https://doi.org/10.64211/oidaijsd191015

Beyond adoption: trust and promotion in explaining sustained QRIS usage among micro-enterprises

Kartika Indah Permanasari *[1], Endang Siti Astuti [2], Kadarisman Hidayat [3], Mukhammad Kholid Mawardi [4]

[1] Doctoral Program in Administrative Science, Faculty of Administrative Science, Universitas Brawijaya, Malang, Indonesia.

[2,3,4] Faculty of Administrative Science, Universitas Brawijaya, Malang, Indonesia

Corresponding author: kartika18@student.ub.ac.id

© Permanasari et al

OIDA International Journal of Sustainable Development, Ontario International Development Agency, Canada.
ISSN 1923-6654 (print) ISSN 1923-6662 (online) www.oidaijsd.com
Deposited in SSRN repository: https://www.ssrn.com/ssrn/

Abstract: Digital payment systems have expanded rapidly across emerging economies, yet sustained usage among micro-enterprises remains inconsistent. In Indonesia, the implementation of the Quick Response Code Indonesian Standard (QRIS) has accelerated digital transaction integration, especially in the culinary micro-business sector. Nevertheless, many enterprises adopt QRIS formally without using it consistently in everyday transactions. Existing technology adoption studies largely emphasize initial acceptance while paying less attention to the behavioural and contextual mechanisms that sustain continued usage. This study addresses that gap by extending UTAUT through the inclusion of trust as a mediating variable and promotion as a moderating variable to explain actual QRIS usage behaviour among micro-enterprises.

The study is positioned within the broader literature on digital payment adoption, financial technology, and behavioural technology acceptance in emerging markets. Prior studies have consistently shown that performance expectancy, effort expectancy, social influence, and facilitating conditions influence technology adoption. However, digital financial environments involve uncertainty, perceived transaction risk, and dependence on platform reliability, making trust a central behavioural factor. At the same time, promotional incentives such as cashback, discounts, and rewards have become dominant strategies for increasing QRIS transactions, although their long-term implications for sustained usage behaviour remain insufficiently explored.

A quantitative cross-sectional survey design was employed. Data were collected from 200 micro culinary enterprises in Indonesia that actively use QRIS in daily transactions. Respondents were selected using purposive sampling to ensure relevance to the research objectives. The questionnaire was developed from validated UTAUT and fintech adoption measures and utilized a five-point Likert scale. Data were analyzed using PLS-SEM, which is appropriate for examining complex predictive relationships involving mediation and moderation effects.

The findings demonstrate that performance expectancy, effort expectancy, social influence, and facilitating conditions significantly influence both trust and actual usage behaviour. Among these factors, social influence and facilitating conditions exert relatively stronger effects, indicating that digital payment behaviour among micro-enterprises is shaped not only by perceived usefulness but also by ecosystem readiness and social interaction. Trust is also found to significantly influence usage behaviour and partially mediate the relationships between all UTAUT constructs and sustained QRIS usage. This result suggests that technological perceptions are translated into behavioural outcomes through psychological confidence in system reliability and security.

The moderating role of promotion reveals more nuanced results. Promotional incentives strengthen the effects of effort expectancy, social influence, and facilitating conditions on usage behaviour, indicating that incentives can reinforce behavioural drivers associated with convenience, social endorsement, and infrastructural support. However, promotion does not significantly moderate the relationship between performance expectancy and usage behaviour.

More importantly, promotion negatively moderates the relationship between trust and usage behaviour, suggesting that excessive reliance on incentives may weaken trust-driven engagement and encourage transactional rather than sustainable behavioural patterns.

These findings contribute to digital payment and fintech literature by providing a more integrative explanation of sustained usage behaviour that combines cognitive, psychological, and contextual dimensions within an extended UTAUT framework. The study also highlights the asymmetric role of promotional strategies in digital ecosystems, showing that incentives may simultaneously strengthen adoption drivers while undermining intrinsic trust-based usage. For policymakers, fintech providers, and financial institutions, the results imply that long-term digital payment sustainability cannot rely solely on promotional campaigns. Greater attention should be directed toward strengthening trust, system reliability, user support, and ecosystem readiness to foster stable and sustainable digital financial behaviour in emerging economies.

Keywords: digital payment, promotion, QRIS, trust, UTAUT

Introduction

The acceleration of digital technology development has transformed the architecture of payment systems worldwide, encouraging a gradual shift from conventional cash transactions toward digital and cashless payment mechanisms. In many emerging economies, digital payment innovation is increasingly viewed as an important instrument for strengthening financial inclusion, improving transaction efficiency, and supporting economic resilience [1]; [2]. In Indonesia, the QRIS was introduced as a national policy initiative aimed at integrating and standardizing digital payment systems across platforms while simultaneously broadening financial accessibility for MSMEs. Although QRIS adoption has expanded rapidly, the continuity of its actual usage among merchants remains uneven, indicating a substantial gap between formal adoption and sustained behavioural engagement [3]; [4]; [5].

Among Indonesian MSMEs, micro culinary enterprises represent one of the most economically significant sectors due to their contribution to employment generation and local economic circulation. Nevertheless, the integration of digital payment systems within this sector has not been fully stable or consistent. Previous studies indicate that many micro-enterprises continue to encounter barriers related to digital literacy limitations, concerns regarding transaction security, uncertainty over platform reliability, and strong dependence on short-term promotional incentives [6]; [7]; [8]. Such conditions imply that the sustained use of digital payment systems cannot be unders [9]; [10].

To explain technology adoption behaviour, UTAUT has frequently been employed through key constructs including performance expectancy, effort expectancy, social influence, and facilitating conditions [11]; [12]. Although UTAUT has shown considerable explanatory capability in various technological contexts, its application in financial technology environments—particularly digital payment ecosystems—still requires further theoretical refinement. Digital payment activities inherently involve issues of uncertainty, financial vulnerability, privacy protection, and system reliability, thereby positioning trust as a central factor influencing behavioural outcomes [13]; [14]; [15]; [16]; [17].

From a broader behavioural standpoint, TPB conceptualizes behaviour through attitudes, subjective norms, and perceived behavioural control [18]; [19]. However, TPB alone does not adequately capture technology-specific perceptions relevant to digital financial systems. Consequently, combining TPB with UTAUT allows for a more comprehensive analytical framework in which UTAUT explains technological perceptions, while TPB contributes behavioural and normative dimensions. Within this integrated perspective, trust can be positioned as an important mediating mechanism linking users' cognitive evaluations with their actual behavioural practices [20]; [21]; [22]; [23]; [24].

Despite the growing literature on digital payment adoption, several important limitations remain evident. First, much of the existing research concentrates on behavioural intention rather than actual usage behaviour, thereby relying heavily on intention-based proxies that may not accurately represent real transactional practices [13]; [25]; [26]. Second, dominant adoption models, including UTAUT, are frequently applied in a linear manner and often overlook the psychological processes that mediate the transition from perception to behaviour, particularly trust in high-risk financial settings [27]; [21]; [28]. Third, contextual factors such as promotion are generally treated as direct predictors of adoption, despite the possibility that promotional mechanisms may instead alter the strength of behavioural relationships [27]; [28]. Fourth, prior studies largely emphasize consumers, leaving merchant behaviour—especially among resource-constrained micro-enterprises—relatively underexplored [29]; [30]; [31]. In addition, evidence from developing economies remains fragmented and often fails to sufficiently address contextual realities such as infrastructural disparities, informal market structures, and socially driven business practices.

The role of promotion also requires further theoretical clarification. Incentive-based mechanisms including cashback programs, discounts, and onboarding rewards are widely utilized to stimulate digital payment transactions. Nevertheless, empirical findings regarding their effectiveness remain inconsistent. Some studies report that promotional incentives strengthen user participation and accelerate digital payment engagement, whereas others suggest that such effects are temporary and insufficient for maintaining long-term behavioural continuity [27]; [28]. These contradictory findings indicate that promotion may operate more appropriately as a moderating factor capable of amplifying or weakening behavioural relationships rather than functioning merely as a direct determinant.

Furthermore, existing scholarship has focused predominantly on consumer adoption, creating limited understanding of merchant-side digital payment behaviour, particularly within non-metropolitan and micro-business environments [29]; [30]; [31]. Merchant adoption dynamics differ substantially from consumer behaviour because they are closely associated with operational continuity, transaction management, efficiency considerations, and business sustainability. Therefore, examining QRIS usage from the perspective of micro culinary enterprises offers important theoretical and empirical contributions to the digital payment literature.

Based on these gaps, this study aims to investigate how digital payment usage can be sustained beyond the initial stage of adoption. To address this issue, the study develops an extended UTAUT framework by incorporating trust as a mediating variable and promotion as a moderating variable in explaining the actual usage behaviour of QRIS among micro culinary enterprises. This research contributes to the literature by shifting attention from adoption intention toward sustained behavioural usage within resource-constrained business settings. In contrast to previous intention-oriented and linear models, this study proposes a more integrative perspective in which trust acts as a key psychological mechanism translating technological perceptions into behavioural outcomes, while promotion is conceptualized as a contingent factor producing asymmetric effects. The findings further demonstrate that promotional incentives do not uniformly strengthen usage behaviour; under certain conditions, they may simultaneously reinforce some behavioural drivers while weakening trust-based engagement. By revealing these complex and non-linear dynamics in an emerging market context, this study extends the theoretical development of UTAUT and offers practical insights for policymakers and fintech providers in designing more sustainable, trust-oriented digital payment ecosystems.

Materials and Methods

This research employs a quantitative methodology with a cross-sectional survey design to investigate the factors influencing the actual usage behaviour of QRIS among micro culinary enterprises in Indonesia. The quantitative approach was selected because the study seeks to empirically evaluate theoretically derived relationships and generate findings that can be generalized within a structured analytical framework [13]; [32]; [33]; [34]; [35].

The population of this study comprises micro culinary enterprises that have implemented QRIS as part of their payment system. Respondents were selected through purposive sampling to ensure their suitability for the research objectives. The inclusion criteria required participants to: (1) actively utilize QRIS in routine business transactions, and (2) belong to the micro-enterprise category according to national business classification standards. A total of 200 valid questionnaires were obtained and included in the analysis. This sample size satisfies the recommended requirements for PLS-SEM, particularly for research models involving both mediation and moderation relationships [36]; [37]; [38]; [39].

