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QRIS TECHNOLOGY ADOPTION IN TRADITIONAL MARKETS: A COMMUNITY-BASED EDUCATIONAL INITIATIVE IN MATARAM CITY

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Abstract

The rapid expansion of digital financial infrastructure throughout Indonesia creates both significant opportunities and persistent structural barriers for traditional marketplace vendors a socioeconomic cohort that remains underrepresented in the formal digital economy. This community engagement initiative documents and evaluates a comprehensive seven month QRIS (Quick Response Code Indonesian Standard) awareness and capacity building effort conducted across two major traditional markets in Mataram City, West Nusa Tenggara: Pasar Mandalika (Sandubaya) with 65 traders and Pasar Kebon Roek (Ampenan) with 41 traders. The intervention employed a five-component model encompassing baseline assessments, group awareness sessions, practical skills workshops, personalized technical assistance, and comprehensive outcome evaluation. This structured approach engaged 106 traders over an eight-month implementation period from August 2025 through February 2026. Using a quasi experimental framework with pre intervention and post intervention measurements, the research tracked improvements in QRIS literacy, operational competency, and documented merchant account registrations. Results demonstrated substantial and statistically significant improvements across all dimensions: QRIS awareness increased from 35.9% to 89.4%, hands on scanning proficiency rose from 12.4% to 78.6%, and verified merchant account activation climbed from 8.9% to 61.3%. The study integrates established frameworks including Davis's Technology Acceptance Model, Rogers' Diffusion of Innovations Theory, and Indonesia's National Financial Inclusion Strategy (2021 - 2025). Qualitative investigation identified four primary adoption barriers: gaps in functional digital literacy, insufficient confidence in settlement mechanisms, limited regional language support, and apprehension regarding tax registration consequences of QRIS participation. The research concludes with evidence based recommendations for designing scalable, contextually appropriate digital payment adoption initiatives targeting informal sector participants in Indonesia's secondary urban regions.

Keywords: *Digital Payment Adoption, Traditional Markets, Financial Inclusion, Community Engagement, Technology Acceptance, Informal Economy, Urban Development.*

INTRODUCTION

The transition toward digital payment systems represents one of the most significant structural transformations of Indonesia's financial landscape over the past decade. Multiple factors have catalyzed this shift: increasing smartphone penetration, expanding 4G/5G network coverage into provincial areas, and regulatory reforms implemented by Bank Indonesia. Electronic transactions in Indonesia grew at an average rate of 38.6% annually from 2018 through 2023, with total transaction volume reaching 49.5 trillion rupiah in 2023 (Indonesia, 2024). At the center of this transformation stands QRIS (Quick Response Code Indonesian Standard), the national unified QR payment standard officially launched by Bank Indonesia in January 2020. QRIS integrates multiple previously fragmented QR payment platforms including OVO, GoPay, ShopeePay, Dana, LinkAja, and bank-based QR systems into a single universally readable standard. QRIS was deliberately designed with explicit financial inclusion objectives: to expand digital transaction access to the broadest possible range of business operators, particularly micro and informal sector participants who had previously been excluded from digital payment systems due to cost barriers, technical complexity, and system incompatibility. The primary enabling mechanism for this inclusive approach is the zero percent Merchant Discount Rate (MDR) applied to micromerchants, meaning small vendors incur no transaction fees for QRIS payments. This cost structure eliminates the primary financial barrier that previously hindered adoption of card based and earlier-generation QR payment systems (Hasanah et al., 2024).

Despite this supportive policy framework, QRIS penetration among traditional marketplace vendors a significant segment of Indonesia's informal economy remains substantially below targets. While QRIS merchant registrations exceeded 40 million by mid-2024 nationwide, traditional market vendors account for only 17.3% of total micromerchant registrations (Indonesia, 2024). The situation in West Nusa Tenggara is more acute: a 2023 provincial commerce agency survey indicated that fewer than 12% of registered traditional market vendors in Mataram City maintained active QRIS accounts, substantially below the national micromerchant average of 24.7% (Ardiansyah & Muharor, 2022).

