JEMSI: Jurnal Ekonomi Manajemen Sistem Informasi
E-ISSN: 2686-5238
P-ISSN: 2686-4916
https://dinastirev.org/JEMSI dinasti.info@gmail.com +62 811 7404 455
DOI: https://doi.org/10.38035/jemsi.v7i2
https://creativecommons.org/licenses/by/4.0/
Received: 04 November 2025 | **Revised:** 13 November 2025 | **Accepted:** 23 November 2025

Phygital Marketing Transformation: Integrating QRIS to Enhance Customer Experience and Engagement

Dodhy Hyronimus Ama Longgy[1], Florentina Blandina Parapaga[2], Yumiad Fernando Richard[3], Jacobus Rico Kuntag[4]
[1]Universitas Musamus, Merauke, Indonesia, dodhyhyronimus@unmus.ac.id
[2]Universitas Musamus, Merauke, Indonesia, flopaga@unmus.ac.id
[3]Universitas Musamus, Merauke, Indonesia, yumiad@unmus.ac.id
[4]Universitas Musamus, Merauke, Indonesia, jacobusrico@unmus.ac.id

Corresponding Author: jacobusrico@unmus.ac.id[4]

Abstract: Digital transformation drives the convergence between physical and digital spaces in retail marketing, known as phygital marketing. In Indonesia, the Quick Response Code Indonesian Standard (QRIS) has become a key instrument in supporting technology-based customer experiences. This study aims to examine the influence of perceived information quality, system quality, service quality, transaction speed, and risk on customer experience and customer engagement in the use of QRIS. Using an explanatory sequential mixed-method design, the quantitative phase involved 188 QRIS users in traditional retail, followed by in-depth interviews with five business actors in Merauke Regency. Data analysis using SEM- PLS showed that perceptions of information, system, and service quality had a positive effect on customer experience, while perceived risk had a negative effect. However, transaction speed had no significant effect. Only customer experience directly influenced customer engagement and partially mediated most of the indirect effects of the perceptual variables. Qualitative findings confirmed that business actors faced challenges related to infrastructure, technological understanding, and support services, which affected the optimal use of QRIS. This study extends the ISSM model by incorporating risk and transaction speed dimensions and emphasizes the importance of customer experience in strengthening user engagement. Practical implications include the need for education, technical support services, and enhancement of digital infrastructure to increase the sustainable adoption of QRIS in the traditional retail sector.

Keywords: Phygital Marketing, QRIS, Customer Experience, Customer Engagement

INTRODUCTION

Physical stores no longer serve merely as points of transaction, but have evolved into venues for delivering comprehensive customer experiences. This shift is marked by the integration of physical and digital channels through technologies such as artificial intelligence

(AI), augmented/virtual reality (AR/VR), and click & collect features that enhance cross-channel connectivity (Alexander & Varley, 2025). As consumer expectations for personalized experiences grow, companies are required to redesign customer interactions more proactively and based on data.

The globalization of digital technology has transformed the way consumers interact with brands. Today's consumers demand consistent experiences across physical and digital channels, known as the phygital customer experience (Alexander & Cano, 2020; Ylilehto et al., 2021). This transformation reflects a shift from conventional marketing strategies to phygital marketing, which combines the strengths of both physical and digital realms to create more personalized and emotionally connected experiences (Bruce et al., 2023)

In Indonesia, the adoption of phygital technologies is facilitated by the use of the Quick Response Code Indonesian Standard (QRIS), a digital payment system developed by Bank Indonesia. QRIS enables fast, secure, and inclusive transactions, and has been adopted by over 54 million users and 34.7 million merchants (Bank Indonesia, 2024). This innovation not only enhances transactional efficiency but also promotes digital financial literacy across various segments of society.ba

QRIS no longer functions solely as a payment tool, but also as a strategic means to strengthen customer experience and customer engagement, particularly in the context of Industry 5.0, which emphasizes human-centered technology and personalization (Ghobakhloo et al., 2022; Stentoft & Rajkumar, 2020). The integration of QRIS into marketing strategies enables companies to facilitate real-time, cross-channel interactions and to collect accurate consumer behavior data (Ylilehto et al., 2021).

Although QRIS adoption has increased nationwide, its implementation in rural areas still faces challenges such as infrastructure limitations and low levels of digital literacy. Previous studies have predominantly focused on behavioral intention aspects of technology adoption, based on models such as the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and other behavioral theories (Gao et al., 2018; Liébana-Cabanillas et al., 2015; Liu et al., 2021; Zhao & Bacao, 2021). However, there is still limited research that specifically evaluates customer experience in the context of QR code-based digital payment systems, particularly in developing countries such as Indonesia (Le, 2022; Yan et al., 2021).

Focusing on customer experience is crucial in building sustainable competitive advantage, increasing loyalty, satisfaction, and generating positive word-of-mouth (Rawson et al., 2013). The COVID-19 pandemic has also accelerated the adoption of contactless payment systems, including QR code-based payments, due to demands for safety and social distancing.

