

THE ROLE OF CUSTOMER RELATIONSHIP MARKETING ON CUSTOMER LOYALTY WITH CUSTOMER SATISFACTION AS A MEDIATING VARIABLE AMONG QRIS USERS IN GENERATION Z



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Abstract

This study aims to examine the role of Customer Relationship Marketing (CRM) on Customer Loyalty with Customer Satisfaction as a mediating variable among QRIS users in Generation Z in Indonesia. A quantitative approach was employed, using primary data collected through an online questionnaire distributed via Google Forms with a five-point Likert scale. The respondents were Generation Z individuals (born 1997–2012) who had used QRIS within the last six months, selected using purposive sampling with a minimum of 100 respondents. The variables consist of CRM and User Experience as independent variables, Customer Satisfaction as the intervening variable, and Customer Loyalty as the dependent variable. Data were analyzed using SmartPLS with the PLS-SEM method, including validity and reliability testing, multicollinearity assessment, coefficient of determination, effect size, and hypothesis testing through bootstrapping for both direct and indirect effects. The results show that CRM has a positive and significant effect on both Customer Satisfaction and Customer Loyalty. User Experience positively and significantly affects Customer Satisfaction but does not directly influence Customer Loyalty. Customer Satisfaction has a positive and significant effect on Customer Loyalty and also mediates the relationship between CRM, User Experience, and Loyalty.

Keywords: Customer Loyalty, Customer Relationship Marketing, Customer Satisfaction, QRIS, User Experience.

INTRODUCTION

The development of information and communication technology has fundamentally transformed society's economic behavior, particularly through the transition from cash-based transactions toward a cashless society. Payment digitalization is no longer merely a technological trend but has become an essential infrastructure supporting the development of the digital economy (Novita, 2025). In Indonesia, this transformation reached an important milestone through the implementation of the Quick Response Code Indonesian Standard (QRIS) by Bank Indonesia, which standardized QR-code-based payment transactions across different payment service providers (Handayani, 2023).

QRIS was developed to address the fragmentation of digital payment systems by enabling interoperability among various digital wallets and mobile banking applications through a single standardized QR code (Shalihin, 2025). This integration provides greater convenience for consumers while improving transaction efficiency for businesses. However, interoperability also creates a competitive challenge for payment service providers because users can easily conduct QRIS transactions through different applications. Consequently, competition is no longer determined solely by the availability of payment functions, but increasingly by the ability of service providers to create positive experiences and maintain long-term relationships with users (Pancawati, 2025).

Generation Z represents an important segment within this digital payment ecosystem. Born between 1997 and 2012, members of Generation Z have grown up alongside the rapid development of the internet, smartphones, and digital platforms. Their familiarity with technology encourages rapid adoption of digital payment methods such as QRIS because these services offer speed, convenience, and accessibility (Setiawan, 2025). At the same time, their extensive exposure to alternative digital services allows them to compare applications easily and switch between service providers when their expectations are not fulfilled. Therefore, maintaining loyalty among Generation Z requires more than merely providing functional digital payment facilities.

One important factor in addressing this challenge is Customer Relationship Marketing (CRM). CRM emphasizes the development of sustainable relationships with customers through personalized communication, responsive services, customer understanding, and relationship-building activities. In digital payment services, an effective CRM strategy can strengthen users' perceptions that service providers understand their preferences and provide relevant benefits. Such relationships are increasingly important because customers can easily move between competing applications offering similar payment functions, promotions, and incentives (Putri, 2026). Therefore, CRM is expected to contribute to customer loyalty by creating stronger relational value between users and service providers.

In addition to relational factors, User Experience (UX) is increasingly important in determining how users evaluate digital payment services. UX reflects users' overall perceptions and responses when interacting with an application, including aspects such as ease of use, accessibility, transaction speed, interface clarity, convenience, and overall interaction quality. For Generation Z, who regularly interact with digital platforms, a smooth and intuitive experience can influence whether they continue using a particular payment application. Although QRIS provides a standardized payment mechanism, users access QRIS

through different applications with different interfaces, features, response speeds, and service experiences. Thus, while CRM represents the relational dimension of customer management, UX represents the experiential dimension of digital service interaction. Examining these two factors simultaneously provides a more comprehensive explanation of customer loyalty in the QRIS ecosystem.