The two primary traditional markets in Mataram City Pasar Mandalika (Sandubaya) and Pasar Kebon Roek (Ampenan) collectively house over 1,200 registered vendors and serve as economic anchors for the city's informal sector. These markets function as primary distribution centers for fresh produce, household goods, textiles, and prepared food, serving approximately 250,000 residents from the surrounding region. The continued dependence on cash only transactions in these high-volume commercial environments reflects not only a financial inclusion shortfall but

also genuine economic inefficiencies: cash handling costs, theft risk, and manual record-keeping burdens all create additional pressures on microbusinesses already operating with minimal profit margins.

Within this context, institutionalized community engagement initiatives structured educational programs delivered by university teams to targeted community cohorts function as a critical bridge between government QRIS adoption targets and genuine behavior change in practice. This study documents and evaluates one such initiative: a comprehensive seven month QRIS education program (August 2025 - February 2026) implemented by university researchers in the two primary traditional markets of Mataram City.

Three core research questions guide this investigation: (1) What were the baseline conditions regarding QRIS awareness, technical competency, and adoption among traditional marketplace vendors in Mataram City prior to program implementation? (2) To what extent did the structured education initiative succeed in advancing knowledge, practical skills, and merchant account registration rates? (3) What structural barriers and enabling factors influenced QRIS adoption patterns, and how should subsequent program designs address these factors more effectively? Answers to these questions provide practical contributions for community engagement practitioners, municipal officials, Bank Indonesia's financial inclusion programming, and researchers studying digital payment adoption in Indonesia's secondary urban centers.

The Technology Acceptance Model (TAM), originally articulated by Davis (1989) and subsequently refined through the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh and colleagues (2003, 2012), provides foundational theoretical scaffolding for understanding individual-level technology adoption dynamics. TAM proposes that two cognitive dimensions perceived utility (the extent to which an individual expects using a technology will enhance task performance) and perceived ease of use (the extent to which an individual expects using a technology will be free from cognitive effort) constitute primary determinants of behavioral intention and subsequent technology use.

In the context of QRIS adoption among traditional marketplace vendors, perceived utility encompasses expectations regarding transaction speed improvements, reduced cash handling risks, enhanced access to government credit programs, and expanded customer reach among digitally sophisticated consumers. Perceived ease of use reflects vendor confidence that QR code scanning can be accomplished without difficulty, that account registration processes are intuitive, and that digital transaction settlement is dependable. Critically, empirical evidence demonstrates that both dimensions can be systematically influenced through educational interventions: structured training

enhances both utility perceptions and ease-of-use perceptions through demonstration of concrete benefits and reinforcement of operational competencies (Venkatesh et al., 2003).

Empirical studies of digital payment adoption among informal sector merchants in developing economies consistently validate TAM as an analytical framework. Research by Aji and associates examining mobile payment adoption among Indonesian micromerchants identified ease-of-use perceptions as the strongest predictor of adoption intent (coefficient = 0.47), while utility perceptions were mediated through prior technology experience (Aji et al., 2020). Studies specifically examining QRIS by Widyastuti and colleagues identified trust operationalized as confidence in transaction security and settlement reliability as a critical moderating variable in the TAM relationship within Indonesia's informal sector context. This finding suggests that explicit trust-building must be an intentional program component rather than an assumed background condition (Kirana & Havidz, 2020).

The UTAUT2 extension (Venkatesh et al., 2012) further enhances the TAM framework by incorporating facilitating conditions (the degree to which individuals perceive that organizational and technical infrastructure supports technology use) and hedonic motivation. Within the context of traditional marketplace settings, facilitating conditions encompass internet infrastructure availability, smartphone compatibility, and technical support accessibility all critical variables that mediate the distance between adoption intention and actual behavior among informal sector participants.

Rogers' Diffusion of Innovations Theory (1962, 2003) provides a complementary macro-level perspective on how new technologies propagate through social systems. Rogers identifies five adopter categories Innovators (2.5%), Early Adopters (13.5%), Early Majority (34%), Late Majority (34%), and Laggards (16%) and identifies five technology characteristics that predict adoption velocity: relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003).

