogeneity. Sector composition is balanced across trade/retail (38.5%), food and beverage (34.6%), and services (26.9%). A majority are micro (UMi) merchants (64.6%), and QRIS tenure is well spread between 3–6 months (21.5%), 7–12 months (39.2%), and over 12 months (39.2%), providing variation in post-adoption experience.

Table 1. Sample characteristics

Attribute	Category	n	%
Location (Kab/Kota)	Makassar	71	54.6
	Gowa	7	5.4
	Maros	6	4.6
	Pangkep	5	3.8
	Barru	4	3.1
	Bone	6	4.6
	Soppeng	4	3.1
	Wajo	5	3.8
	Pinrang	5	3.8
	Enrekang	3	2.3
	Sidenreng Rappang	4	3.1
	Parepare	3	2.3
	Palopo	7	5.4
Sector	Trade/Retail	50	38.5
	Food & Beverage	45	34.6
	Services	35	26.9
Merchant category	Micro (UMi)	84	64.6
	Non-UMi (small/medium)	46	35.4
QRIS tenure	3–6 months	28	21.5
	7–12 months	51	39.2
	> 12 months	51	39.2

Source: Primary Data (2025)

4.2 Descriptive statistics and inter-construct correlations

The descriptive statistics and inter-construct correlations among the latent variables are presented in Table 2. The table reports the mean values, standard deviations, and correlation coefficients used to assess the relationships between the constructs prior to structural model estimation. Means sit above the midpoint for all constructs, with Satisfaction the highest on average. Correlations are moderate and positive in all hypothesised pairings (two-tailed $p < .001$). Inter-construct correlations remain well below multicollinearity thresholds ($< .80$), supporting discriminant validity and subsequent structural estimation.

Table 2. Descriptive statistics and inter-construct correlations

Construct	Mean	SD	1	2	3	4
1. Service Reliability (second-stage latent)	3.86	0.61				
2. Perceived Convenience	3.74	0.66	.41			
3. Satisfaction	3.92	0.63	.69	.44		
4. Usage Intensity	3.48	0.70	.52	.36	.67	

Source: Primary Data (2025)

4.3 Reliability and validity (PLS-SEM)

The results of the reliability and validity assessment of the reflective measurement model are presented in Table 3. The table summarizes the loading ranges, Composite Reliability (CR), rho_A, Average Variance Extracted (AVE), and HTMT values for each construct. The reflective measurement model shows robust internal consistency and convergent validity. All reported loadings are $\geq .70$; composite reliability (CR) and ρ_A meet or exceed common thresholds, and $AVE \geq .57$. HTMT values remain below .85 and HTMT confidence intervals do not include 1, supporting discriminant validity. Multicollinearity is not a concern (indicator/construct VIF < 3). The formative second-order specification for Service Reliability exhibits significant and substantively weighted dimensions with acceptable VIF and supportive redundancy analysis.

Table 3. Reliability and validity (reflective blocks; formative summary for SR)

Construct	Loading range	CR	ρ_A	AVE	Max HTMT
Perceived Convenience	.82–.86	.88	.86	.71	.74
Satisfaction	.86–.90	.91	.90	.77	.68
Usage Intensity	.87–.88	.87	.83	.77	.55

Source: Primary Data (2025)

4.4 Structural estimates

The structural model estimation results are presented in Table 4. The table reports the path coefficients, t-values, p-values, and confidence intervals for the hypothesised

relationships among the constructs in the mediation model. The structural model aligns with the theorised mediation. Service Reliability shows a strong, significant association with Satisfaction, and Perceived Convenience exhibits a positive, smaller yet significant association. Satisfaction relates strongly to Usage Intensity. Direct links from Service Reliability and Perceived Convenience to Usage Intensity were not estimated (constrained to zero) consistent with the mediation-only design. Explanatory power is substantial ($R^2_{\text{Satisfaction}} = .68$; $R^2_{\text{Usage Intensity}} = .45$) and blindfolding indicates predictive relevance ($Q^2_{\text{Satisfaction}} = .43$; $Q^2_{\text{Usage Intensity}} = .31$).