Nevertheless, the lack of integration between information technology and marketing perspectives in previous research has resulted in limited understanding of fintech product development from the customer's point of view (Hoyer et al., 2020). This may hinder the development of features and long-term adoption.

This study adopts the Information System Success Model (ISSM) developed by Eren (2024), expanding it with variables such as perceived risk and transaction speed to better capture the dynamics of customer experience. The model also considers various factors such as individual characteristics, socio-cultural context, product category, location, and time of transaction (Verhoef et al., 2009).

This research offers three main contributions: First, it fills a gap in the literature by linking ISSM and customer experience, and evaluating them through individual differences. Second, it develops a comprehensive understanding of customer experience by incorporating psychological variables such as risk and transaction speed. Third, it provides practical insights

for business actors to predict the adoption of digital payment systems in Indonesia and other developing countries.

The development of hypotheses in this study is based on a conceptual framework that explains the relationships among information system quality, user perception, and customer experience in the use of the QRIS digital payment system. Referring to the Information System Success Model (DeLone & McLean, 2003), this study emphasizes that information quality, system quality, and service quality along with factors such as perceived risk and transaction speed simultaneously shape customer experience, which ultimately influences customer engagement. Accordingly, each construct is elaborated to support the formulation of hypotheses to be empirically tested.

Information quality refers to users' perceptions of the value of outputs generated by a website or application, which are determined by timeliness, accuracy, usefulness, and completeness (Wixom & Todd, 2005). In the context of web-based applications, complete, relevant, understandable, and secure information quality encourages users to conduct transactions and positively evaluate the application (DeLone & McLean, 2003). High information quality enhances users' perceptions of ease of use and usefulness (Shin, 2015), whereas irrelevant or outdated information reduces the service provider's credibility (Zhou, 2013). Therefore, banks must ensure that the information provided through QR code-based payment systems such as QRIS can create a positive customer experience.

H1a: The perceived information quality of QRIS usage has a significant and positive effect on customer experience.

H1b: The perceived information quality of QRIS usage has a significant and positive effect on customer engagement.

System quality measures aspects such as availability, reliability, adaptability, and response time (DeLone & McLean, 2003), and serves as a key indicator of web-based application performance. High system quality reflects the technical reliability of the information system (Gorla et al., 2010; Gupta & Mukherjee, 2025) and enhances users' perceptions of ease of use and usefulness (Hau et al., 2012; Shin, 2015). Conversely, poor system quality can hinder user satisfaction and degrade customer experience. In the context of digital payments, high system quality has been shown to positively influence user satisfaction and experience (Zhong & Moon, 2022; Zhou, 2013).

H2a: The perceived system quality of QRIS usage has a significant and positive effect on customer experience.

H2b: The perceived system quality of QRIS usage has a significant and positive effect on customer engagement.

The development of information systems has positioned service quality as a distinct dimension of system quality (DeLone & McLean, 2003), encompassing assurance, empathy, and responsiveness. In QR code-based payment services, service quality relates to the ability of service providers to understand users' needs and provide timely assistance (Zeithaml et al., 2002). Superior service quality creates positive attitudes and enjoyable experiences among users (Pires et al., 2024; Raman & Aashish, 2021), while poor service quality causes disappointment and negative evaluations. Therefore, the level of service quality is an essential dimension of information system success.

H3a: The perceived service quality of QRIS usage has a significant and positive effect on customer experience.

H3b: The perceived service quality of QRIS usage has a significant and positive effect on customer engagement.

Perceived risk reflects users' concerns about the security of their personal data when using web-based payment applications (Johnson et al., 2018). Although QR codes are considered secure because they do not directly verify payment information, there remain potential risks that must be managed through strengthened security mechanisms such as blockchain technology (Smahi et al., 2020). High perceived risk may diminish user experience and hinder application adoption (Chen, 2008; Yang et al., 2015), whereas a high sense of security enhances users' positive attitudes toward QR code payments (Chang et al., 2021).

H4a: The perceived risk of QRIS usage has a significant and negative effect on customer experience.

H4b: The perceived risk of QRIS usage has a significant and negative effect on customer engagement.

Transaction speed is a crucial factor in information systems and e-commerce applications, as it directly influences user satisfaction (Yoon, 2010). Mobile payment technology enables fast, efficient, and secure transactions, resulting in better user experiences compared to traditional methods (Chen, 2008). In the context of QR code payments, processing speed is a key feature that determines perceived ease of use and usefulness (Yan et al., 2021).

H5a: The perceived transaction speed of QRIS usage has a significant and positive effect on customer experience.

H5b: The perceived transaction speed of QRIS usage has a significant and positive effect on customer engagement.