Customer satisfaction may provide an important mechanism connecting CRM and UX with customer loyalty. Satisfaction emerges when users perceive that the services and experiences they receive meet or exceed their expectations. In the context of QRIS users, personalized relationships and responsive communication generated through CRM may increase satisfaction, while an efficient, convenient, and intuitive user experience may strengthen positive evaluations of the service. Satisfied customers are subsequently more likely to continue using the same service and develop stronger loyalty toward the payment application (Adistra, 2024). Accordingly, customer satisfaction is positioned in this study as a mediating variable because CRM and UX may not only influence loyalty directly but may also encourage loyalty through positive evaluations formed from customers' relational and experiential interactions with service providers.

Previous discussions of digital payment adoption have largely emphasized technological convenience, transaction efficiency, promotional benefits, and users' willingness to adopt digital payment systems. However, the growing interoperability of QRIS creates a different managerial issue because the ability to use QRIS is no longer exclusive to a particular application. The critical question has therefore shifted from whether consumers are willing to adopt QRIS to why they remain loyal to a particular payment service provider when similar QRIS functionality is available across multiple applications. Moreover, limited attention has been given to simultaneously examining CRM as a relational factor and UX as an experiential factor while considering customer satisfaction as the psychological mechanism connecting these factors with loyalty, particularly among Generation Z users. This condition establishes the research gap addressed in this study.

Based on this gap, this study aims to examine the effects of Customer Relationship Marketing and User Experience on customer loyalty among Generation Z QRIS users, both directly and indirectly through customer satisfaction as a mediating variable. The study is expected to provide a more integrated understanding of how relational and experiential factors contribute to maintaining customer loyalty within an increasingly competitive and interoperable digital payment ecosystem.

REVIEW OF LITERATURE

Theoretical Foundation

This study is primarily grounded in the Stimulus–Organism–Response (S-O-R) Theory, which explains how external environmental stimuli influence individuals' internal psychological states and subsequently generate behavioral responses. Originally introduced by Mehrabian and Russell (1974), the S-O-R framework proposes that environmental factors act as stimuli (S), which influence an individual's cognitive or affective condition as the organism (O), ultimately producing a particular behavioral response (R). In the context of digital services, this framework has been widely applied to explain how service attributes and digital interactions shape customer evaluations and subsequent behavioral intentions.

Within the context of this study, Customer Relationship Marketing (CRM) and User Experience (UX) represent external stimuli because both reflect customers' interactions with and perceptions of QRIS-based payment service providers. CRM provides relational stimuli through personalized communication, responsiveness, trust-building activities, and relationship management, whereas UX provides experiential stimuli through usability, transaction convenience, interface quality, accessibility, and interaction efficiency. These stimuli are expected to influence Customer Satisfaction, which represents the organism because satisfaction reflects customers' internal evaluation of whether the service experience meets or exceeds their expectations. Subsequently, satisfaction generates a behavioral response in the form of Customer Loyalty, reflected through continued usage, preference for the service, resistance to competing alternatives, and willingness to recommend the service. Accordingly, the S-O-R framework provides an overarching theoretical explanation for both the direct and indirect relationships among CRM, UX, customer satisfaction, and customer loyalty.

In addition, this study draws on Relationship Marketing Theory, which emphasizes the importance of developing, maintaining, and strengthening long-term relationships between organizations and customers rather than focusing solely on individual transactions. Morgan and Hunt (1994) argue that successful relationship marketing is fundamentally supported by trust and commitment, which encourage customers to maintain relationships with service providers. This perspective is particularly relevant to CRM because personalized interactions, effective communication, responsiveness, and conflict handling can strengthen customers' relational evaluations. In QRIS-based digital payment services, such relational efforts may increase customer satisfaction and strengthen customers' willingness to maintain long-term relationships with the application they use. Therefore, Relationship Marketing Theory complements the S-O-R framework by providing a more specific theoretical explanation for the role of CRM in developing satisfaction and loyalty.

Customer Relationship Marketing (CRM)

Customer Relationship Marketing (CRM) is a strategic approach aimed at developing and maintaining mutually beneficial relationships between organizations and customers to enhance customer value and long-term organizational performance (Widiastuti, 2024). Unlike transactional marketing, which emphasizes short-term exchanges, CRM focuses on sustainable relationships by integrating customer information, communication, service responsiveness, and personalized interactions to generate superior customer value (Fauzi, 2024). From the perspective of Relationship Marketing Theory, successful customer relationships are supported by trust, commitment, communication, and effective conflict handling, which contribute to stronger relational bonds between customers and service providers.