Primary data were gathered through a structured questionnaire administered to QRIS merchants. The measurement items for all constructs were adapted from previously validated studies and subsequently adjusted to fit the context of digital payment usage. Responses were measured using a five-point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). The variables of performance expectancy, effort expectancy, social influence, and facilitating conditions were derived from UTAUT. Meanwhile, the constructs of trust and usage behaviour were adapted from prior literature in the areas of financial technology and electronic commerce. The promotion variable was designed to capture respondents’ perceptions regarding the attractiveness and intensity of incentive-based programs, including cashback offers, discounts, and transaction-related rewards [26]; [38]; [39].

To mitigate potential internal biases during data collection, several procedural measures were implemented. First, all questionnaire items were adapted from well-established and previously validated measurement scales to enhance construct validity and reduce measurement error. Prior to the main survey, the questionnaire was reviewed by academic experts and pilot-tested with a small group of QRIS users to ensure clarity, readability, and contextual relevance. Second, respondents were informed that their participation was voluntary, anonymous, and confidential, thereby minimizing social desirability bias and encouraging honest responses. Third, standardized instructions were provided to all participants, and identical questionnaire formats were used throughout the data collection process to reduce interviewer and procedural bias. In addition, the order of measurement items was arranged to minimize response pattern effects and common method bias arising from self-reported data. Finally, data screening procedures were conducted to identify incomplete responses, inconsistent answer patterns, and

duplicate submissions before statistical analysis. These procedures enhanced the reliability and internal validity of the collected data and strengthened the credibility of the empirical findings.

Research Model and Hypotheses Development

The widespread expansion of digital payment systems has substantially altered transaction practices, especially within emerging economies where micro-enterprises contribute significantly to economic activity. In Indonesia, the implementation of QRIS reflects an important transformation in transaction management and payment integration for small businesses. Nevertheless, although digital payment infrastructure has become increasingly accessible, the continuity of actual system usage among micro-enterprises remains inconsistent. Consequently, understanding how technological access is translated into sustained behavioural usage has become an important issue in digital payment research.

To address this issue, the present study adopts UTAUT as its primary theoretical foundation. UTAUT explains technology usage behaviour through four principal constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. These dimensions represent both individual-level evaluations and environmental influences that shape behavioural responses toward technology adoption. However, within financial technology environments—particularly digital payment systems—trust becomes highly important because users must deal with concerns related to transaction security, system reliability, and data protection.

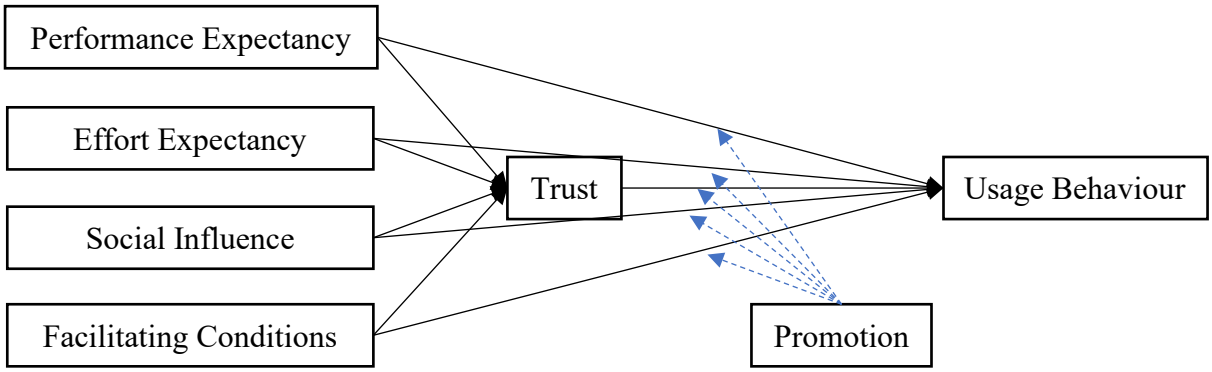


Figure 1: Research Model

Source: Authors

At the same time, promotional mechanisms such as cashback, discounts, and incentive programs have become common strategies for encouraging digital payment usage. Despite their widespread application, previous findings concerning their effectiveness in sustaining long-term behavioural engagement remain inconclusive. Some studies suggest that promotions strengthen user participation, whereas others indicate that incentive-based usage may only generate temporary behavioural responses. Accordingly, this study extends the UTAUT framework by positioning trust as a mediating variable and promotion as a moderating variable in order to provide a broader explanation of actual QRIS usage behaviour among micro culinary enterprises (Figure 1).

UTAUT Constructs and Trust

Performance expectancy refers to the extent to which users perceive that a technology can improve task performance and operational outcomes [40]; [12]. Within the QRIS environment, micro-enterprises are more likely to build confidence in the system when they experience practical advantages such as faster transaction processing, improved efficiency, and smoother business operations. Consequently, stronger perceptions of usefulness are expected to increase trust in QRIS-based transactions.

Effort expectancy describes the degree to which a system is perceived as easy to learn and operate [13]; [12]. User-friendly technologies generally reduce uncertainty and cognitive effort, thereby increasing users' confidence in adopting digital systems. For micro-enterprises with limited technological expertise, ease of operation becomes an essential factor in fostering trust toward digital payment platforms.

Social influence reflects the perception that significant others encourage or expect the use of a particular technology [41]; [42]; [12]. In the context of digital payments, encouragement from customers, peers, and surrounding business communities can shape user perceptions and strengthen confidence in the reliability and legitimacy of QRIS.

Facilitating conditions refer to the availability of organizational and technical resources that support system usage [43]; [12]. Reliable infrastructure, adequate technical assistance, and compatibility with business activities can minimize perceived uncertainty and improve confidence in the system, thereby reinforcing trust among users.

Based on these arguments, the following hypotheses are formulated:

H1: Performance expectancy has a positive and significant effect on trust.
H2: Effort expectancy has a positive and significant effect on trust.
H3: Social influence has a positive and significant effect on trust.
H4: Facilitating conditions have a positive and significant effect on trust.

UTAUT Constructs and Usage Behaviour

Beyond their influence on trust, the core dimensions of UTAUT are also expected to directly shape actual usage behaviour [44]; [45]; [40]; [12]. Performance expectancy may encourage continued QRIS utilization when users perceive that the technology delivers meaningful operational benefits. Likewise, effort expectancy can reduce barriers to system use, facilitating more frequent and consistent interaction with digital payment services.
Social influence also plays an important role in shaping behavioural patterns, particularly within small business environments where customer preferences and peer practices strongly affect decision-making processes [41]; [42]. At the same time, facilitating conditions ensure that users possess the necessary infrastructure, resources, and support to maintain continuous usage over time [43].

Accordingly, the following hypotheses are proposed:
H5: Performance expectancy has a positive and significant effect on usage behaviour.
H6: Effort expectancy has a positive and significant effect on usage behaviour.
H7: Social influence has a positive and significant effect on usage behaviour.
H8: Facilitating conditions have a positive and significant effect on usage behaviour.
H9: Promotion have a positive and significant effect on usage behaviour.

The Mediating Role of Trust

Trust represents one of the central determinants of behaviour in digital financial services, where users depend on the system to securely process financial transactions and sensitive information [46]; [44]; [45]; [47]; [48]; [16]; [17]. In this research, trust is positioned as a mediating construct that explains how perceptions regarding usefulness, ease of use, social influence, and supporting conditions are translated into sustained usage behaviour.

Users who perceive a system as trustworthy are generally more willing to overcome uncertainty and continue using the technology consistently. Conversely, even technologically beneficial systems may fail to sustain long-term engagement if users lack confidence in their reliability and security. Therefore, trust functions as a crucial psychological mechanism linking technological perception with behavioural outcomes [40]; [16].

Based on this reasoning, the following hypotheses are advanced:

H10: Trust has a positive and significant effect on usage behaviour and mediates the relationship between performance expectancy and usage behaviour.
H11: Trust has a positive and significant effect on usage behaviour and mediates the relationship between effort expectancy and usage behaviour.
H12: Trust has a positive and significant effect on usage behaviour and mediates the relationship between social influence and usage behaviour.
H13: Trust has a positive and significant effect on usage behaviour and mediates the relationship between facilitating conditions and usage behaviour.

The Moderating Role of Promotion

Promotion constitutes an important strategic instrument in digital payment ecosystems. Incentive mechanisms such as cashback, discounts, and transaction rewards are frequently used to stimulate user engagement and encourage repeated transactions [46]; [49]; [50]; [26]. Nevertheless, the effectiveness of promotional strategies may vary across different behavioural contexts.

In this study, promotion is conceptualized as a moderating variable capable of strengthening or weakening the relationship between UTAUT constructs, trust, and usage behaviour. For instance, although users may already perceive QRIS as useful and easy to operate, promotional incentives may further intensify their motivation to use the system regularly. Conversely, in situations where promotional support is absent, these behavioural relationships may become weaker [50].

Therefore, the following hypotheses are proposed:

H14: Promotion moderates the relationship between performance expectancy and usage behaviour, such that the relationship becomes stronger at higher levels of promotion.
H15: Promotion moderates the relationship between effort expectancy and usage behaviour, such that the relationship becomes stronger at higher levels of promotion.
H16: Promotion moderates the relationship between social influence and usage behaviour, such that the relationship becomes stronger at higher levels of promotion.
H17: Promotion moderates the relationship between facilitating conditions and usage behaviour, such that the relationship becomes stronger at higher levels of promotion.
H18: Promotion moderates the relationship between trust and usage behaviour, such that the relationship becomes stronger at higher levels of promotion.

Operationalization of Variables

All constructs in this study were operationalized reflectively, with each variable measured using four indicators. The indicators and measurement items were adapted from prior validated studies and contextualized to the QRIS digital payment environment. The detailed operationalization of variables is presented in Table 1.