Customer experience encompasses customers' emotional, cognitive, social, and sensory responses during their interactions with a product or service (Pusceddu et al., 2025) and serves as a major factor in building customer loyalty (Pullman & Gross, 2004; Vargo & Lusch, 2008). Within the digital and fintech ecosystem, QRIS offers a fast, secure, and inclusive transaction experience (Agarwal et al., 2023; Vyas et al., 2024). Factors such as service quality, perceived value, risk, and technological innovation play important roles in shaping customer engagement (Ramayanti et al., 2025).

H6: Customer experience has a significant and positive effect on customer engagement in using QRIS.

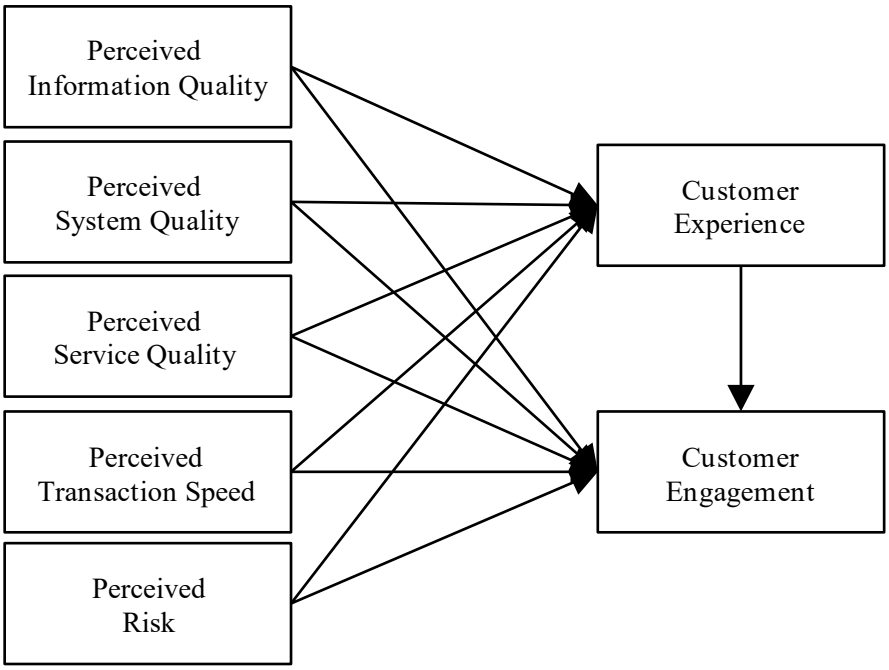
H7a: Customer experience mediates the effect of perceived information quality on customer engagement in using QRIS.

H7b: Customer experience mediates the effect of perceived system quality on customer engagement in using QRIS.

H7c: Customer experience mediates the effect of perceived service quality on customer engagement in using QRIS.

H7d: Customer experience mediates the effect of perceived risk on customer engagement in using QRIS.

H7e: Customer experience mediates the effect of perceived transaction speed on customer engagement in using QRIS.



Source: Research Results

Figure 1. Research Framework

METHOD

The research method contains the type of research, sample and population or research subjects, time and place of research, instruments, procedures, and research techniques, as well as other matters relating to the method of research. This section can be divided into several sub-chapters, but no numbering is necessary.

This study employed an Explanatory Sequential Mixed Method design, a mixed-methods approach that begins with a quantitative phase followed by a qualitative phase.

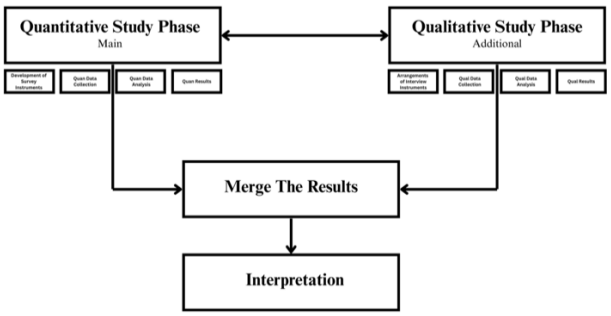
The initial phase involved the collection of quantitative data. A purposive sampling technique was used to select respondents who met the inclusion criteria. A total of 188 respondents participated, with the questionnaire distributed online via Google Forms. The criteria for informants in the qualitative study included: (1) active consumers in traditional retail (stores, stalls, booths, or tents); (2) active users of QRIS in purchasing transactions; and (3) having used QRIS for at least the past six months to ensure sufficient experience and engagement with the QRIS payment system.

Traditional retail in the context of this study is defined as stores, stalls, booths, or tents owned and/or managed by small-scale merchants, community-based entrepreneurs, or cooperatives, characterized by small business scale, limited capital, and transaction processes conducted through bargaining mechanisms.

Following the quantitative phase, the study proceeded to the qualitative phase, which involved conducting semi-structured interviews with five informants who were sellers in traditional retail settings in Merauke Regency. Informant criteria included: (1) actively operating a traditional retail business (store, stall, booth, or tent); (2) actively using QRIS in transactions with consumers; and (3) having used QRIS for at least six months to ensure experience and engagement with the payment system.