Table 4. Structural estimates

Relation (effect of ... on ...)	β	t	p	95% CI
Service Reliability affecting Satisfaction	.52	7.01	< .001	[.37, .65]
Perceived Convenience affecting Satisfaction	.21	2.89	.004	[.07, .35]
Satisfaction affecting Usage Intensity	.67	9.45	< .001	[.53, .78]

Source: Primary Data (2025)

4.5 Mediation and total effects

The mediation and total effect analysis results are presented in Table 5. The table illustrates the indirect effects, total effects, and comparative mediation outcomes between service reliability, perceived convenience, satisfaction, and usage intensity. Bias-corrected bootstrap results show that both indirect paths are positive and significant, with the Service Reliability \rightarrow Satisfaction \rightarrow Usage Intensity route larger than the Perceived Convenience \rightarrow Satisfaction \rightarrow Usage Intensity route. Because direct links to Usage Intensity were constrained to zero, the total effects of Service Reliability and Perceived Convenience on Usage Intensity equal their respective indirect effects, implying a fully mediated mechanism.

Table 5. Indirect and total effects; comparative mediation

Path (indirect)	β_{ind}	95% CI	Sig.
Service Reliability via Satisfaction to Usage Intensity	.35	[.23, .48]	Yes
Perceived Convenience via Satisfaction to Usage Intensity	.14	[.04, .26]	Yes
Difference: indirect(Service Reliability) minus indirect(Perceived Convenience)	.21	[.04, .39]	Yes
Summary	Value		
Total effect of Service Reliability on Usage Intensity	.35 (p < .001)		
Total effect of Perceived Convenience on Usage Intensity	.14 (p = .006)		
Variance accounted for (VAF, each route)	~100% by design (full mediation)		

Source: Primary Data (2025)

5 Discussion

This study set out to adjudicate whether service reliability or perceived convenience is the stronger post-adoption driver of merchant satisfaction and, through satisfaction, of usage intensity in QRIS. The evidence is clear. Service reliability shows a sizeable association with satisfaction, while convenience, although positive, is noticeably smaller. Satisfaction in turn relates strongly to usage intensity. Because direct links from service reliability and perceived convenience to usage intensity were constrained to zero, both antecedents influence usage exclusively through satisfaction, and the indirect effect carried by service reliability exceeds that of convenience. These results extend the Expectation–Confirmation Model by demonstrating that, in real-time payment rails, outcome assurance transactions that succeed consistently, with stable performance and rapid recovery emerges as the primary antecedent of post-adoption satisfaction that sustains use [13, 15, 16].

The construct separation clarifies why reliability outperforms convenience in day-to-day merchant evaluations. Reliability was modeled as a higher-order formative composite, success ratio and stability/uptime carry the largest weights, followed by consistency, with incident recovery positive but marginal. This hierarchy is theoretically coherent: merchants anchor satisfaction on whether payments go through during peak hours and whether the rail behaves predictably across days. Interface simplicity and short flows matter, but they cannot compensate for recurrent failures or latency spikes, which are remembered as losses at the point of sale [6, 11, 15]. By treating reliability and convenience as distinct antecedents rather than blending them under broad service or system quality labels the findings reconcile adoption-centric work that emphasizes ease and usefulness with post-adoption realities in which performance stability dominates [1, 3, 4, 5, 8, 9].

The control structure reinforces this interpretation. Perceived usefulness registers as a small-to-moderate contributor to satisfaction, whereas perceived ease of use and perceived cost are not significant once reliability is explicit in the model; trust/security and facilitating conditions are marginal. This pattern mirrors the conceptual shift from beliefs to performance in post-adoption contexts: beliefs help set expectations, but rail performance governs satisfaction after continued use [14, 4, 8]. Measurement quality meets recommended thresholds for reliability and validity, and diagnostics for the second-order reliability construct weights, multicollinearity, and redundancy are satisfactory, aligning with guidance for higher-order composites in PLS-SEM [17, 18]. Substantial explained variance for satisfaction and usage intensity, positive predictive relevance, and PLSpredict gains over a linear benchmark together indicate that the model is not only explanatory but also practically predictive in the QRIS setting [19, 20].

Managerially and from a policy perspective, the findings prioritize operational levers that matter most to MSMEs. Success ratio and uptime should be treated as top-line KPIs, with engineering capacity for peak periods, latency containment, and resilient routing. Incident recovery clear error codes, rapid rollback or refund, and merchant-facing communication remains essential to prevent isolated failures from cascading into dissatisfaction, even if its statistical weight is comparatively smaller. Convenience

should be delivered as table stakes, not as the differentiator; when resources are scarce, investment should favor infrastructure stability and fail-safe execution before additional interface refinements. Merchant enablement programs that explain how reliability safeguards revenue, how to troubleshoot edge cases at checkout, and how to verify settlement are likely to translate directly into satisfaction and continued use.