Table 1: Operationalization of Variables

Variable	Definition	Indicators	Measurement Items (Likert Scale 1–5)	Sources
Performance Expectancy (PE)	The degree to which using QRIS provides benefits in improving business performance	PE1	Using QRIS improves transaction efficiency in my business	[40]; [12]
		PE2	QRIS helps increase transaction speed	
		PE3	QRIS enhances overall business productivity	
		PE4	QRIS is useful for managing customer payments	
Effort Expectancy (EE)	The degree of ease associated with the use of QRIS	EE1	Learning to use QRIS is easy for me	[13]; [12]
		EE2	Interaction with QRIS is clear and understandable	
		EE3	QRIS is easy to operate in daily transactions	
		EE4	I find QRIS flexible to use	
Social Influence (SI)	The extent to which important others influence the use of QRIS	SI1	People important to me encourage the use of QRIS	[41]; [42]; [12]
		SI2	Customers prefer to pay using QRIS	
		SI3	Other business owners influence me to use QRIS	
		SI4	QRIS is widely accepted in my business environment	
Facilitating Conditions (FC)	The degree to which organizational and technical infrastructure supports QRIS usage	FC1	I have the necessary resources to use QRIS	[43]; [12]
		FC2	QRIS is supported by reliable internet access	
		FC3	Technical support is available when needed	
		FC4	QRIS is compatible with my business operations	

Variable	Definition	Indicators	Measurement Items (Likert Scale 1–5)	Sources
Trust (TR)	The belief that QRIS is secure, reliable, and trustworthy for transactions	TR1	I trust QRIS to handle transactions securely	[46]; [44]; [45]; [47]; [48]
		TR2	QRIS is reliable for daily transactions	
		TR3	QRIS protects my financial information	
		TR4	I feel confident using QRIS for business transactions	
Promotion (PR)	The perceived attractiveness and intensity of incentives offered for using QRIS	PR1	QRIS promotions (cashback/discounts) are attractive	[46]; [49]; [26]
		PR2	Promotions encourage me to use QRIS more frequently	
		PR3	Promotional programs increase my transaction volume	
		PR4	QRIS incentives are beneficial for my business	
Usage Behaviour (UB)	The extent of actual use of QRIS in business transactions	UB1	I frequently use QRIS in my daily transactions	[44]; [45]; [40]
		UB2	QRIS is my primary payment method	
		UB3	I consistently use QRIS for customer payments	
		UB4	I intend to continue using QRIS regularly	

Source: Authors

Methodology

Research Context

The expansion of digital payment technology across emerging economies has significantly altered transactional practices, especially within the micro-enterprise sector. In Indonesia, the implementation of the QRIS constitutes an important national initiative aimed at integrating digital payment services through a standardized platform while simultaneously promoting broader financial inclusion. Through QRIS, merchants are able to receive payments from various digital applications within a single interoperable system, thereby improving transaction efficiency and simplifying operational processes.

Although QRIS infrastructure has become increasingly accessible, sustained usage among micro-enterprises remains inconsistent. This issue is particularly evident in the micro culinary sector, where transactions occur intensively and interactions with consumers are highly frequent. In this setting, continued QRIS utilization is shaped not only by technological accessibility but also by behavioural and contextual dimensions, including trust and promotional exposure. Consequently, identifying the factors that influence actual usage behaviour is crucial for understanding the effectiveness of digital payment systems in emerging-market environments [36; [37]; [51].

Research Design and Data Collection

Questionnaire Design

This research employed a quantitative cross-sectional design using a structured survey instrument derived from an extensive review of prior literature, particularly studies related to UTAUT and digital payment adoption [40]; [12]. The questionnaire was organized into several sections representing the constructs incorporated in the proposed framework, namely performance expectancy, effort expectancy, social influence, facilitating conditions, trust, promotion, and usage behaviour.

This research employed a quantitative cross-sectional design using a structured survey instrument derived from an extensive review of prior literature, particularly studies related to UTAUT and digital payment adoption [40]; [12]. The questionnaire was organized into several sections representing the constructs incorporated in the proposed framework, namely performance expectancy, effort expectancy, social influence, facilitating conditions, trust, promotion, and usage behaviour.

The quantitative cross-sectional design offers several methodological advantages for investigating digital payment adoption behaviour. First, it enables the simultaneous measurement of all study variables within a single period of observation, thereby providing a comprehensive representation of respondents' perceptions and behaviours under consistent contextual conditions. Second, this design is efficient in terms of time and resources while allowing the collection of data from a relatively large sample, thereby enhancing the generalizability of the findings. Third, the design is particularly appropriate for testing theoretically derived relationships among multiple latent constructs using Structural Equation Modeling, including direct, mediating, and moderating effects. Finally, the cross-sectional approach provides a robust empirical basis for understanding behavioural patterns in rapidly evolving digital environments and serves as an important foundation for future longitudinal investigations of technology adoption and sustainable digital transformation.

Measurement indicators were adapted from previously validated scales and subsequently adjusted to fit the QRIS usage context. All responses were assessed using a five-point Likert scale ranging from "strongly disagree" to "strongly agree," a measurement format widely recognized as appropriate for capturing behavioural perceptions and attitudinal responses [52].

Pre-test Phase

Prior to the main survey, a pre-test was conducted to evaluate the clarity, relevance, and readability of the questionnaire items [53]. The instrument was reviewed by several respondents with relevant academic and professional backgrounds, including scholars and practitioners familiar with digital payment systems. Feedback obtained during this stage indicated that the questionnaire was sufficiently understandable and only required limited revisions.

Sample Size Determination

The required minimum sample size was estimated using G*Power software, a statistical tool frequently applied in structural equation modeling research to evaluate statistical power adequacy [54]. The calculation incorporated a medium effect size ($f^2 = 0.15$), a significance level of $\alpha = 0.05$, statistical power of 0.80, and multiple predictor variables. The analysis indicated that the minimum sample requirement for PLS-SEM was achieved. The final dataset consisted of 200 valid responses, exceeding the recommended threshold and ensuring adequate analytical power.

Pilot Test

A pilot study was subsequently performed using a subset of respondents to assess the reliability and validity of the measurement instrument. This stage aimed to identify potentially problematic items and improve overall measurement quality before full-scale implementation [37]. The pilot test results demonstrated satisfactory reliability and validity across all constructs; therefore, all indicators were retained for the final survey.

Cross-Sectional Survey Procedure

The cross-sectional survey was implemented through a series of systematic stages to ensure methodological rigor and consistency throughout the research process.

First, the research problem, objectives, and target population were clearly defined. The study sought to examine the determinants of sustained QRIS usage behaviour among Indonesian micro culinary enterprises by investigating the effects of performance expectancy, effort expectancy, social influence, facilitating conditions, trust, and promotion on actual usage behaviour. The target population consisted of micro culinary enterprises that had adopted QRIS as their digital payment system.

Second, a purposive sampling technique was employed to select respondents who satisfied the predefined inclusion criteria, namely actively using QRIS in business transactions and operating within the micro-enterprise category. This sampling strategy ensured that the selected respondents possessed the relevant experience required to address the research objectives.

Third, data on all independent variables, the mediating variable (trust), the moderating variable (promotion), and the dependent variable (usage behaviour) were collected simultaneously through a single structured questionnaire administered during the same survey period. Collecting all variables at one point in time represents the defining characteristic of a cross-sectional survey and minimizes temporal variation that could influence respondents' perceptions.

Fourth, the relationships among the variables were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). This analytical technique was selected because it is capable of simultaneously estimating complex direct, indirect, and moderating relationships among latent constructs while providing strong predictive

capability. Accordingly, the analytical procedure was fully aligned with the objective of explaining behavioural relationships rather than estimating epidemiological measures such as prevalence or odds ratios.

Overall, these sequential procedures ensured that the cross-sectional survey was conducted systematically, enabling reliable measurement of the proposed constructs and providing robust empirical evidence regarding the determinants of sustained QRIS usage among micro-enterprises.

Data Collection Procedure

Data collection was carried out through direct questionnaire distribution to owners of micro culinary enterprises or individuals responsible for managing financial transactions. Participants received information regarding the purpose of the study and were assured that their responses would remain confidential and anonymous. Participation was entirely voluntary, and the collected data were used exclusively for academic research purposes.

Using purposive sampling, only respondents with prior experience using QRIS in business transactions were included in the study. In total, 200 questionnaires were considered complete and valid for subsequent analysis.

Common Method Bias

To evaluate the potential influence of common method bias (CMB), the study applied the full collinearity assessment proposed by Kock [55]. According to this procedure, variance inflation factor (VIF) values below 3.3 indicate the absence of problematic collinearity and suggest that CMB is unlikely to threaten the validity of the findings. The results revealed that all VIF values remained below the recommended threshold, confirming that common method bias was not a significant issue in the dataset.

Data Analysis Technique

The data were analyzed using PLS-SEM with SmartPLS software. This analytical approach is considered appropriate for predictive and exploratory research involving complex structural relationships, including mediation and moderation effects, while also accommodating non-normal data distributions [38]; [39]; [51]. PLS-SEM has been widely adopted in information systems and digital technology studies due to its flexibility and predictive orientation. The analysis was conducted in two sequential stages.

Measurement Model Evaluation

The first stage focused on evaluating the psychometric quality of the measurement model. Reliability and convergent validity were assessed through indicator loadings, Cronbach's alpha, composite reliability (CR), and AVE. In addition, discriminant validity was examined using HTMT, which is regarded as a robust criterion for determining construct distinctiveness in PLS-SEM analysis [37].

Structural Model Evaluation

The second stage involved assessment of the structural model through examination of path coefficients, coefficient of determination (R^2), predictive relevance (Q^2), and effect size (f^2). To test the significance of direct, indirect, and moderating relationships, a bootstrapping procedure with 5,000 resamples was applied at a 5% significance level [38]; [34]; [51].

Methodological Rigor

Several methodological procedures were implemented to strengthen the robustness of the study. Consistent with recent recommendations in PLS-SEM research, the analysis incorporated predictive assessment techniques and bias-corrected bootstrapping for mediation testing. In addition, pre-testing, pilot testing, and common method bias evaluation were conducted to minimize measurement error and procedural bias. These methodological safeguards improve the reliability, validity, and broader applicability of the findings within the context of digital payment behaviour in emerging economies [32]; [34]; [51].

In addition, the cross-sectional design ensured that all respondents were observed under the same temporal conditions, thereby reducing the potential influence of external environmental changes on behavioural responses. Although this design does not establish causal relationships over time, it provides a reliable empirical snapshot of QRIS adoption behaviour and serves as an appropriate foundation for theory development and future longitudinal investigations of digital payment sustainability. Taken together, these methodological procedures enhanced the internal validity, reliability, and overall credibility of the research findings, ensuring that the empirical conclusions accurately reflected the observed relationships among the study variables.