The quantitative data obtained from the questionnaire distribution were analyzed using Structural Equation Modeling - Partial Least Squares (SEM-PLS) with the aid of SmartPLS 4.0 software. This analysis was employed to examine the relationships among variables and to test

the research hypotheses that had been previously formulated. Meanwhile, the qualitative data were analyzed using a triangulation technique, which involved integrating the results of in-depth interviews, quantitative findings, and relevant supporting literature.



Source: Research Results

Figure 2. Explanatory Sequential Mixed Method Design

RESULTS AND DISCUSSION

Measurement Model

The study initially employed confirmatory factor analysis to test the reliability and validity of the questionnaire, as well as to determine whether the observed variables accurately measured the latent constructs. To assess the degree of correlation between latent variables and their indicators, factor loadings were evaluated. A factor loading value greater than 0.70 is required to confirm the reliability between a latent variable and its measurement indicators (Hair, 2014).

Once strong reliability between latent variables and their indicators was confirmed, the next step involved examining the internal consistency of these dimensions by assessing composite reliability (CR). Fornell & Larcker (1981) recommended that the reliability indicators of latent constructs should exceed 0.70. After confirming measurement consistency, it is necessary to evaluate whether the scale effectively measures the latent construct. In this context, an average variance extracted (AVE) value of 0.50 or higher is used as the criterion for determining whether the scale possesses convergent and discriminant validity (Hair, 2014).

The values of Cronbach's alpha, CR, and the AVE results for the constructs are presented in Table 1. The results show that all dimensions in the questionnaire met the requirements for convergent validity and composite reliability; therefore, the intrinsic quality of the measurement model is considered satisfactory.

Table 1. Confirmatory factor analysis of measurement model

Constructs	Items	Loadings	AVE	CA	CR
Perceived Information Quality (PIQ)	PIQ1	0.945	0.885	0.968	0.968
	PIQ2	0.946			
	PIQ3	0.944			
	PIQ4	0.945			
	PIQ5	0.923			
Perceived System Quality (PSYQ)	PSYQ1	0.895	0.848	0.940	0.940
	PSYQ2	0.935			
	PSYQ3	0.923			

	PSYQ4	0.929			
Perceived Service Quality (PSVQ)	PSVQ1	0.885	0.817	0.925	0.926
	PSVQ2	0.920			
	PSVQ3	0.901			
	PSVQ4	0.910			
Perceived Risk (PR)	PR1	0.940	0.874	0.928	0.928
	PR2	0.936			
	PR3	0.928			
Perceived Transaction Speed (PTS)	PTS1	0.953	0.888	0.937	0.937
	PTS2	0.951			
	PTS3	0.922			
Customer Experience (EXP)	EXP1	0.945	0.825	0.929	0.933
	EXP2	0.944			
	EXP3	0.906			
	EXP4	0.835			
Customer Engagement (ENG)	ENG1	0.930	0.804	0.918	0.921
	ENG2	0.919			
	ENG3	0.898			
	ENG4	0.837			

Source: Research Data

Table 2 compares the correlation coefficients between pairs of variables with the square roots of the AVE values for each respective variable. The square roots are greater than the corresponding correlation coefficients, which meets the recommended criteria (Hair, 2014).

Table 2. Discriminant Validity

	ENG	EXP	PIQ	PR	PSVQ	PSYQ	PTS
ENG	0.897						
EXP	0.979	0.909					
PIQ	0.938	0.945	0.941				
PR	-0.917	-0.931	-0.941	0.935			
PSVQ	0.904	0.912	0.934	-0.899	0.904		
PSYQ	0.936	0.943	0.964	-0.947	0.919	0.921	
PTS	0.918	0.918	0.940	-0.902	0.887	0.941	0.942

Source: Research Data

Structural Model Analysis

After ensuring validity and reliability, the PLS model was evaluated based on the coefficient of determination (R^2). The R^2 value for customer experience (EXP) was 0.918, while for customer engagement (ENG), it was 0.962. These results indicate that the determinant factors explain 91.8% of the variance in customer experience and 96.2% of the variance in customer engagement. Both values exceed 0.75, which is considered very high (Hair, 2014), indicating that these two aspects are critical factors related to consumer usage of QRIS.

The results of the hypothesis testing presented in Table 3 show that EXP is positively predicted by perceived information quality (PIQ) (β = 0.248, ρ < 0.05), perceived system quality (PSYQ) (β = 0.200, ρ < 0.05), and perceived service quality (PSVQ) (β = 0.152, ρ < 0.010), thus supporting H1a, H2a, and H3a. EXP is also negatively predicted by perceived risk (PR) (β = -0.248, ρ < 0.05), supporting H4a. However, perceived transaction speed (PTS) does not significantly affect EXP, and therefore H5a is not supported.