In QRIS-based digital payment services, CRM is particularly relevant because customers interact with service providers in an environment characterized by intangible services, limited physical contact, and high dependence on perceived reliability, security, and responsiveness (Jam'an, 2021). Effective CRM allows payment service providers to understand users' preferences, provide relevant information and personalized offers, respond effectively to complaints, and establish continuous communication. These practices are particularly important for Generation Z, whose expectations of digital services include personalization, immediacy, and responsiveness (Oktophilus, 2022). Consistent with the S-

O-R framework, CRM functions as a relational stimulus that may create favorable internal evaluations in the form of customer satisfaction and subsequently encourage customer loyalty.

User Experience

User Experience (UX) refers to users' overall perceptions, emotions, and responses resulting from their interaction with a digital system, including usability, convenience, accessibility, satisfaction, and perceived interaction quality (Hassenzahl, 2008; ISO 9241-210, 2019). In QRIS-based payment services, UX can be reflected through ease of navigation, transaction speed, feature clarity, interface convenience, system responsiveness, security perceptions, and flexibility of use (Tiwari et al., 2022; Ahmad et al., 2023).

For Generation Z, UX plays an important role because members of this generation are highly accustomed to digital applications and expect services to operate quickly, intuitively, and seamlessly (Maharipa, 2025). Although QRIS provides a standardized transaction mechanism, users may access QRIS through different mobile banking and digital wallet applications that provide different interfaces, features, service quality, and transaction experiences. Therefore, customers may evaluate not only whether QRIS can successfully complete a transaction but also how convenient and pleasant the overall interaction is. Within the S-O-R framework, UX represents an experiential stimulus capable of shaping customers' internal evaluations. A positive digital experience is therefore expected to enhance customer satisfaction and encourage continued usage and loyalty (Wang & Chen, 2022; Agustina et al., 2023; Utomo, 2025).

Customer Satisfaction

Customer satisfaction refers to customers' overall evaluation of whether the performance and experience provided by a product or service meet or exceed their expectations. Satisfaction emerges from the comparison between expected and perceived service performance and therefore represents an important psychological evaluation following service consumption. In digital payment services, customers may experience satisfaction when transactions are efficient, services are reliable, problems are handled responsively, and interactions with the application are convenient and consistent with their expectations.

Within the S-O-R framework, customer satisfaction represents the organism, or the internal psychological state generated after customers receive relational and experiential stimuli. CRM can generate satisfaction by making users feel recognized, valued, and appropriately supported, whereas UX can create satisfaction through convenient and efficient digital interactions. Satisfaction consequently serves not only as an outcome of CRM and UX but also as an important mechanism through which both factors may eventually influence loyalty. This theoretical positioning provides the foundation for examining customer satisfaction as a mediating variable in the present study.

Customer Loyalty

Customer loyalty refers to customers' commitment to continuously use or repurchase a product or service despite situational influences and competitive marketing efforts that may encourage switching behavior (Mulikah, 2026). Loyalty extends beyond repetitive transactions because it also reflects preference, emotional attachment, positive recommendations, and resistance to competing alternatives. Oliver (1999) explains that loyalty may develop sequentially through cognitive, affective, conative, and action stages,

while Griffin (2015) associates loyal customers with repeat purchases, cross-product usage, positive referrals, and resistance to competing offers.

Customer loyalty is particularly important in digital payment services because customers can readily switch between digital wallets or mobile banking applications offering similar QRIS functions. For Generation Z, loyalty is therefore less likely to emerge merely because a payment function is available and more likely to depend on accumulated positive relationships and service experiences. From the S-O-R perspective, loyalty represents the response generated from favorable internal evaluations such as satisfaction. Thus, customers who perceive strong relational value through CRM and positive interactions through UX are expected to develop higher satisfaction and, ultimately, stronger loyalty.

Generation Z and QRIS Technology

Generation Z, commonly defined as individuals born between 1997 and 2012, grew up in an environment characterized by widespread internet connectivity, smartphones, social media, and rapidly developing digital services (Purnama, 2024). Their familiarity with digital technology has shaped preferences for practical, rapid, transparent, and technology-based services. In financial activities, these characteristics encourage the adoption of digital payment instruments that provide convenience and efficient transaction processes (Meliza, 2023).