Results and Discussion

Result

Measurement Model Assessment

The measurement model was evaluated to assess indicator reliability, internal consistency reliability, and convergent validity, following established guidelines in PLS-SEM [37]; [38]; [34].

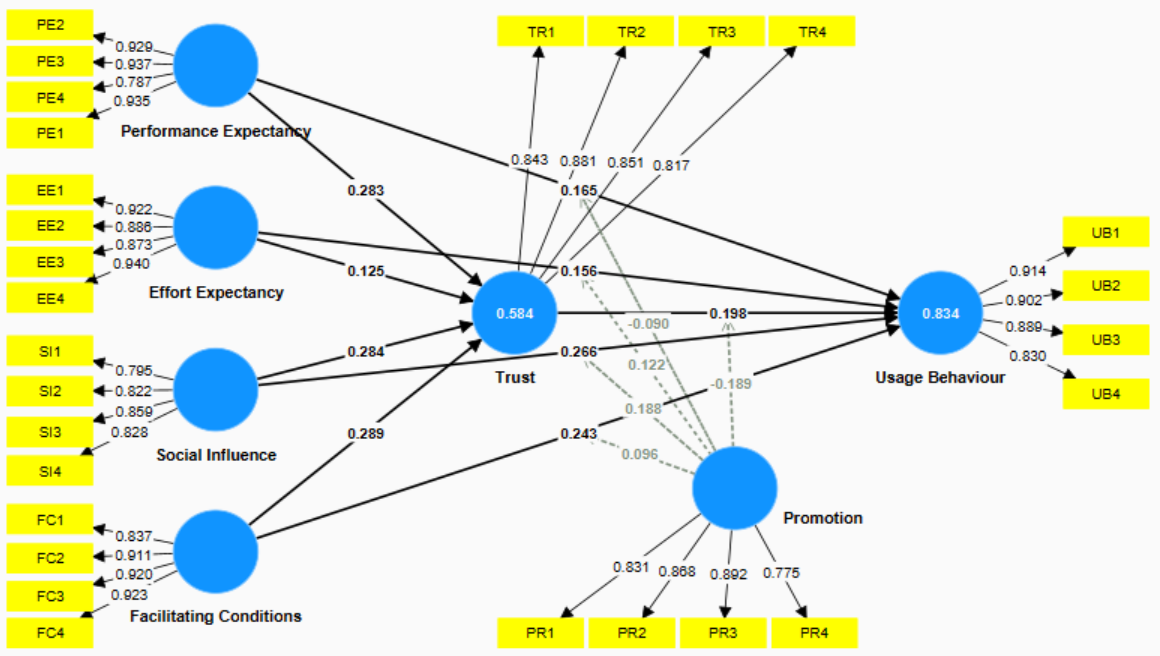


Figure 2: Measurement Model
Source: SmartPLS 4

Indicator reliability was assessed by examining outer loadings, as presented in Figure 2 and Table 2. All indicators exhibit loadings above the recommended threshold of 0.70, ranging from 0.775 to 0.940. This indicates that each indicator shares a substantial proportion of variance with its respective construct. Although one indicator (PE4 = 0.787) is relatively lower compared to others, it remains within the acceptable range, thus retaining its validity [37].

Table 2: Construct's reliability and validity

Higher-order constructs	Lower-order constructs	Outer loadings	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	AVE
Performance Expectancy	PE1	0,935	0,919	0,925	0,944	0,809
	PE2	0,929	0,929			
	PE3	0,937	0,937			
	PE4	0,787	0,787			
Effort Expectancy	EE1	0,922	0,927	0,928	0,948	0,820
	EE2	0,886				
	EE3	0,873				
	EE4	0,940				
Social Influence	SI1	0,795	0,846	0,856	0,896	0,683
	SI2	0,822				
	SI3	0,859				
	SI4	0,828				
Facilitating Conditions	FC1	0,837	0,921	0,932	0,944	0,808

Higher-order constructs	Lower-order constructs	Outer loadings	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	AVE
	FC2	0,911				
	FC3	0,920				
	FC4	0,923				
Promotion	PR1	0,831	0,864	0,878	0,907	0,710
	PR2	0,868				
	PR3	0,892				
	PR4	0,775				
Trust	TR1	0,843	0,870	0,874	0,911	0,719
	TR2	0,881				
	TR3	0,851				
	TR4	0,817				
Usage Behaviour	UB1	0,914	0,906	0,908	0,935	0,782
	UB2	0,902				
	UB3	0,889				
	UB4	0,830				

Source: SmartPLS 4

Internal consistency reliability was assessed using Cronbach's alpha, composite reliability (ρa), and composite reliability (ρc), with all constructs exceeding the recommended threshold of 0.70, indicating strong internal consistency. In particular, composite reliability values (ρc) range from 0.896 to 0.948, demonstrating a high level of reliability across constructs, with effort expectancy (ρc = 0.948), facilitating conditions (ρc = 0.944), and performance expectancy (ρc = 0.944) exhibiting the strongest consistency, in line with recent PLS-SEM recommendations that prioritize composite reliability over Cronbach's alpha [37]; [34]. Convergent validity was further confirmed through the AVE, where all values exceed the 0.50 threshold, ranging from 0.683 to 0.820, indicating that each construct explains a substantial proportion of the variance in its indicators [38]. Notably, effort expectancy (AVE = 0.820), performance expectancy (AVE = 0.809), and facilitating conditions (AVE = 0.808) show the highest levels of convergent validity, suggesting strong construct representation. Overall, the measurement model demonstrates robust psychometric properties, satisfying the criteria for indicator reliability, internal consistency reliability, and convergent validity, thereby confirming its adequacy for subsequent structural model analysis and aligning with recent methodological advancements in PLS-SEM emphasizing model accuracy and predictive capability [38]; [34]; [51].

Table 3: Discriminant validity-Fornell-Larcker criterion

	Effort Expectancy	Facilitating Conditions	Performance Expectancy	Promotion	Social Influence	Trust	Usage Behaviour
Performance Expectancy	0,471	0,399	0,899				
Effort Expectancy	0,906						
Social Influence	0,523	0,334	0,647	0,571	0,827		
Facilitating Conditions	0,415	0,899					
Promotion	0,394	0,481	0,363	0,843			
Trust	0,527	0,549	0,641	0,413	0,629	0,848	
Usage Behaviour	0,634	0,667	0,675	0,640	0,709	0,727	0,884

Source: SmartPLS 4

Discriminant validity was assessed using HTMT, which is widely recommended as a more sensitive criterion compared to traditional approaches such as the Fornell–Larcker criterion in PLS-SEM analysis [37]; [56]; [38]. As presented in Table 4, all HTMT values among the main constructs are below the conservative threshold of 0.85, indicating adequate discriminant validity. Specifically, the highest HTMT value among core constructs is observed between trust and usage behaviour (HTMT = 0.816), which remains within acceptable limits, suggesting that although conceptually related, the constructs are empirically distinct. Similarly, the relationships among UTAUT constructs—such as performance expectancy, effort expectancy, social influence, and facilitating conditions—exhibit HTMT values ranging from 0.353 to 0.738, further confirming satisfactory discriminant validity. In addition, the interaction (moderation) constructs, including promotion × performance expectancy, promotion × effort expectancy, promotion × trust, promotion × social influence, and promotion × facilitating conditions, also demonstrate HTMT values well below the threshold, indicating that these interaction terms are empirically distinguishable from their constituent constructs. Overall, these results confirm that all constructs in the model are conceptually and statistically distinct, thereby supporting the robustness of the measurement model and ensuring the validity of subsequent structural model evaluation [39]; [51].

Table 4: Discriminant validity-HTMT criterion

	EE	FC	PE	PR	SI	TR	UB	PR x PE	PR x EE	PR x TR	PR x SI	PR x FC
Performance Expectancy	0,508	0,425										
Effort Expectancy												
Social Influence	0,571	0,353	0,719	0,659								
Facilitating Conditions	0,441											
Social Influence	0,571	0,353	0,719	0,659								
Promotion	0,427	0,522	0,403									
Trust	0,582	0,605	0,714	0,467	0,719							
Usage Behaviour	0,689	0,728	0,738	0,707	0,798	0,816						
Promotion x Performance Expectancy	0,118	0,133	0,214	0,225	0,244	0,131	0,167					
Promotion x Effort Expectancy	0,066	0,102	0,119	0,124	0,250	0,089	0,066	0,495				
Promotion x Trust	0,088	0,049	0,131	0,243	0,219	0,070	0,120	0,591	0,574			
Promotion x Social Influence	0,196	0,050	0,193	0,297	0,406	0,171	0,122	0,672	0,631	0,630		
Promotion x Facilitating Conditions	0,104	0,120	0,128	0,060	0,041	0,055	0,041	0,369	0,435	0,519	0,314	

Source: SmartPLS 4

Structural Model Assessment

Following the satisfactory evaluation of the measurement model, the structural model was assessed to examine the relationships among constructs and the predictive capability of the model, including collinearity and explanatory power (R^2), in line with established PLS-SEM guidelines [37]; [38]; [34]. Collinearity was evaluated using VIF, with all values falling below the threshold of 3, indicating the absence of multicollinearity issues and confirming that each predictor construct contributes uniquely to the endogenous variables [37]. The model's explanatory power was assessed using the coefficient of determination (R^2), where values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak, respectively. As shown in Table 5, the model explains 58.4% of the variance in trust ($R^2 = 0.584$), indicating a moderate level of explanatory power, suggesting that performance

expectancy, effort expectancy, social influence, and facilitating conditions meaningfully explain trust formation in digital payment usage. Moreover, the model demonstrates strong predictive capability for usage behaviour, with $R^2 = 0.834$, indicating a substantial level of explanatory power, meaning that the combined effects of UTAUT constructs, trust, and promotion account for a large proportion of variance in actual QRIS usage behaviour. The adjusted R^2 values (0.576 for trust and 0.824 for usage behaviour) further confirm the robustness of the model, indicating minimal bias due to model complexity and reinforcing the strong predictive performance of the proposed framework in explaining digital payment behaviour among micro-enterprises.