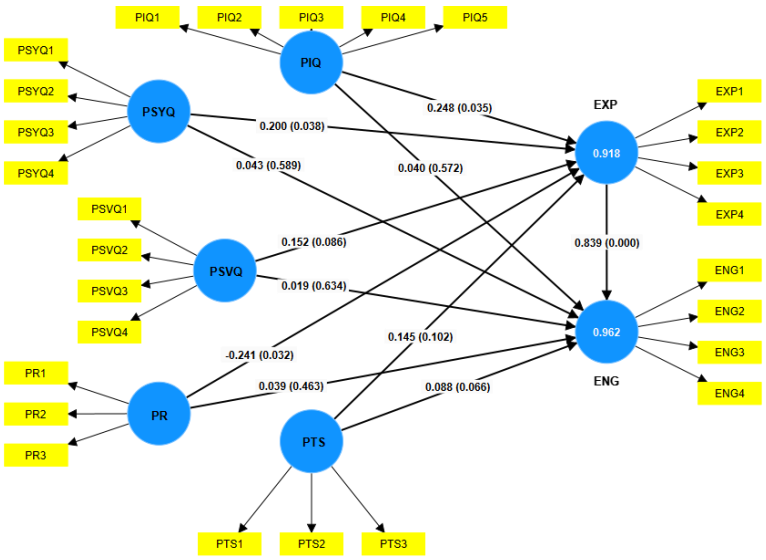
Furthermore, none of the determinant factors significantly influence ENG, thus rejecting H1b, H2b, H3b, and H4b. On the other hand, EXP has a significant and positive effect on ENG (β = 0.839, ρ < 0.01), which supports H6.

Table 3. Path Coefficients of Direct Effects

Hypotheses		β	S.D	t-statistics	*ρ*-values	Supported
H1a	PIQ -> EXP	0.248	0.118	2.105	0.035	Yes
H1b	PIQ -> ENG	0.040	0.071	0.566	0.572	No
H2a	PSYQ -> EXP	0.200	0.097	2.072	0.038	Yes
H2b	PSYQ -> ENG	0.043	0.080	0.540	0.589	No.
H3a	PSVQ -> EXP	0.152	0.088	1.715	0.086	Yes
H3b	PSVQ -> ENG	0.019	0.039	0.476	0.634	No.
H4a	PR -> EXP	-0.241	0.112	2.143	0.032	Yes
H4b	PR -> ENG	0.039	0.053	0.734	0.463	No.
H5a	PTS -> EXP	0.145	0.089	1.635	0.102	No.
H5b	PTS -> ENG	0.088	0.048	1.842	0.066	No
H6	EXP -> ENG	0.839	0.050	16.852	0.000	Yes

Notes: **p < .01; *p < .05; S.D. = Standard Deviation.

Source: Research Data



Source: Research Results

Figure 3. Structural Model Results

Mediation Effect

A mediation effect is tested when an intervening variable is suspected to exist between an independent variable and a dependent variable. This implies that the effect of the independent variable on the dependent variable does not occur directly, but rather through a transformation process represented by the mediating variable (Baron & Kenny, 1986).

Customer experience (EXP) was found to mediate the relationship between perceived information quality (PIQ) and customer engagement (ENG) ($\beta = 0.208$, $\rho < 0.05$), perceived system quality (PSYQ) and ENG ($\beta = 0.168$, $\rho < 0.05$), as well as perceived risk (PR) and ENG ($\beta = -0.202$, $\rho < 0.05$). However, EXP did not mediate the relationship between perceived service quality (PSVQ) and ENG, nor between perceived transaction speed (PTS) and ENG.

Table 4. Path Coefficients of Indirect Effects

Hypotheses		β	SD	t-statistics	*ρ*-values	Supported
H7a	PIQ -> EXP -> ENG	0.208	0.103	2.010	0.044	Yes
H7b	PSYQ -> EXP -> ENG	0.168	0.080	2.109	0.035	Yes
H7c	PSVQ -> EXP -> ENG	0.127	0.077	1.651	0.099	No
H7d	PR -> EXP -> ENG	-0.202	0.094	2.144	0.032	Yes
H7e	PTS -> EXP -> ENG	0.121	0.075	1.628	0.104	No

Source: Research Data

Customer Experience and Engagement

The findings of this study indicate that the perceived information quality related to QRIS usage has a positive effect on customer experience. This is supported by previous studies (Eren, 2022; Kumalasari et al., 2022; Patma et al., 2021; Trivedi, 2019). However, perceived information quality does not significantly influence customer engagement, possibly because customers perceive information as a basic necessity rather than a factor that evokes emotional connection.

Perceived system quality has a positive effect on customer experience. As users' positive perceptions of information and system quality increase, their experience with QRIS usage also improves. This is consistent with earlier findings (Eren, 2022; Kumalasari et al., 2022; Patma et al., 2021; Trivedi, 2019). However, perceived system quality does not affect customer engagement, possibly because customers view QRIS usage as a functional necessity, not something that fosters additional emotional attachment.