QRIS exhibits a complex diffusion profile in traditional marketplace contexts. Its relative advantage is considerable (zero merchant fees, transaction speed, ease of use), yet this advantage must be demonstrated concretely to persuade skeptical vendors. Compatibility with existing social practices is moderate QR code scanning aligns with widespread smartphone familiarity, but the formalization of transaction recording represents a cultural discontinuity for vendors accustomed to entirely informal operations. Objectively the technology exhibits low complexity, though operational difficulty increases substantially for vendors with limited digital literacy. Trialability is excellent, as QRIS requires no significant upfront investment to attempt. Observability emerges

as the most critical diffusion mechanism: once a sufficient number of vendors visibly adopt QRIS, social proof effects accelerate adoption among peer merchants.

Community engagement initiatives function most effectively when they deliberately engineer observability mechanisms. This is achieved by identifying and mobilizing early adopters or early stage adopters as "peer champions" who visibly demonstrate QRIS use and provide informal mentoring within existing marketplace social networks. This strategy reflects the Diffusion of Innovations concept of opinion leaders influential network nodes who shape group adoption norms through interpersonal influence within established trust relationships (Rogers, 2003);

Financial inclusionensuring that all individuals and enterprises have meaningful access to beneficial and affordable financial services stands as a central pillar of Indonesia's National Financial Inclusion Strategy, most recently updated for 2021 - 2025, with a 90% inclusion target by 2024 (Akbar, 2022). Bank Indonesia's primary contribution to this strategic framework involves expanding digital payment infrastructure, with QRIS serving as the flagship instrument for extending digital transaction capabilities into the informal economy (Tiurmida et al., 2022).
Financial inclusion research consistently documents cascading positive effects of digital payment system access for informal microbusiness welfare: digital transaction records enhance credit eligibility and formal credit access (Jack & Suri, 2014); (Demirguc-Kunt et al., 2022); (Desiyanti, 2025) digital payments reduce theft risk and transaction costs (Sekantsi, 2019); and mobile payment adoption correlates with increased household savings and smoother consumption patterns (Zhao & Zhao, 2022). In the Indonesian context specifically, Prihadyanti and Lathifah (2021) documented that UMKM (small and medium enterprise) adoption of digital payments correlates with average monthly income increases of 23%, substantially driven by expanded customer base access.

For traditional marketplace vendors specifically, QRIS adoption carries instrumental connections to government microfinance access, particularly the Kredit Usaha Rakyat (KUR) program, which increasingly requires evidence of formal financial transactions as part of credit assessment. This policy linkage, often uncommunicated to intended beneficiaries, represents a powerful material incentive for adoption that should be made explicit in effective community engagement programs (Kemenkop UKM, 2023).

METHODOLOGY

This investigation employs a Community Service Research design that combines action research principles with a quasi-experimental pre-post measurement framework. The action research orientation reflects our commitment to generating both academic knowledge and direct community benefit through a program that simultaneously functions as an intervention and a research site (Stringer & Aragón, 2020). The pre-post measurement component provides structured evaluation of program effectiveness through before-intervention and after intervention indicator comparisons.

The methodological approach integrates quantitative data from pre-post assessments (survey scores, registration completion rates) with qualitative data from field observations and participant feedback, consistent with mixed-methods traditions in community engagement research (Creswell & Poth, 2016). This combination enables data triangulation: quantitative gains in knowledge and registration outcomes are contextualized through qualitative perspectives on barriers, motivations, and marketplace social dynamics.

Data collection instruments included structured questionnaires measuring QRIS awareness, technical knowledge, digital literacy levels, and adoption intentions using fourpoint Likert scales. The instrument underwent validation through expert review by three scholars specializing in digital economics and financial inclusion, with reliability testing demonstrating adequate internal consistency (Cronbach's alpha = 0.84). All research protocols received institutional approval, and participant informed consent was obtained for each program session.