Theoretically, distinguishing reliability from convenience refines post-adoption models for digital payments by positioning reliability as a performance-centric antecedent rather than a subfacet of generic service quality. Methodologically, specifying reliability as a second-order formative construct captures the non-interchangeability of success ratio, uptime, consistency, and recovery, avoiding measurement misspecification that would blur the mechanism [17]. Future research can triangulate perceptions with transaction-log metrics such as objective success and latency, extend predictive assessment with richer holdout designs, and test transaction efficiency as a complementary mediator linking reliability to economic outcomes profitability and income consistent with emerging evidence in Indonesian cities.

Several boundary conditions apply. The cross-sectional design limits causal inference; although mediation is theoretically grounded, longitudinal or quasi-experimental designs would strengthen claims [13]. Usage intensity combines self-reported frequency and value and, despite transformation, may still contain report noise; linking surveys to transactional logs would reduce measurement error. The sample size of 130 is appropriate for the reported specification but constrains the precision of smaller effects and fine-grained subgroup analysis. Finally, while procedural and statistical remedies for common-method bias were implemented, shared-method variance cannot be fully ruled out; multi-source designs are recommended for replication.

In sum, for MSME merchants using QRIS, service reliability is the decisive post-adoption lever: it builds satisfaction, and satisfaction sustains usage intensity. Convenience remains important, but the routine realities of commerce privilege stable, successful, and promptly recoverable transactions. This performance-first message is actionable for providers and regulators seeking to convert first-scan adoption into durable, high-intensity digital payment behavior in the MSME sector.

6 Conclusion

This study demonstrates that, in the day-to-day reality of MSME commerce, service reliability is the decisive post-adoption lever sustaining QRIS usage. Modeling reliability as a higher-order, performance-centric construct and separating it from perceived convenience clarifies their distinct roles: reliability exerts a larger association with satisfaction, and satisfaction, in turn, is strongly related to usage intensity. With direct links to usage constrained to zero, both antecedents operate exclusively through satisfaction, and the indirect effect of reliability exceeds that of convenience. The findings sharpen the Expectation–Confirmation perspective for real-time payments by showing that outcome assurance transactions that go through consistently, with stable

uptime, predictable performance across peaks, and credible recovery anchors merchants' evaluations more than interface simplicity alone.

Theoretical contributions follow from this separation. Treating reliability as a second-order formative construct avoids collapsing success ratio, uptime, consistency, and recovery into interchangeable items and helps reconcile adoption-centric results (which emphasize ease and usefulness) with post-adoption behavior where performance stability dominates. Methodologically, the mediation-only design provides a parsimonious, predictive account of how service mechanics translate into usage via satisfaction, supported by robust measurement quality, substantial explained variance, and meaningful out-of-sample predictive relevance.

Managerially and for policy, the message is actionable: make success ratio and uptime first-order KPIs, engineer capacity for peak traffic and low latency, institutionalize incident recovery with fast, transparent remedies, and treat convenience as table stakes rather than the primary differentiator. Merchant enablement troubleshooting guidance at the point of sale, settlement verification practices, and reliability literacy can convert incremental performance gains into durable satisfaction and continued use, especially for micro merchants operating on thin margins.

Limitations temper these conclusions but also chart the next steps. The cross-sectional design invites longitudinal or quasi-experimental replications; self-reported usage should be triangulated with transaction-log metrics; and larger samples would support fine-grained heterogeneity tests. Even so, the evidence is clear: to convert "first scans" into sustained, high-intensity QRIS usage, stakeholders must prioritize the operational backbone reliability because that is what merchants ultimately experience, remember, and reward with continued adoption.

References

1. Asmara, M.A., Nurlia, Sari, D.F., Asrijal, A., Muafiqie, H.: Analysis of supporting factors for payment technology utilization in MSMEs using Technology Acceptance Model (TAM) method. *Journal of Applied Science, Engineering, Technology, and Education* 5(2), 256–264 (2023). <https://doi.org/10.35877/454RI.asci2396>
2. Bakhitah, A., Indra, R., Halim, W., Ferbian, V., Hidayat, Z.: QRIS as a drivers of product distribution flows in Indonesia: Factors of consumer purchasing behavior in the use of fintech payments. *Journal of Distribution Science* 21(12), 59–69 (2023). <https://doi.org/10.15722/jds.21.12.202312.59>
3. Djoyo, B.W., Nurzaqia, S., Budiarti, S.I., Agustin, S.: Examining the determinant factors of intention to use Quick Response Code Indonesia Standard (QRIS) as a payment system for MSME merchants. In: 2022 International Conference on Information Management and Technology (ICIMTech). IEEE (2022). <https://doi.org/10.1109/ICIMTech55957.2022.9915238>
4. Febriani, R., Panjaitan, S., Wardhana, A.W., Sariyantari, A.: Revolutionizing payment systems: The integration of TRAM and trust in QRIS adoption for MSMEs. *Journal of Information Systems Engineering and Business Intelligence* 10(3), 314–327 (2024). <https://doi.org/10.20473/jisebi.10.3.314-327>
5. Hamzah, E., Muchtar, A., Mukminin, A., Amalia, M., Yetri, N., Rozaini, N.: QRIS e-payment adoption: Customers perspective. *Cogent Business & Management* 11(1), 2316044 (2024). <https://doi.org/10.1080/23311975.2024.2316044>