Perceived service quality positively influences customer experience. This finding is supported by several previous studies (Hassan, 2024; Kumalasari et al., 2022; Mbama & Ezepue, 2018; Trivedi, 2019). However, perceived service quality does not significantly impact customer engagement. The service quality of QRIS providers does not form strong customer attachment to QRIS, likely because consumers are more focused on speed and ease of digital transactions than on interpersonal service aspects. Additionally, the self-service nature of QRIS usage may reduce the direct role of service providers in shaping customer perceptions.

Perceived risk negatively affects customer experience. This suggests that high levels of concern regarding data and digital transaction security can diminish the overall customer experience (Gupta & Mukherjee, 2025; Nancyprabha & Sivakumar, 2023; Pires et al., 2024). Concerns over data security, system failures, or unsuccessful transactions may hinder the formation of positive experiences.

Perceived risk does not directly reduce customer engagement; instead, it does so indirectly by lowering the quality of customer experience during QRIS usage. Such negative experiences, in turn, hinder the development of emotional involvement or long-term trust in using QRIS. Therefore, to foster positive experiences and strengthen customer engagement, service providers and merchants must reduce perceived risk by offering security guarantees, transparent information, and responsive support in the event of transaction issues.

Contrary to the proposed hypothesis, the findings reveal that perceived transaction speed does not significantly affect either customer experience or engagement. Customers may perceive speed as an inherent or standard feature of digital payment systems, and thus, it no longer serves as a strong differentiating factor. Moreover, if QRIS transactions generally operate quickly, variations in perceived speed may not be large enough to influence customer experience or engagement.

Customer experience has a significant and positive impact on customer engagement. This aligns with Gupta & Mukherjee (2025), who assert that user habits and comfort levels can discourage switching behavior. Meanwhile, customer experiences that are immersive, personalized, and holistic within a phygital environment tend to foster stronger emotional engagement between customers and the brand (Alexander & Varley, 2025).

Retailer Experience and Engagement

Based on the interview findings, information about QRIS is perceived as unclear by most business actors. The majority admitted to only having a superficial understanding of QRIS, without detailed knowledge, and some were unaware of how to register for the service. Even store owners who had implemented QRIS stated that the information provided by the service provider was still general in nature. Therefore, store owners and QRIS service providers must ensure that the quality of information provided genuinely helps create a positive user experience, ultimately increasing sustained customer engagement.

Interview results revealed that most informants believed the system quality of QRIS is highly dependent on signal strength and the devices used. Stall and kiosk owners considered the system too complex, as it requires smartphones and data packages. One kiosk owner cited device limitations as the primary barrier. Even store owners already using QRIS complained about dependency on network stability. Access to mobile phones and the internet plays a critical role in driving the adoption of digital payments (Andaregie et al., 2024).

Retailers interviewed reported that they rarely or never received technical support from QRIS providers. They stated that they had never been contacted or received information about further training or education. The only support they experienced occurred during the initial installation phase. Interview informants also expressed concerns regarding potential risks in digital transactions. Tent and kiosk owners feared that money might not be received or that devices might malfunction during transactions. Some expressed worries about forgetting passwords, while others avoided using the system altogether due to fear of fraud. Security and transparency were regarded as essential aspects for building trust, especially as the boundary between digital and physical spaces becomes increasingly blurred (Alexander & Varley, 2025). Although some informants acknowledged that QRIS transactions could be fast under strong signal conditions, many still viewed cash payments as more practical and faster. Kiosk and tent owners noted that waiting for payment confirmation could actually slow down the process, particularly when the signal was weak.

The qualitative findings from interviews with traditional retail business actors indicate that limitations in system and information quality are the primary barriers to QRIS adoption. The lack of understanding about registration procedures, dependency on internet connectivity,

and device constraints reduce the perceived ease of use as emphasized in the Technology Acceptance Model (TAM) (Davis, 1989). This is also aligned with the "facilitating conditions" construct in the Unified Theory of Acceptance and Use of Technology (UTAUT), which posits that infrastructure support and technical resources play a crucial role in influencing behavioral intentions toward technology (Hoyer et al., 2020).

Additionally, the perceived service quality by business actors indicates that technical support from QRIS providers has not been optimal. According to the ISSM model, poor service quality may hinder the success of an information system by undermining user trust and comfort (DeLone & McLean, 2003). The absence of follow-up training and low levels of communication from service providers weaken users' perceived value of the system. The experiences of these business actors reflect that system quality, information quality, and service quality are interrelated and form key factors influencing the sustainable use of QRIS in the traditional retail sector.

CONCLUSION

Phygitality must be understood as a holistic ecosystem that synergistically integrates emotional, social, and technological aspects to produce meaningful and sustainable experiences. This study affirms that customer experience serves as a key variable in mediating the influence of perceived system, information, and service quality on customer engagement. However, perceived transaction speed is no longer a significant differentiator, as it is now considered a standard feature. On the other hand, from the perspective of traditional business operators, limitations in information, devices, and service provision remain the primary barriers to optimal QRIS adoption. Therefore, the implementation of digital payment systems must be accompanied by educational interventions and ongoing technical support.