Table 5: Explanatory power (R2)

Dependents constructs	R-square	R-square adjusted
Trust	0,584	0,576
Usage Behaviour	0,834	0,824

Source: SmartPLS 4

Overall, the structural model demonstrates strong explanatory power and no collinearity issues, supporting the robustness of the proposed framework. The substantial R^2 value for usage behaviour is particularly noteworthy, as it exceeds the commonly reported levels in technology adoption studies, indicating that the integration of trust and promotion enhances the model's predictive capability. These findings are consistent with recent advancements in PLS-SEM research, which emphasize the importance of predictive accuracy and model robustness in evaluating structural relationships [37]; [34]; [51].

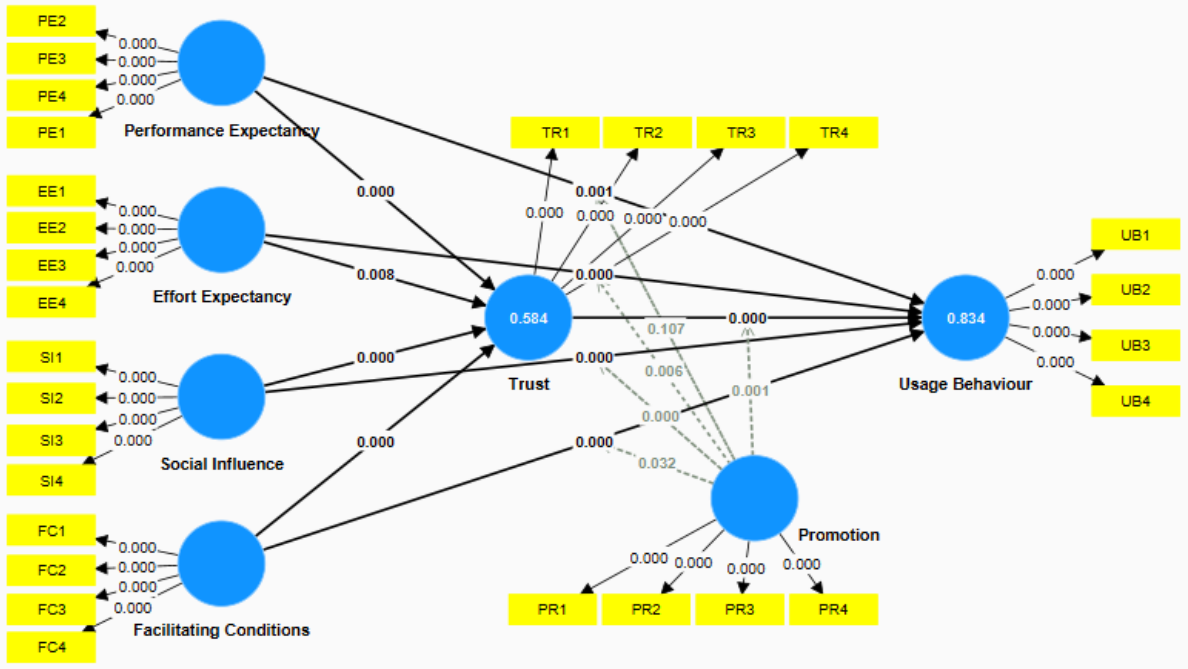


Figure 3: Structural Model
Source: SmartPLS 4

Finally, the bootstrapping method was employed to assess the significance and statistical relevance of the path coefficients. The results (Table 6) confirm that all proposed hypotheses are supported, indicating that performance expectancy (H1; O = 0.283, p < 0.001), effort expectancy (H2; O = 0.125, p = 0.008), social influence (H3; O = 0.284, p < 0.001), and facilitating conditions (H4; O = 0.289, p < 0.001) have positive and significant effects on trust. Furthermore, performance expectancy (H5; O = 0.165, p = 0.001), effort expectancy (H6; O = 0.156, p < 0.001), social influence (H7; O = 0.266, p < 0.001), and facilitating conditions (H8; O = 0.243, p < 0.001) significantly influence usage behaviour, with social influence and facilitating conditions demonstrating relatively stronger effects. In addition, promotion is found to have a positive and significant effect on usage behaviour (H9; O = 0.173, p < 0.001), highlighting the importance of incentive-based strategies in enhancing digital payment usage. These findings are consistent with recent literature emphasizing the role of technological perceptions, social context, and external support in shaping behavioural outcomes in digital payment adoption [13]; [57]; [38]; [51].

Table 6: Hypotheses testing

	Hypotheses	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Conclusion
H1	Performance Expectancy -> Trust	0,283	0,278	0,058	4,869	0,000	Accepted
H2	Effort Expectancy -> Trust	0,125	0,127	0,047	2,651	0,008	Accepted
H3	Social Influence -> Trust	0,284	0,285	0,056	5,071	0,000	Accepted
H4	Facilitating Conditions -> Trust	0,289	0,292	0,043	6,788	0,000	Accepted
H5	Performance Expectancy -> Usage Behaviour	0,165	0,162	0,05	3,308	0,001	Accepted
H6	Effort Expectancy -> Usage Behaviour	0,156	0,158	0,037	4,261	0,000	Accepted
H7	Social Influence -> Usage Behaviour	0,266	0,269	0,055	4,827	0,000	Accepted
H8	Facilitating Conditions -> Usage Behaviour	0,243	0,246	0,038	6,472	0,000	Accepted
H9	Promotion -> Usage Behaviour	0,173	0,169	0,039	4,386	0,000	Accepted

Source: SmartPLS 4

Table 7 presents the mediation analysis results, demonstrating that trust significantly mediates the relationships between UTAUT constructs and usage behaviour. Specifically, effort expectancy ($\beta = 0.025$, $p = 0.014$), facilitating conditions ($\beta = 0.057$, $p = 0.002$), performance expectancy ($\beta = 0.056$, $p = 0.008$), and social influence ($\beta = 0.056$, $p = 0.002$) all exhibit significant indirect effects on usage behaviour through trust, confirming partial mediation in all proposed paths. These findings indicate that while UTAUT constructs directly influence usage behaviour, their effects are also transmitted through trust as a critical psychological mechanism. Among the mediating paths, facilitating conditions show the strongest indirect effect, highlighting the importance of infrastructural and technical support in building trust that translates into sustained usage. The presence of partial mediation suggests that trust complements, rather than replaces, the direct effects of UTAUT constructs, reinforcing its central role in digital payment contexts where perceived risk and uncertainty are prominent. These results align with recent literature emphasizing the mediating role of trust in technology adoption and digital financial services, particularly in emerging markets, where trust acts as a bridge between user perceptions and behavioural outcomes [13]; [57]; [38]; [51].

Table 7: Mediation relationship

	Hypotheses	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Conclusion
H10	Effort Expectancy -> Trust -> Usage Behaviour	0,025	0,024	0,010	2,456	0,014	Partial mediation
H11	Facilitating Conditions -> Trust -> Usage Behaviour	0,057	0,057	0,018	3,174	0,002	Partial mediation
H12	Performance Expectancy -> Trust -> Usage Behaviour	0,056	0,055	0,021	2,643	0,008	Partial mediation
H13	Social Influence -> Trust -> Usage Behaviour	0,056	0,056	0,018	3,107	0,002	Partial mediation

Source: SmartPLS 4

Table 8 presents the moderating effects of promotion on the relationships between UTAUT constructs, trust, and usage behaviour. The results indicate that promotion does not significantly moderate the relationship between performance expectancy and usage behaviour ($\beta = -0.090$, $p = 0.107$), suggesting that perceived usefulness alone is not contingent on promotional incentives. In contrast, promotion significantly strengthens the effects of effort expectancy ($\beta = 0.122$, $p = 0.006$), social influence ($\beta = 0.188$, $p < 0.001$), and facilitating conditions ($\beta = 0.096$, $p = 0.032$) on usage behaviour, indicating that incentives amplify the impact of ease of use, social pressure, and infrastructural support on actual system use. Notably, promotion also exhibits a significant but negative moderating effect on the relationship between trust and usage behaviour ($\beta = -0.189$, $p = 0.001$), implying that excessive reliance on promotional incentives may weaken the intrinsic role of trust in driving sustained usage. These findings highlight the contingent and asymmetric nature of promotional strategies in digital payment adoption, where incentives can enhance certain behavioural drivers while potentially undermining others. This is consistent with recent studies suggesting that promotional mechanisms can act as both enablers and distorters of user behaviour, particularly in fintech contexts where intrinsic motivations such as trust interact with extrinsic rewards [13]; [57]; [49]; [50].

Table 8: Moderating relationship

	Hypotheses	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Conclusion
H14	Promotion x Performance Expectancy -> Usage Behaviour	-0,090	-0,083	0,056	1,612	0,107	Not moderating
H15	Promotion x Effort Expectancy -> Usage Behaviour	0,122	0,115	0,044	2,739	0,006	Moderation supported
H16	Promotion x Social Influence -> Usage Behaviour	0,188	0,184	0,054	3,513	0,000	Moderation supported
H17	Promotion x Facilitating Conditions -> Usage Behaviour	0,096	0,103	0,045	2,142	0,032	Moderation supported
H18	Promotion x Trust -> Usage Behaviour	-0,189	-0,191	0,060	3,177	0,001	Moderation supported (negative effect)

Source: SmartPLS 4

Discussions and Implications

Discussion of Findings

This study aims to explain the determinants of actual usage behaviour of QRIS by extending UTAUT through the inclusion of trust as a mediating variable and promotion as a moderating variable. The findings provide several important insights into digital payment behaviour among micro-enterprises in emerging market contexts. More importantly, the findings are interpreted in relation to the study objective of identifying the contributions and challenges of digital payment adoption for sustainable development. In this context, sustainable development refers not only to the expansion of digital financial inclusion but also to the creation of resilient, trustworthy, and inclusive digital payment ecosystems that enhance the long-term competitiveness of micro-enterprises.

First, the results confirm that all UTAUT constructs—performance expectancy, effort expectancy, social influence, and facilitating conditions—significantly influence trust. This finding reinforces the argument that trust in digital payment systems is not formed in isolation but is shaped by users' cognitive evaluations of usefulness, ease of use, and external environment. Among these factors, facilitating conditions and social influence emerge as the strongest predictors of trust, suggesting that infrastructural readiness and social endorsement play a critical role in reducing perceived uncertainty. This aligns with recent studies emphasizing that trust in fintech systems is strongly influenced by system support and social validation mechanisms [46]; [13]; [57]; [49]; [50]; [48]. From a sustainable development perspective, the establishment of trust reduces uncertainty in digital financial transactions and encourages broader participation of micro-enterprises in formal digital economic systems. This contributes to inclusive economic growth by increasing access to secure financial services and strengthening the resilience of small businesses in an increasingly digital economy.