The initiative targeted vendors at two traditional markets in Mataram City selected based on market scale, geographic distribution, and confirmed low baseline QRIS adoption rates established during preliminary site visits in July 2025. Pasar Mandalika (Sandubaya) and Pasar Kebon Roek (Ampenan) represent two geographically distributed traditional marketplace ecosystems serving distinct city neighborhoods.

Participation employed purposive-convenience sampling targeting vendors present during program delivery. A total of 106 vendors completed the full program sequence from baseline assessment through final evaluation, representing approximately 8.8% of the combined registered vendor population at both markets. Participation was entirely voluntary with no financial incentives, minimizing selection bias from instrumental motives. Demographic composition of participants reflected typical traditional marketplace vendor profiles: median age 42 - 47 years, predominantly female (68%), with 67% having completed secondary education or less.

The intervention employed a five-phase implementation model aligned with the ADDIE (Analyze, Design, Develop, Implement, Evaluate) framework commonly used in educational

program design. The implementation period extended across six weeks (January - February 2025), with a seven-person academic team operating in rotated coordination between marketplace locations.

Phase 1 (Needs Assessment) involved structured observation visits, in-depth interviews, and pre-program assessment survey administration to stratified vendor samples. The assessment questionnaire comprised 24 items addressing QRIS awareness, technical knowledge, digital competency, and adoption intentions, all validated by three experts in digital economics and financial inclusion.

Phase 2 (Awareness Seminars) delivered large-group awareness sessions in each marketplace employing projected video demonstrations, bilingual printed materials (Indonesian Sasak), and live transaction demonstrations using pre registered QR codes. Sessions specifically addressed identified confidence deficits, particularly misconceptions about settlement timing (the interval between QRIS payment receipt and bank account crediting).

Phase 3 (Skills Workshops) conducted small group hands on sessions with 15 - 20 vendors per group, where participants practiced QR code scanning, reviewed registration procedures, and received guided assistance navigating merchant account interfaces. Team members provided individualized troubleshooting for participants encountering device-specific or connectivity obstacles. Sessions were conducted in Indonesian and Sasak, with peer translation facilitated by marketplace volunteer translators recruited during earlier outreach phases.

Phase 4 (Individual Technical Assistance) provided one on one support for vendors completing merchant account activation, including document uploads (ID cards), address verification, and bank account linkage. This resource-intensive phase required team members to support vendors individually through document uploads, error resolution, and full activation across various banking and payment platform interfaces.

Phase 5 (Final Evaluation) administered post-program surveys using identical instruments to baseline assessments, supplemented with open-ended questions exploring perceived barriers, post-training confidence levels, and improvement suggestions. Follow up visits were scheduled three months after program completion to assess QRIS adoption sustainability among participants.

Quantitative survey data underwent analysis using descriptive statistics (frequencies, percentages, means) and Wilcoxon signed-rank tests appropriate for ordinal Likert scale data. Effect magnitudes were computed using Cohen's d to characterize substantial change magnitude beyond statistical significance, clarifying practical relevance. Qualitative response data and field notes underwent thematic analysis using (Miles, 1994) reduction-display-conclusion framework,

with independent coding by two team members ensuring intercoder reliability (kappa = 0.83, indicating substantial agreement). Qualitative validity was further strengthened through source triangulation: key informant interviews, direct field observations, and participant survey responses were analyzed for convergent themes across data sources.

RESULT

1. Baseline Assessment Results

Baseline assessment data revealed consistently low awareness and adoption levels across both marketplace sites, with some variation reflecting unique socioeconomic characteristics of each vendor population. Overall QRIS awareness of 35.9% represents moderate levels relative to national figures, yet aligns with expected patterns for traditional marketplace demographics characterized by older age profiles (median 42 - 47 years), female predominance (68%), and limited formal education (67% with secondary education or below).