REFERENSI

Agarwal, S., Amromin, G., Chomsisengphet, S., Landvoigt, T., Piskorski, T., Seru, A., & Yao, V. (2023). Mortgage refinancing, consumer spending, and competition: Evidence from the home affordable refinance program. *The Review of Economic Studies*, *90*(2), 499–537.

Alexander, B., & Cano, M. B. (2020). Store of the future: Towards a (re) invention and (re) imagination of physical store space in an omnichannel context. *Journal of Retailing and Consumer Services*, *55*, 101913.

Alexander, B., & Varley, R. (2025). Retail futures: Customer experience, phygital retailing, and the Experiential Retail Territories perspective. *Journal of Retailing and Consumer Services*, *82*, 104108.

Andaregie, A., Abebe, G. K., Gupta, P., Worku, G., Matsumoto, H., Astatkie, T., & Takagi, I. (2024). Exploring individuals' socioeconomic characteristics and digital infrastructure determinants of digital payment adoption in Ethiopia. *Digital Business*, *4*(2), 100092.

Bruce, E., Keelson, S., Amoah, J., & Bankuoru Egala, S. (2023). Social media integration: An opportunity for SMEs sustainability. *Cogent Business & Management*, *10*(1), 2173859.

Chang, V., Chen, W., Xu, Q. A., & Xiong, C. (2021). Towards the customers' intention to use QR codes in mobile payments. *Journal of Global Information Management (JGIM)*, *29*(6), 1–21.

Chen, L. (2008). A model of consumer acceptance of mobile payment. *International Journal of Mobile Communications*, *6*(1), 32–52.

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: a ten-year update. *Journal of Management Information Systems*, *19*(4), 9–30.

Eren, B. A. (2022). QR code m-payment from a customer experience perspective. *Journal of Financial Services Marketing*, 1.

Gao, S., Yang, X., Guo, H., & Jing, J. (2018). An empirical study on users' continuous usage intention of QR code mobile payment services in China. *International Journal of E-Adoption (IJEA)*, *10*(1), 18–33.

Ghobakhloo, M., Iranmanesh, M., Mubarak, M. F., Mubarik, M., Rejeb, A., & Nilashi, M. (2022). Identifying industry 5.0 contributions to sustainable development: A strategy roadmap for delivering sustainability values. *Sustainable Production and Consumption*, *33*, 716–737.

Gorla, N., Somers, T. M., & Wong, B. (2010). Organizational impact of system quality, information quality, and service quality. *The Journal of Strategic Information Systems*, *19*(3), 207–228.

Gupta, A. S., & Mukherjee, J. (2025). Exploring drivers of customer engagement with voice interface in E-retail. *International Journal of Retail & Distribution Management*, *53*(4), 297–311.

Hair, J. F. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)*. sage.

Hassan, H. E. (2024). The role of mobile shopping service quality in enhancing customers M-satisfaction, M-loyalty, and E-word of mouth. *Future Business Journal*, *10*(1), 109.

Hau, Y. S., Kim, G., & Kim, B. (2012). Antecedents of user satisfaction in the context of mobile data services: the moderating role of variety and rate of usage. *International Journal of Mobile Communications*, *10*(6), 617–636.

Hoyer, W. D., Kroschke, M., Schmitt, B., Kraume, K., & Shankar, V. (2020). Transforming the customer experience through new technologies. *Journal of Interactive Marketing*, *51*(1), 57–71.

Johnson, V. L., Kiser, A., Washington, R., & Torres, R. (2018). Limitations to the rapid adoption of M-payment services: Understanding the impact of privacy risk on M-Payment services. *Computers in Human Behavior*, *79*, 111–122.

Kumalasari, R. A. D., Permanasari, K. I., Karismariyanti, M., & Munandar, D. (2022). Mobile banking: system quality, information quality, service quality, customer satisfaction, and loyalty. *Jurnal Administrare: Jurnal Pemikiran Ilmiah Dan Pendidikan Administrasi Perkantoran*, *9*(1), 141–148.

Le, X. C. (2022). The diffusion of mobile QR-code payment: an empirical evaluation for a pandemic. *Asia-Pacific Journal of Business Administration*, *14*(4), 617–636.

Liébana-Cabanillas, F., Ramos de Luna, I., & Montoro-Ríos, F. J. (2015). User behaviour in QR mobile payment system: the QR Payment Acceptance Model. *Technology Analysis & Strategic Management*, *27*(9), 1031–1049.

Liu, R., Wu, J., & Yu-Buck, G. F. (2021). The influence of mobile QR code payment on payment pleasure: evidence from China. *International Journal of Bank Marketing*, *39*(2), 337–356.