In Indonesia, Bank Indonesia introduced the Quick Response Code Indonesian Standard (QRIS) to standardize QR-code-based payments and enable interoperability among different payment service providers. Through QRIS, consumers can conduct transactions using various digital wallets and mobile banking applications through a standardized QR code (Pangestika, 2025). Its convenience, compatibility with digital lifestyles, and perceived security have contributed to its adoption among Generation Z (Roza, 2025). However, interoperability also means that QRIS users are not strongly bound to one particular payment application because similar transaction functions can be accessed through competing providers. Consequently, maintaining Generation Z customers requires not only technological functionality but also positive relational and experiential stimuli capable of generating satisfaction and sustained loyalty (Inayah, 2026).

Hypothesis Development

The Effect of Customer Relationship Marketing on Customer Satisfaction

Building long-term relationships between service providers and customers is a fundamental aspect of marketing success in the digital era. Theoretically, Customer Relationship Marketing (CRM) aims to create greater value for customers through personalized interactions. In the context of QRIS usage, CRM is reflected in service accessibility, data security, and prompt responses to user issues. When customers perceive that service providers genuinely understand their needs and provide effective solutions to their problems, they are more likely to experience satisfaction because their expectations are fulfilled or even exceeded. This argument is supported by the study of Sari and Rahardjo (2022), which found that CRM dimensions such as trust and communication have a strong positive correlation with customer satisfaction in the fintech industry. Similarly, Pratama (2023) reported that effective complaint handling, as an essential component of CRM, is a key determinant of user satisfaction among younger generations. Based on these theoretical arguments and empirical findings, the following hypothesis is proposed: **H₁: Customer**

Relationship Marketing (CRM) has a positive and significant effect on Customer Satisfaction among Generation Z QRIS users.

The Effect of User Experience on Customer Satisfaction

User Experience (UX) refers to the overall perceptions and feelings of customers when using QRIS services. A positive user experience encompasses ease of application navigation, transaction speed, and engaging interactive features. Pleasant experiences create comfort and convenience, which ultimately enhance overall customer satisfaction. Hasanah (2024) demonstrated that a positive user experience significantly influences customer satisfaction, as customers tend to evaluate digital services not only based on functionality but also on the ease and comfort of their interactions. Therefore, supported by both theoretical perspectives and empirical evidence, the following hypothesis is formulated: **H₂: User Experience has a positive and significant effect on Customer Satisfaction among Generation Z QRIS users.**

The Effect of Customer Relationship Marketing and User Experience on Customer Loyalty

Effective CRM not only enhances customer satisfaction but can also directly influence customer loyalty. Customer loyalty reflects a commitment to continue using QRIS services despite the availability of competing alternatives. Studies by Widiastuti et al. (2021) and Nadhir and Anwar (2021) revealed that strong relational bonds between users and service providers encourage customer loyalty, particularly among younger consumers. Furthermore, a positive user experience can strengthen loyalty by making customers feel comfortable, secure, and motivated to continue using QRIS. Griffin (2015) emphasized that a superior user experience increases customers' resistance to competitors' promotions and switching incentives. Based on these theoretical foundations and empirical findings, the following hypotheses are proposed: **H₃: Customer Relationship Marketing (CRM) has a positive and significant effect on Customer Loyalty among Generation Z QRIS users. H₄: User Experience has a positive and significant effect on Customer Loyalty among Generation Z QRIS users.**

Effect of Customer Satisfaction on Customer Loyalty

Customer satisfaction is a crucial determinant of customer loyalty, as satisfied customers are more likely to continue using a service consistently and maintain long-term relationships with service providers. Satisfaction reflects customers' evaluation of the value, convenience, and overall experience obtained from using a service. According to Tjiptono (2020), higher levels of customer satisfaction significantly increase the likelihood of repeat purchases and long-term customer retention. In the context of QRIS usage among Generation Z, customers who are satisfied with the service are expected to demonstrate stronger loyalty by continuing to use QRIS and recommending it to others. Therefore, the proposed hypothesis is: **H₅: Customer Satisfaction has a positive and significant effect on Customer Loyalty among Generation Z QRIS users.**

Effect of Customer Relationship Management (CRM) on Customer Loyalty through Customer Satisfaction as an Intervening Variable

Long-term organizational performance increasingly depends on an organization's capability to cultivate enduring customer relationships, making Customer Relationship Management (CRM) an essential strategic framework for managing customer engagement. Rather than emphasizing transactional exchanges, CRM promotes individualized

communication, responsive service provision, and relationship-oriented interactions that generate favorable customer perceptions. These positive evaluations contribute to the development of customer satisfaction, which functions as an intervening construct linking relationship management initiatives with stronger behavioral loyalty. Consequently, customers experiencing higher satisfaction demonstrate greater intentions to continue purchasing and maintain enduring relationships with service providers. Supporting this perspective, empirical findings reported by Nur Intan and Nurhasanah (2025) in *J-CEKI: Jurnal Cendekia Ilmiah* confirm that customer satisfaction significantly mediates the positive association between CRM implementation and customer loyalty. Accordingly, the following hypothesis is proposed: **H6: Customer Relationship Management (CRM) has a positive effect on Customer Loyalty through Customer Satisfaction as an intervening variable.**