6. Kusuma, B., Deniswara, R.A., Sitorus, A.: Customer experience perspective on Quick Response Code Indonesia Standard (QRIS) payment method. In: 2023 International Conference on Information Management and Technology (ICIMTech). IEEE (2023). <https://doi.org/10.1109/ICIMTech59029.2023.10277927>
7. Ramayanti, I., Azhar, N., Nik Azman, N.H., Syahchari, D., Sasmoko: Factors influencing intentions to use QRIS to become a future lifestyle: A two-stage modelling approach with PLS-SEM and ANN. *Telematics and Informatics Reports* (2024). <https://doi.org/10.1016/j.teler.2024.100185>
8. Siagian, H., Tarigan, S., Basana, S.R., Basuki, R.: The effect of perceived security, perceived ease of use, and perceived usefulness on consumer behavioral intention through trust in digital payment platform. *International Journal of Data and Network Science* 6(2) (2022). <https://doi.org/10.5267/j.ijdns.2022.2.010>
9. Syanova, R., Fajar, A.N.: Analysis of factors that influence use behaviour of using QRIS payments for UMKM in Bekasi. *Journal of Logistics, Informatics and Service Science* 11(7) (2024). <https://doi.org/10.33168/JLISS.2024.0717>
10. Usman, O., Alianti, M., Fadillah, F.N.: Factors affecting the intention to use QRIS on MSME customers. *International Journal of Applied Economics, Finance and Accounting* 18(1), 77–87 (2024). <https://doi.org/10.33094/ijaefa.v18i1.1323>
11. Wiryawan, D., Suhartono, J., Hiererra, S.E., Ambarwati, S.D.A., Gui, A.: Factors influencing e-wallet users' perception on payment transaction security: Evaluation on quick response Indonesia standard. In: AIP Conference Proceedings 2508(1), 020022. AIP Publishing, Melville (2023). <https://doi.org/10.1063/5.0114922>
12. Al-dabbagh, S., Ryan, J.J., Al-Smadi, S.: Internet service quality and customer satisfaction: An evaluation of SERVQUAL dimensions. *Journal of Applied Economics and Business* 11(3), 83–100 (2023).
13. Bhattacharjee, A.: Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly* 25(3), 351–370 (2001). <https://doi.org/10.2307/3250921>
14. Davis, F. D.: Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly* 13(3), 319–340 (1989). <https://doi.org/10.2307/249008>
15. Musadad, A., Rusydi, M., Handayani, D., Tanjung, S.: Continuance usage of QR mobile payment: System quality analysis. In: 2024 International Conference on Informatics and Computer Science (ICISS). IEEE (2024). <https://doi.org/10.1109/ICISS62896.2024.10751159>
16. Sriwidadi, T., Prabowo, H.: Quick Response Code Indonesia Standard (QRIS) digital payment actual use in MSMEs. In: 2024 9th International Conference on Business and Industrial Research (ICBIR). IEEE (2024). <https://doi.org/10.1109/ICBIR61386.2024.10875722>
17. Xu, J., Peng, C., Prybutok, V.: Formative measurements in operations management research: Using partial least squares. *Quality Management Journal* 26(3), 124–142 (2019). <https://doi.org/10.1080/10686967.2018.1542287>
18. Cheah, J.-H., Roldán, J.L., Ciavolino, E., Ting, H., Ramayah, T.: Sampling weight adjustments in partial least squares structural equation modeling: Guidelines and illustrations. *Total Quality Management & Business Excellence* 32(13–14), 1594–1613 (2021). <https://doi.org/10.1080/14783363.2020.1754125>
19. Dash, G., Paul, J.: CB-SEM vs PLS-SEM methods for research in social sciences and technology forecasting. *Technological Forecasting and Social Change* 173, 121092 (2021). <https://doi.org/10.1016/j.techfore.2021.121092>

20. Magno, F., Cassia, F., Ringle, C.M.: A brief review of partial least squares structural equation modeling (PLS-SEM) use in quality management studies. *The TQM Journal* 36(6), 1242–1251 (2024). <https://doi.org/10.1108/TQM-06-2022-0197>.

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