Second, all UTAUT constructs are found to have significant direct effects on usage behaviour, confirming the robustness of UTAUT in explaining digital payment adoption. Notably, social influence and facilitating conditions demonstrate stronger effects compared to performance expectancy and effort expectancy, indicating that behavioural decisions in micro-enterprises are more socially and contextually driven rather than purely utility-based. This finding extends prior research by highlighting that in small business environments, peer practices and ecosystem readiness are more influential than individual perceptions alone [27]; [43]; [49]; [25]; [42]. These findings indicate that sustainable digital transformation among micro-enterprises depends not only on technological functionality but also on the availability of supportive infrastructure and collaborative business environments. Therefore, strengthening digital infrastructure and institutional support becomes an essential prerequisite for achieving sustainable digital development.

Third, trust is confirmed as a significant predictor of usage behaviour and acts as a partial mediator in all relationships between UTAUT constructs and usage behaviour. This result underscores the central role of trust as a psychological mechanism that translates perceptions into sustained behavioural outcomes. The presence of partial mediation indicates that while users may directly respond to perceived benefits and ease of use, trust enhances and stabilizes these effects over time. This finding is consistent with recent fintech literature, which positions trust as a critical bridge between technology perception and actual usage, particularly in environments characterized by uncertainty and perceived risk [57]; [43]; [58]; [35]. The findings further suggest that trust represents a critical foundation for the long-term sustainability of digital payment systems. Sustainable development cannot be achieved solely through technological innovation unless users continuously perceive the system as reliable, secure, and transparent. Consequently, trust should be viewed as a strategic resource for maintaining sustainable digital financial ecosystems.

Fourth, the moderating role of promotion reveals a nuanced and asymmetric effect. Promotion significantly strengthens the relationships between effort expectancy, social influence, and facilitating conditions with usage behaviour, suggesting that incentives amplify the effects of ease, social pressure, and infrastructural support. However, promotion does not significantly moderate the relationship between performance expectancy and usage behaviour, indicating that perceived usefulness operates independently of external incentives. More importantly, the negative moderating effect of promotion on the relationship between trust and usage behaviour suggests that excessive reliance on incentives may weaken intrinsic motivations. This finding provides a critical insight that promotional strategies, while effective in stimulating short-term usage, may undermine long-term trust-based engagement if overused. This is in line with recent studies highlighting the dual role of incentives in digital platforms, where they can both motivate and distort user behaviour [13]; [14]; [49]. This finding also resolves an important contradiction in digital payment adoption. Although promotional incentives successfully increase short-term transaction intensity, they are insufficient to sustain long-term usage when users become dependent on external rewards rather than developing intrinsic trust in the payment system. Therefore, sustainable development requires balancing promotional strategies with initiatives that strengthen user confidence, service quality, digital literacy, and institutional credibility.

Theoretical and Practical Implications

This study offers important theoretical and practical implications for digital payment adoption research. Theoretically, it extends the UTAUT framework by incorporating trust as a mediating mechanism, addressing the limitation of traditional models that often overlook psychological dimensions in financial technology contexts. By demonstrating that trust partially mediates all relationships between UTAUT constructs and usage behaviour, this study provides a deeper understanding of how cognitive perceptions are translated into sustained behavioural outcomes. In addition, the inclusion of promotion as a moderating variable introduces a more dynamic perspective, revealing that external incentives do not operate uniformly but exert selective and asymmetric effects, including a negative interaction with trust. This finding contributes to the growing discourse on the interplay between intrinsic and extrinsic motivations in technology usage. These theoretical findings also extend the sustainable development literature by demonstrating that digital payment sustainability is determined by the interaction between technological acceptance, psychological trust, and institutional support. Rather than viewing digital payment adoption merely as a technological issue, this study positions it as an important mechanism for promoting financial inclusion, economic resilience, and sustainable digital transformation among micro-enterprises.

From a practical perspective, the findings suggest that efforts to enhance digital payment usage should go beyond functional improvements and focus on building trust through system reliability, security, and transparency. Strengthening facilitating conditions, such as infrastructure and technical support, is also critical, as these factors not only directly influence usage but also reinforce trust. Furthermore, leveraging social influence through community-based strategies can accelerate adoption in micro-enterprise environments. However, promotional strategies should be implemented cautiously, as excessive reliance on incentives may undermine trust-driven behaviour and reduce long-term sustainability. Therefore, a balanced approach that integrates trust-building and strategic incentives is essential for fostering sustainable digital payment ecosystems. For policymakers, financial

institutions, and digital payment providers, these findings imply that sustainable development policies should prioritize long-term trust-building initiatives, equitable digital infrastructure, and continuous financial education alongside promotional campaigns. Such integrated strategies are more likely to generate sustainable behavioural change than relying solely on short-term financial incentives.

Research Contributions

This study contributes to the literature in five important ways. First, it extends UTAUT by integrating trust as a mediating mechanism, providing a more comprehensive explanation of sustained digital payment usage. Second, it introduces promotion as a moderating variable and demonstrates its asymmetric influence on behavioural outcomes. Third, it enriches the sustainable development literature by showing that long-term digital payment adoption depends on the interaction between technological acceptance, trust, and institutional support rather than promotional incentives alone. Fourth, it provides empirical evidence from micro-enterprises in an emerging economy, highlighting the importance of socio-contextual factors in advancing financial inclusion and digital economic resilience. Finally, the application of PLS-SEM incorporating mediation and moderation enhances the explanatory and predictive capability of technology adoption research while offering practical insights for developing more sustainable digital payment ecosystems.

Conclusion

This study examined the determinants of sustained QRIS usage behaviour among Indonesian micro-enterprises by extending the Unified Theory of Acceptance and Use of Technology (UTAUT) framework through the incorporation of trust as a mediating variable and promotion as a moderating variable. The findings demonstrate that performance expectancy, effort expectancy, social influence, and facilitating conditions significantly influence both trust and actual usage behaviour, confirming the robustness of the UTAUT model in explaining digital payment adoption in the micro-enterprise context. Furthermore, trust partially mediates the relationships between all UTAUT constructs and usage behaviour, indicating that users' confidence in the security, reliability, and credibility of QRIS serves as a critical psychological mechanism that transforms favourable perceptions into sustained behavioural intentions and actual usage.

The study also reveals that promotion exerts a selective moderating effect. Promotional programs significantly strengthen the relationships between effort expectancy, social influence, facilitating conditions, and usage behaviour, indicating that financial incentives remain effective in encouraging the continued use of digital payment systems. However, promotion does not strengthen the influence of performance expectancy and negatively moderates the relationship between trust and usage behaviour. This apparent contradiction suggests that while promotional incentives are effective in stimulating initial engagement and transaction frequency, excessive reliance on incentives may gradually reduce the importance of intrinsic trust as the primary driver of sustained digital payment adoption. Therefore, promotional strategies should complement rather than substitute efforts to strengthen user confidence, service quality, and institutional credibility.

These findings contribute to a broader understanding of sustainable development by demonstrating that sustainable digital financial ecosystems depend not only on technological acceptance but also on the development of long-term trust between users and digital payment providers. From a sustainable development perspective, QRIS adoption supports financial inclusion, improves transaction efficiency, strengthens the competitiveness of micro-enterprises, and accelerates digital economic transformation. At the same time, the study identifies an important challenge: sustainable digital payment adoption cannot be maintained solely through short-term promotional incentives. Long-term sustainability requires balanced strategies that combine technological innovation, trustworthy financial services, supportive digital infrastructure, and continuous user education. Consequently, the findings extend existing knowledge by showing that the sustainability of digital payment systems is determined by the interaction between technological, behavioural, and institutional factors rather than by promotional activities alone.

The conclusions presented in this study were derived through a rigorous analytical process designed to minimize potential internal biases and strengthen the credibility of the findings. Internal bias was mitigated through the use of validated measurement instruments adapted from established literature, standardized questionnaire administration, anonymous and voluntary respondent participation, and systematic screening of responses to eliminate incomplete or inconsistent data. These procedures reduced the potential influence of measurement error, response bias, and common method bias associated with self-reported survey data. Furthermore, the application of Partial Least Squares Structural Equation Modeling (PLS-SEM) ensured that both the measurement model and structural model satisfied accepted standards of reliability and validity before the research hypotheses were interpreted. Accordingly, the conclusions were drawn exclusively from statistically supported empirical evidence and interpreted in accordance with the theoretical foundations of UTAUT and trust theory rather than subjective assumptions. Although the cross-sectional design provides only a snapshot of QRIS usage behaviour and does not permit causal inference over time, the findings offer robust empirical evidence regarding the factors influencing

sustained digital payment adoption among Indonesian micro-enterprises. Future research should employ longitudinal or mixed-method designs to capture behavioural changes over time, compare different business sectors and geographical contexts, and incorporate additional variables such as institutional quality, digital literacy, financial resilience, and regulatory support. Such approaches would provide a more comprehensive understanding of how digital payment ecosystems evolve and how technological innovation can more effectively contribute to sustainable development in emerging economies.

Acknowledgements

The authors would like to express their gratitude to Universitas Brawijaya for academic support and to all respondents who participated in this study. Appreciation is also extended to supervisors and colleagues who contributed to the completion of this research.

Declaration of AI-Assisted Writing Tools

The authors declare that artificial intelligence (AI) tools were used solely for language editing and translation purposes in the preparation of this manuscript. Specifically, Grammarly was utilized for grammar checking and improving writing clarity, while DeepL Pro was used to assist with translation and language refinement. These tools were applied only to enhance the readability and linguistic quality of the manuscript. All intellectual content, including the research design, data analysis, interpretation of results, and conclusions, was entirely developed by the authors. The authors take full responsibility for the content and integrity of this work.