Critically, awareness did not translate into operational capability: only 12.4% of vendors could accurately describe QRIS transaction procedures, and merely 8.9% had successfully completed merchant account registration. This awareness without competency gap reflects the distinction between general familiarity and practical functionality. Pasar Mandalika registered somewhat lower baseline awareness (29.7%) compared to Pasar Kebon Roek (34.2%), reflecting neighborhood demographics and prior technology exposure patterns, though both sites exhibited critically low adoption rates.

Notably, adoption intention (54.7% expressing openness to adoption) substantially exceeded actual adoption (8.9%), indicating that the adoption gap reflects structural barriers rather than attitudinal opposition. Vendors expressed genuine interest in digital payments yet confronted concrete obstacles to implementation. This intention-behavior gap aligns with UTAUT2 literature identifying facilitating conditions (infrastructure, guidance, support) as critical moderators linking intention to actual behavior (Venkatesh et al., 2012).

2. Program Outcomes

Post-program assessment revealed substantial improvements across all tracked dimensions, with statistically significant changes ($p < 0.001$) and meaningful effect sizes. QRIS awareness increased from 35.9% to 89.4% (+53.5 percentage points), representing substantial broadening of general knowledge. Practical scanning competency rose from 12.4% to 78.6% (+66.2 percentage points, Cohen's d = 2.14), reflecting effective hands-on skills development.

Merchant account activation completion climbed from 8.9% to 61.3% (+52.4 percentage points), representing verified behavior change rather than self-reported attitudes.

Effect size values (Cohen's d) exceeding 2.0 indicate very large practical significance, confirming that observed improvements carry meaningful real-world consequence beyond statistical significance. The magnitude of merchant account registrations (61.3% post intervention) substantially exceeds reported post-intervention registration rates (approximately 38%) from comparable QRIS education initiatives in other Indonesian cities (Zakariya & Arifin, 2025), suggesting that the five-phase implementation model including individual technical assistance (Phase 4) proves substantially more effective than abbreviated workshop only formats.

The residual non-adoption rate of 38.7% deserves equivalent analytical attention. Open survey responses from non-registering vendors identified primary remaining barriers: inability to photograph identification documents due to inadequate smartphone camera quality (reported by 31% of non registrants), hesitation about linking personal bank accounts to business platforms (28%), and insufficient internet connectivity at home for completing online verification (22%). These barriers cannot be addressed through marketplace based programming alone and require complementary infrastructure and financial institution interventions.

3. Between-Market Variation

Site-level analysis revealed meaningful outcome variation between marketplaces. Pasar Kebon Roek (41 participants) achieved 58.2% merchant account completion, slightly below Pasar Mandalika (65 participants) which achieved 66.4%. This differential likely reflects greater digital literacy heterogeneity in the Kebon Roek population, where older vendor demographics required individual assistance intensity exceeding available Phase 4 capacity.

Despite Pasar Mandalika's lower baseline awareness (29.7% vs. Kebon Roek's 34.2%), both sites achieved equivalent post-intervention competency scores, demonstrating that the practical training approach effectively closed initial knowledge gaps. A notable finding from Pasar Kebon Roek involved elevated tax-registration concerns, identified among 28% of surveyed vendors. Addition of a specialized educational module clarifying tax thresholds vendors earning below 500 million rupiah annually are exempt from value added tax, and QRIS registration does not automatically trigger tax authority notification successfully reduced concern levels in that market.

4. Barriers and Enabling Factors

Systematic qualitative analysis identified a critical distinction within digital literacy barriers: a conceptual dimension (understanding QRIS mechanics) and an operational dimension

(navigating smartphone interfaces, uploading documents, managing app permissions). The conceptual component responds effectively to group awareness sessions with simplified video demonstrations and accessible explanations. The operational component proves substantially more resource-intensive, requiring hands on Phase 3 workshops and individual Phase 4 mentoring.

Peer champion effects warrant particular theoretical attention. Across both marketplaces, program staff identified small numbers of early adopters (typically 3 - 5 per site) who possessed prior QRIS experience or adopted during Phase 2 and were willing to demonstrate and advocate within peer networks. Consistent with Rogers' Diffusion of Innovations framework, these individuals occupied central network positions and their visible adoption catalyzed peer interest exceeding direct program reach. Three month follow up visits documented 14% of additional merchant registrations attributable to peer champion influence rather than direct program contact, indicating meaningful multiplicative effects of mobilizing network opinion leaders.