Mbama, C. I., & Ezepue, P. O. (2018). Digital banking, customer experience and bank financial performance: UK customers' perceptions. *International Journal of Bank Marketing*, *36*(2), 230–255.

Nancyprabha, P., & Sivakumar, V. J. (2023). The influence of perceived risk and trust on customer experience: an empirical study on young m-banking app users in India. *International Journal of Business Excellence*, *29*(2), 222–247.

Patma, T. S., Fienaningsih, N., Rahayu, K. S., & Artatanaya, I. G. L. S. (2021). Impact of information quality on customer perceived value, experience quality, and customer

satisfaction from using Gofood Aplication. *Journal of Indonesian Economy and Business: JIEB.*, *36*(1), 51–61.

Pires, P. B., Prisco, M., Delgado, C., & Santos, J. D. (2024). A conceptual approach to understanding the customer experience in e-commerce: An empirical study. *Journal of Theoretical and Applied Electronic Commerce Research*, *19*(3), 1943–1983.

Pullman, M. E., & Gross, M. A. (2004). Ability of experience design elements to elicit emotions and loyalty behaviors. *Decision Sciences*, *35*(3), 551–578.

Pusceddu, G., Moi, L., & Cabiddu, F. (2025). Do they see eye to eye? Managing customer experience in phygital high-tech retail. *Management Decision*, *63*(6), 2008–2037.

Raman, P., & Aashish, K. (2021). To continue or not to continue: a structural analysis of antecedents of mobile payment systems in India. *International Journal of Bank Marketing*, *39*(2), 242–271.

Ramayanti, R. N., Mahmudah, H., Yaskun, M., & Najiah, E. F. (2025). Analysis of The Influence of Customer Relationship Management, Digital Marketing And Service Quality on Customer Loyalty Mediated By Customer Satisfaction on The DANA Application (Study Case at Bima Cell). *NICEBIS: National Innovation Conference on Economics and Business*, *1*(1).

Shin, D.-H. (2015). Effect of the customer experience on satisfaction with smartphones: Assessing smart satisfaction index with partial least squares. *Telecommunications Policy*, *39*(8), 627–641.

Smahi, A., Xia, Q., Xia, H., Sulemana, N., Fateh, A. A., Gao, J., Du, X., & Guizani, M. (2020). A blockchainized privacy-preserving support vector machine classification on mobile crowd sensed data. *Pervasive and Mobile Computing*, *66*, 101195.

Stentoft, J., & Rajkumar, C. (2020). The relevance of Industry 4.0 and its relationship with moving manufacturing out, back and staying at home. *International Journal of Production Research*, *58*(10), 2953–2973.

Trivedi, J. (2019). Examining the customer experience of using banking chatbots and its impact on brand love: The moderating role of perceived risk. *Journal of Internet Commerce*, *18*(1), 91–111.

Vargo, S. L., & Lusch, R. F. (2008). A service logic for service science. In *Service science, management and engineering education for the 21st century* (pp. 83–88). Springer.

Verhoef, P. C., Lemon, K. N., Parasuraman, A., Roggeveen, A., Tsiros, M., & Schlesinger, L. A. (2009). Customer experience creation: Determinants, dynamics and management strategies. *Journal of Retailing*, *85*(1), 31–41.

Vyas, S., Rathore, J. S., & Kumar, V. (2024). Insights into mobile app experience: a systematic literature review using TCCM framework. *Global Knowledge, Memory and Communication*.

Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research*, *16*(1), 85–102.

Yan, L.-Y., Tan, G. W.-H., Loh, X.-M., Hew, J.-J., & Ooi, K.-B. (2021). QR code and mobile payment: The disruptive forces in retail. *Journal of Retailing and Consumer Services*, *58*, 102300.

Yang, Y., Liu, Y., Li, H., & Yu, B. (2015). Understanding perceived risks in mobile payment acceptance. *Industrial Management & Data Systems*, *115*(2), 253–269.

Ylilehto, M., Komulainen, H., & Ulkuniemi, P. (2021). The critical factors shaping customer shopping experiences with innovative technologies. *Baltic Journal of Management*, *16*(5), 661–680.

Yoon, C. (2010). Antecedents of customer satisfaction with online banking in China: The effects of experience. *Computers in Human Behavior*, *26*(6), 1296–1304.

Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through web sites: a critical review of extant knowledge. *Journal of the Academy of Marketing Science*, *30*(4), 362–375.

Zhao, Y., & Bacao, F. (2021). How does the pandemic facilitate mobile payment? An investigation on users' perspective under the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, *18*(3), 1016.

Zhong, Y., & Moon, H.-C. (2022). Investigating customer behavior of using contactless payment in China: A comparative study of facial recognition payment and mobile QR-code payment. *Sustainability*, *14*(12), 7150.

Zhou, T. (2013). An empirical examination of continuance intention of mobile payment services. *Decision Support Systems*, *54*(2), 1085–1091.