References

[1] Ozili, P. K. (2021). Financial inclusion research around the world: A review. *Forum for Social Economics*, *50*(4), 457–479. https://doi.org/10.1080/07360932.2020.1715238

[2] Sahay, R., Allmen, U., Lahreche, A., Khera, P., Ogawa, S., & Beaton, K. (2020). The Promise of Fintech Financial Inclusion in the Post COVID-19 Era. *Departmental Papers*, *2020*. https://doi.org/10.5089/9781513512242.087

[3] Kurniawati, E., Idris, I., Handayati, P., & ... (2021). Digital transformation of MSMEs in Indonesia during the pandemic. *Entrepreneurship and Sustainability Issues*. https://doi.org/10.9770/jesi.2021.9.2(21)

[4] Muchtar, E. H., Trianto, B., Maulana, I., Alim, M. N., Marasabessy, R. H., Hidayat, W., Junaedi, E., & Masrizal. (2024). Quick response code Indonesia standard (QRIS) E-payment adoption: customers perspective. *Cogent Business & Management*, *11*(1), 2316044. https://doi.org/10.1080/23311975.2024.2316044

[5] Yelfiarita, Y., Darwanto, D. H., Waluyati, L. R., & Masyhuri, M. (2025). MSME development through a digitalize ecosystem: Challenges and opportunities. *AIP Conference Proceedings*, *3277*(1), 20019. https://doi.org/10.1063/5.0269294

[6] Al-shami, S. A., Damayanti, R., Adil, H., Farhi, F., & Al, A. (2024). Heliyon Financial and digital financial literacy through social media use towards financial inclusion among batik small enterprises in Indonesia. *Heliyon*, *10*(15), e34902. https://doi.org/10.1016/j.heliyon.2024.e34902

[7] Anatan, L. (2023). Micro , Small , and Medium Enterprises' Readiness for Digital Transformation in Indonesia. *MDPI - Economies*, *11*(156). https://doi.org/10.3390/economies

[8] Noerchoidah, N., Suhardiyah, M., Nurcahyanie, Y. D., & Sawitri, A. P. (2025). Optimization of Digital Literacy Knowledge Sharing and Human Capital on Digital Economy for MSMEs Business Sustainability. *International Journal of Human Capital and Information Technology Professionals*, *16*(1). https://doi.org/10.4018/IJHCITP.368715

[9] Albuainain, A., & Ashby, S. (2025). Enablers and Barriers in FinTech Adoption: A Systematic Literature Review of Customer Adoption and Its Impact on Bank Performance. *FinTech MDPI*, *4*(49), 1–35. https://doi.org/10.3390/fintech4030049

[10] Nalluri, V., & Chen, L.-S. (2024). Modelling the FinTech adoption barriers in the context of emerging economies—An integrated Fuzzy hybrid approach. *Technological Forecasting and Social Change*, *199*, 123049. https://doi.org/10.1016/j.techfore.2023.123049

[11] Neves, C., Oliveira, T., Cruz-Jesus, F., & Venkatesh, V. (2025). Extending the unified theory of acceptance and use of technology for sustainable technologies context. *International Journal of Information Management*, *80*, 102838. https://doi.org/10.1016/j.ijinfomgt.2024.102838

[12] Venkatesh, V. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly: Management Information Systems*, *36*(1), 157–178. https://doi.org/10.2307/41410412

[13] Dwivedi, Y. K., Rana, N. P., Tamilmani, K., & Raman, R. (2020). A meta-analysis based modified unified theory of acceptance and use of technology (meta-UTAUT): a review of emerging literature. *Current Opinion in Psychology*, *36*, 13–18. https://doi.org/10.1016/j.copsyc.2020.03.008

[14] FakhrHosseini, S., Chan, K., Lee, C., Jeon, M., Son, H., Rudnik, J., & Coughlin, J. (2022). User Adoption of Intelligent Environments: A Review of Technology Adoption Models, Challenges, and Prospects. *International Journal of Human-Computer Interaction*, *40*, 1–13. https://doi.org/10.1080/10447318.2022.2118851

[15] Jafri, J. A., Mohd Amin, S. I., Abdul Rahman, A., & Mohd Nor, S. (2024). A systematic literature review of the role of trust and security on Fintech adoption in banking. *Heliyon*, *10*(1), e22980. https://doi.org/10.1016/j.heliyon.2023.e22980

[16] Xie, J., Ye, L., Huang, W., & Ye, M. (2021). Understanding FinTech Platform Adoption: Impacts of Perceived Value and Perceived Risk. *Journal of Theoretical and Applied Electronic Commerce Research*, *16*, 1893–1911. https://doi.org/10.3390/jtaer16050106

[17] Zhang, W., Siyal, S., Riaz, S., Ahmad, R., Hilmi, M. F., & Li, Z. (2023). Data Security, Customer Trust and Intention for Adoption of Fintech Services: An Empirical Analysis From Commercial Bank Users in Pakistan Wenxiang. *SAGE Open*, *September*, 1–17. https://doi.org/10.1177/21582440231181388

[18] Aljaradat, A., & Shukla, S. K. (2025). Trust and cybersecurity in digital payment adoption: socioeconomic insights from India. *Journal of Business and Socio-Economic Development*, *5*(4), 372–386. https://doi.org/10.1108/JBSED-04-2025-0119

[19] Haris, F., & Yustian, O. (2025). *Trust and Security in Digital Payments Drive Small Business Growth in Bandung*. https://doi.org/10.1109/ICIMTech67074.2025.11265408

[20] Al-Saedi, K., Al-Emran, M., Ramayah, T., & Abusham, E. (2020). Developing a general extended UTAUT model for M-payment adoption. *Technology in Society*, *62*, 101293. https://doi.org/10.1016/j.techsoc.2020.101293

[21] Bosnjak, M., Ajzen, I., & Schmidt, P. (2020). The Theory of Planned Behavior: Selected Recent Advances and Applications. In *Europe's journal of psychology* (Vol. 16, Issue 3, pp. 352–356). https://doi.org/10.5964/ejop.v16i3.3107

[22] Lupiyoadi, R., Pramesti, M., Ikhsan, R., Usman, L., Games, D., Kurniawan, & Ahmad, F. (2025). Extending UTAUT with perceived intelligence for the adoption of artificial intelligence in MSMEs and Startups in Indonesia: A multi-group analysis. *Journal of Open Innovation: Technology, Market, and Complexity*, *11*, 100673. https://doi.org/10.1016/j.joitmc.2025.100673

[23] Tamilmani, K., Rana, N. P., Wamba, S. F., & Dwivedi, R. (2021). The extended Unified Theory of Acceptance and Use of Technology (UTAUT2): A systematic literature review and theory evaluation. *International Journal of Information Management*, *57*, 102269. https://doi.org/10.1016/j.ijinfomgt.2020.102269

[24] Yu, Chen-Wei, Chao, Cheng-Min, Chang, Che-Fu, Chen, Rueg-Juen, Chen, Po-Chung, & Liu, Yi-Xuan. (2021). Exploring Behavioral Intention to Use a Mobile Health Education Website: An Extension of the UTAUT 2 Model. *Sage Open*, *11*(4), 21582440211055720. https://doi.org/10.1177/21582440211055721

[25] Or, C. (2023). Examining Unified Theory of Acceptance and Use of Technology 2 through Meta-analytic Structural Equation Modelling Article Info. *Journal of Applied Learning & Teaching*, *6*. https://doi.org/10.37074/jalt.2023.6.2.7

[26] Raghukumari, P. S., & Doshi, A. (2025). Incentivising innovation: the moderating role of promotions in shaping millennials' mobile payments adoption. *Cogent Business & Management*, *12*. https://doi.org/10.1080/23311975.2025.2463575

[27] Allen, J., Carbo, S., Chakravorti, S., Rodriguez-Fernandez, F., & Ardic, O. (2022). Assessing Incentives to Increase Digital Payment Acceptance and Usage: A Machine Learning Approach. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4167356

[28] Ly, R., & Ly, B. (2024). Digital payment systems in an emerging economy. *Computers in Human Behavior Reports*, *16*, 100517. https://doi.org/10.1016/j.chbr.2024.100517

[29] Acosta-Prado, J. C., Rojas Rincón, J. S., Mejía Martínez, A. M., & Riveros Tarazona, A. R. (2024). Trends in the Literature About the Adoption of Digital Banking in Emerging Economies: A Bibliometric Analysis. *Journal of Risk and Financial Management*, *17*(12). https://doi.org/10.3390/jrfm17120545

[30] Alnemer, H. A. (2022). Determinants of digital banking adoption in the Kingdom of Saudi Arabia: A technology acceptance model approach. *Digital Business*, *2*(2), 100037. https://doi.org/10.1016/j.digbus.2022.100037

[31] Setiawan, R., & Prakoso, L. (2024). Digital Banking Adoption, Bank Size, and Bank Performance in Indonesia. *Jurnal Ekonomi Dan Bisnis Airlangga*, *34*, 196–207. https://doi.org/10.20473/jeba.V34I22024.196-207

[32] Gudergan, S. P., Moisescu, O. I., Radomir, L., Ringle, C. M., & Sarstedt, M. (2025). Special issue editorial: Advanced PLS-SEM applications in business research. *Journal of Business Research*, *188*, 115087. https://doi.org/10.1016/j.jbusres.2024.115087

[33] Koul, S., & Eydgahi, A. (2017). A systematic review of technology adoption frameworks and their applications. *Journal of Technology Management & Innovation*, *12*, 106–113. https://doi.org/10.4067/S0718-27242017000400011

[34] Sarstedt, M., Ringle, C. M., Smith, D., Reams, R., & Hair, J. F. (2014). PLS-SEM: A useful tool for family business researchers. *Journal of Family Business Strategy*, *5*(1), 105–115. https://doi.org/10.1016/j.jfbs.2014.01.002

[35] Taherdoost, H. (2018a). A review of technology acceptance and adoption models and theories. *Procedia Manufacturing*, *22*, 960–967. https://doi.org/10.1016/j.promfg.2018.03.137

[36] Hair, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, *109*, 101–110. https://doi.org/10.1016/j.jbusres.2019.11.069

[37] Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2021). *A Primer on PLS-SEM* (3rd ed.). SAGE Publication, Inc.