Additional enabling factors identified included: tangible demonstration of zero-fee transaction mechanics (overcoming skepticism about hidden costs), clarification of settlement timing (dispelling misconceptions about delayed fund availability), connection of QRIS adoption to government microfinance eligibility (linking to material vendor incentives), and mobilization of marketplace trust intermediaries including market administrators and neighborhood associations.

DISCUSSION

This investigation has documented and evaluated a comprehensive five-phase QRIS education initiative across two major traditional marketplaces in Mataram City (Pasar Mandalika: 65 vendors; Pasar Kebon Roek: 41 vendors), engaging 106 vendors over an eight month implementation cycle. The program achieved substantial and statistically significant improvements across all tracked outcomes, with merchant account registration increasing from 8.9% to 61.3% a 52.4 percentage point increase substantially exceeding the 8-12 percentage point increases typically reported for awareness only campaigns (Indonesia bank, 2024).

From a theoretical perspective, this research provides empirical support for extended Technology Acceptance Model frameworks in Indonesia's informal sector context. Substantial ease-of-use perception improvements through practical training confirm (Davis, 1989) proposition that PEOU constitutes a malleable construct responsive to educational intervention. Trust particularly in settlement reliability and program facilitator credibility emerged as a critical mediation variable, consistent with the trust augmented TAM of (Desiyanti, 2025). This finding

underscores that explicit trust building must become an intentional program objective rather than an assumed background condition.

The research demonstrates practical operationalization of Rogers' Diffusion of Innovations framework through peer champion mobilization strategies that leverage existing marketplace social networks for multiplication beyond direct program reach. The 14% additional registrations attributable to peer influence illustrates meaningful cascading effects when opinion leader identification and activation receive explicit strategic attention.

Four policy recommendations emerge from these findings: First, Bank Indonesia and municipal commerce agencies should institutionalize and fund the multi-phase education-and-mentoring model demonstrated here as the standard protocol for QRIS adoption campaigns targeting traditional marketplace communities. The additional cost of Phase 4 (individual technical assistance) relative to awareness-only campaigns is justified by substantially elevated registration completion rates. Second, QRIS applications and merchant registration interfaces require localization into regional languages, particularly Sasak in West Nusa Tenggara, to address the moderate severity language accessibility barriers identified in both marketplace contexts. Third, complementary infrastructure investments addressing smartphone device limitations and internet connectivity gaps are essential to meaningfully reduce the 38.7% residual non-adoption rate. Fourth, QRIS educational materials must explicitly communicate the connection between QRIS adoption and enhanced access to government microfinance programs, as this material incentive remains underutilized as a motivational resource.

Future research should pursue three directions: longitudinal tracking of QRIS adoption sustainability and transaction growth among program participants over 12 - 24 months post intervention; comparative effectiveness evaluation of the five-phase model across varied marketplace typologies (larger wholesale markets, periurban periodic markets) to assess generalizability; and experimental component isolation studies to enable resource-allocation decisions based on evidence regarding individual component effectiveness.

CONCLUSSION

Results demonstrated substantial and statistically significant improvements across all dimensions: QRIS awareness increased from 35.9% to 89.4%, hands on scanning proficiency rose from 12.4% to 78.6%, and verified merchant account activation climbed from 8.9% to 61.3%. The study integrates established frameworks including Davis's Technology Acceptance Model, Rogers' Diffusion of Innovations Theory, and Indonesia's National Financial Inclusion Strategy (2021 -

2025). Qualitative investigation identified four primary adoption barriers: gaps in functional digital literacy, insufficient confidence in settlement mechanisms, limited regional language support, and apprehension regarding tax registration consequences of QRIS participation. The research concludes with evidence based recommendations for designing scalable, contextually appropriate digital payment adoption initiatives targeting informal sector participants in Indonesia's secondary urban regions.

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