[38] Ringle, C. M., Sarstedt, M., Sinkovics, N., & Sinkovics, R. R. (2023). A perspective on using partial least squares structural equation modelling in data articles. *Data in Brief*, *48*, 109074. https://doi.org/10.1016/j.dib.2023.109074

[39] Sarstedt, M., Ringle, C., & Hair, J. (2021). *Partial Least Squares Structural Equation Modeling* (pp. 1–47). https://doi.org/10.1007/978-3-319-05542-8_15-2

[40] Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., Duan, Y., Dwivedi, R., Edwards, J., Eirug, A., Galanos, V., Ilavarasan, P. V., Janssen, M., Jones, P., Kar, A. K., Kizgin, H., Kronemann, B., Lal, B., Lucini, B., … Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, *57*, 101994. https://doi.org/10.1016/j.ijinfomgt.2019.08.002

[41] Alamoodi, M., & Selamat, Z. (2021). Determinants of Fintech Products and Services Adoption in Kingdom of Saudi Arabia (KSA). *Journal of International Business, Economics and Entrepreneurship*, *6*, 1. https://doi.org/10.24191/jibe.v6i2.16637

[42] Sharma, A., Mohan, A., Johri, A., & Asif, M. (2025). Determinants of financial technology (FinTech) adoption by the farmers in agrarian economy. *Social Sciences & Humanities Open*, *11*, 101370. https://doi.org/10.1016/j.ssaho.2025.101370

[43] Neves, C., Oliveira, T., Santini, F., & Gutman, L. (2023). Adoption and use of digital financial services: A meta analysis of barriers and facilitators. *International Journal of Information Management Data Insights*, *3*(2), 100201. https://doi.org/10.1016/j.jjimei.2023.100201

[44] Czechowska, I. D., & Paduszyńska, M. (2025). The Role of Trust in Fintech Adoption and Development: Bibliometric Analysis. *Procedia Computer Science*, *270*, 2790–2798. https://doi.org/10.1016/j.procs.2025.09.401

[45] Devlin, J. F., Roy, S. K., Sekhon, H., Moin, S. M. A., & Sahiner, M. (2025). Trust and FinTech: A review and research agenda. *Electronic Markets*, *35*(1), 1–17. https://doi.org/10.1007/s12525-025-00803-w

[46] Beheri, T. (2025). Consumer Trust in Digital Payment Systems. *Journal of Information Systems Engineering and Management*, *10*, 721–730. https://doi.org/10.52783/jisem.v10i42s.8179

[47] Rubio, J., & Tulcanaza-Prieto, A. B. (2025). Digital Payments Trust in Latin America and the Caribbean. *Economies*, *13*(5), 1–18. https://doi.org/10.3390/economies13050140

[48] Szumski, O. (2020). Technological trust from the perspective of digital payment. *Procedia Computer Science*, *176*, 3545–3554. https://doi.org/10.1016/j.procs.2020.09.032

[49] Nguyen, O., & Nguyen, H. (2022). Impacts of Promotional Benefit on Actual Use Behavior of Mobile Wallet: Evidence From Vietnam. *International Journal of EBusiness and EGovernment Studies*, *14*, 530–559. https://www.agbioforum.org/sobiad.org/menuscript/index.php/ijebeg/article/view/1315/411

[50] Nguyen Thi, B., Tran, T. L. A., Tran, T. T. H., Le, T. T., Tran, P. N. H., & Nguyen, M. H. (2022). Factors influencing continuance intention of online shopping of generation Y and Z during the new normal in Vietnam. *Cogent Business & Management*, *9*(1), 2143016. https://doi.org/10.1080/23311975.2022.2143016

[51] Shmueli, G., Sarstedt, M., Hair, J., Cheah, J.-H., Ting, H., Vaithilingam, S., & Ringle, C. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. *European Journal of Marketing*, *53*, 2322–2347. https://doi.org/10.1108/EJM-02-2019-0189

[52] Boone, H. N., & Boone, D. A. (2012). Analyzing Likert Data. *The Journal of Extension*, *50*, 1–5. https://doi.org/10.34068/joe.50.02.48

[53] Taherdoost, H. (2018b). Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. *SSRN Electronic Journal*, *5*(3), 28–36. https://doi.org/10.2139/ssrn.3205040

[54] Schoemann, Alexander M, Boulton, Aaron J, & Short, Stephen D. (2017). Determining Power and Sample Size for Simple and Complex Mediation Models. *Social Psychological and Personality Science*, *8*(4), 379–386. https://doi.org/10.1177/1948550617715068

[55] Kock, N. (2015). Common Method Bias in PLS-SEM: A Full Collinearity Assessment Approach. *International Journal of E-Collaboration (IJeC)*, *11*, 1–10. https://doi.org/10.4018/ijec.2015100101

[56] Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

[57] Fernandes, T., & Oliveira, E. (2021). Understanding consumers' acceptance of automated technologies in service encounters: Drivers of digital voice assistants adoption. *Journal of Business Research*, *122*, 180–191. https://doi.org/10.1016/j.jbusres.2020.08.058

[58] Soomro, R. B., Al-Rahmi, W., Dahri, N., Alblehai, F., Alshimai, A., Aldaijy, A., & Salameh, A. A. (2024). Evaluating the Influence of UTAUT Factors on the Adoption of QR Codes in MSMEs: An Application of SEM and ANN Methodologies. *IEEE Access*, *PP*, 1. https://doi.org/10.1109/ACCESS.2024.3510375

About the authors:

Name: Kartika Indah Permanasari, S.E., M.M.
Kartika Indah Permanasari is a lecturer in the Department of Business Administration at Politeknik Negeri Malang, Indonesia. She earned a Bachelor's degree in Marketing Management from Universitas Negeri Malang and a Master's degree in Marketing Management from Universitas Brawijaya. She teaches undergraduate courses in Marketing Management, Customer Relationship Management, Strategic Marketing, Retail Management, Consumer Behavior, Business Ethics, Sales Management, Marketing Planning, and Research Methodology.
She has actively participated in research and community engagement projects funded by Politeknik Negeri Malang and other institutions. Her work has been published in national journals, conference proceedings, and scholarly publications focusing on marketing and digital business. Her research interests include digital marketing, electronic payment systems, technology adoption, consumer behavior, customer relationship management, digital transformation, marketing communication, service marketing, brand management, and innovation in small and medium-sized enterprises (SMEs). More recently, her research has explored digital payment adoption, particularly QRIS and e-wallet technologies, using the Unified Theory of Acceptance and Use of Technology (UTAUT) to examine the factors influencing technology acceptance and usage among micro and small enterprises. Her research aims to support digital transformation, sustainable business development, and marketing innovation in Indonesia.
Mailing address:
Faculty of Administrative Science, Universitas Brawijaya
Jl. MT. Haryono No.163, Malang 65145, East Java, Indonesia
Tel: +62-341-553737
Fax: +62-341-558227
E-mail: kartikaindah@student.ub.ac.id

Name: Prof. Dr. Endang Siti Astuti, M.Si.
Prof. Dr. Endang Siti Astuti is a Professor at the Faculty of Administrative Science, Universitas Brawijaya, Indonesia. Her academic expertise covers public administration, organizational governance, digital public services, and administrative reform. She has actively contributed to research on institutional transformation and public sector innovation in Indonesia. Her research interests encompass public sector governance, organizational change, strategic public management, digital government, public service innovation, and institutional capacity development. Throughout her academic career, she has supervised numerous graduate and doctoral research projects while publishing extensively in the fields of administrative science, governance, and organizational development. Her recent studies focus on the digital transformation of public institutions, governance innovation, public policy implementation, and organizational performance within the context of emerging economies. She is actively engaged in collaborative research involving government agencies, universities, and public organizations aimed at improving public service quality and promoting sustainable institutional development. Her scholarly work emphasizes the integration of governance reform, technological innovation, and evidence-based policymaking to strengthen public administration and sustainable development.
Mailing address:
Faculty of Administrative Science, Universitas Brawijaya
Jl. MT. Haryono No.163, Malang 65145, East Java, Indonesia
Tel: +62-341-553737
Fax: +62-341-558227
E-mail: ending.siti@ub.ac.id

Name: Prof. Dr. Drs. Kadarisman Hidayat, M.Si.
Prof. Dr. Drs. Kadarisman Hidayat is a Professor at the Faculty of Administrative Science, Universitas Brawijaya, Indonesia. His research focuses on strategic management, organizational development, innovation management, and digital business transformation. His scholarly work emphasizes the role of technology and organizational capability in improving institutional performance. His academic interests include strategic management, organizational behaviour, business innovation, leadership, digital transformation, and organizational sustainability. He has published widely on organizational strategy, innovation capability, knowledge management, and institutional competitiveness in both public and private organizations. His recent research examines the strategic implications of digital transformation, organizational resilience, and technology-driven innovation for improving organizational effectiveness and long-term competitiveness. In addition to supervising graduate and doctoral students, he actively collaborates with industry and government institutions in research projects related to organizational development, strategic performance management, and digital innovation. His work consistently highlights the importance of integrating strategic leadership, technological capability, and organizational learning to support sustainable organizational development in rapidly changing environments.
Mailing address:
Faculty of Administrative Science, Universitas Brawijaya
Jl. MT. Haryono No.163, Malang 65145, East Java, Indonesia
Tel: +62-341-553737
Fax: +62-341-558227
E-mail: kadaris_fia@ub.ac.id

Name: M. Kholid Mawardi, S.Sos., M.Si., Ph.D.
M. Kholid Mawardi is a lecturer and researcher at the Faculty of Administrative Science, Universitas Brawijaya, Indonesia. His research interests include marketing, consumer behaviour, digital commerce, and financial technology adoption. His recent studies examine digital consumer ecosystems and sustainable technology-driven business practices in developing countries. His broader research interests include digital marketing, electronic commerce, consumer behaviour, financial technology, innovation management, and sustainable business strategies. He has conducted extensive research on digital consumer behaviour, online purchasing decisions, service quality, and technology acceptance across various business sectors. His publications contribute to the understanding of how digital innovation influences organizational performance, consumer engagement, and business competitiveness in emerging markets. He is actively involved in multidisciplinary research collaborations focusing on digital transformation, marketing analytics, and sustainable digital business ecosystems. His current research explores the intersection of consumer trust, digital platforms, financial technology, and sustainable digital commerce, with the objective of supporting evidence-based managerial decision-making and strengthening the competitiveness of small and medium-sized enterprises in the digital economy.
Mailing address:
Faculty of Administrative Science, Universitas Brawijaya
Jl. MT. Haryono No.163, Malang 65145, East Java, Indonesia
Tel: +62-341-553737
Fax: +62-341-558227
E-mail: mk_mawardi@ub.ac.id