Effect of User Experience on Customer Loyalty through Customer Satisfaction as an Intervening Variable

User experience refers to customers' perceptions and evaluations of a service during its use, including aspects such as ease of navigation, transaction speed, feature clarity, security, and overall convenience. In the context of QRIS, a positive user experience can make transactions more practical, efficient, and comfortable, thereby increasing customer satisfaction. Satisfied customers are more likely to continue using the service, prefer it over alternative payment methods, and recommend it to others, resulting in stronger customer loyalty. Supporting this relationship, Saputra (2021) in *Review of Management, Accounting, and Business Studies* found that user experience significantly affects both customer satisfaction and customer loyalty, with customer satisfaction acting as a mediating variable. These findings indicate that positive user experiences contribute to higher satisfaction levels, which subsequently foster customer loyalty. Therefore, the proposed hypothesis is: **H7: User Experience has a positive effect on Customer Loyalty through Customer Satisfaction as an intervening variable.**

RESEARCH METHOD

This study employed a quantitative explanatory research design to examine the relationships among Customer Relationship Marketing (CRM), User Experience, Customer Satisfaction, and Customer Loyalty among Generation Z QRIS users in Indonesia. Customer Satisfaction was positioned as a mediating variable to explain the indirect effects of CRM and User Experience on Customer Loyalty. Primary data were collected through a structured questionnaire distributed online using Google Forms on April 13–14, 2026. All measurement items were assessed using a five-point Likert scale.

The population of this study consisted of Generation Z individuals who had experience using QRIS for payment transactions. Generation Z was operationally defined as individuals born between 1997 and 2012. Respondents were selected using purposive sampling based on two inclusion criteria: they belonged to the Generation Z cohort and had conducted at least one QRIS payment transaction within the preceding six months. These criteria were applied to ensure that all respondents had recent experience with QRIS and were therefore able to evaluate the digital payment service based on actual usage. A total of 100 respondents who fulfilled these criteria participated in the study.

The research model consisted of Customer Relationship Marketing and User Experience as exogenous variables, Customer Loyalty as the endogenous variable, and Customer Satisfaction as the mediating variable. Each construct was measured using multiple indicators adapted from relevant theoretical and empirical studies. CRM was measured through indicators related to trust, commitment, communication, and relationship management. User Experience was represented by indicators concerning usability, ease of interaction, transaction convenience, system responsiveness, and perceived security. Customer Satisfaction reflected respondents' overall evaluations of their QRIS usage experience, while Customer Loyalty represented continued usage intention, preference, recommendation intention, and resistance to switching to alternative services.

Descriptive analysis of respondent characteristics, including gender and age distribution, was conducted using SPSS version 22. Meanwhile, hypothesis testing and evaluation of the research model were performed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The measurement model was assessed through outer loading, convergent validity using Average Variance Extracted (AVE), discriminant validity, Cronbach's Alpha, and Composite Reliability. Multicollinearity was evaluated using the Variance Inflation Factor (VIF).

The structural model was subsequently evaluated using the coefficient of determination (R^2) and effect size (f^2) to assess the explanatory power of the model. Hypothesis testing was conducted through the bootstrapping procedure in SmartPLS 4 by examining path coefficients, t -statistics, and p -values. The analysis included both direct effects and indirect effects through Customer Satisfaction to determine its mediating role in the relationships between Customer Relationship Marketing and Customer Loyalty and between User Experience and Customer Loyalty. Statistical decisions were based on conventional significance criteria for PLS-SEM as recommended by Ghazali and Latan (2022).

RESULTS AND DISCUSSION

Respondent Description

The empirical analysis was conducted using data obtained from 100 members of Generation Z who regularly perform payment transactions through the QRIS platform and fulfilled the predetermined sampling requirements. Participant recruitment and data acquisition were accomplished by administering a structured questionnaire through Google Forms in an online setting. The resulting dataset provides a demographic profile of the sampled QRIS users by presenting distributions according to age category, gender, and the frequency with which QRIS is utilized for transactional activities. These respondent characteristics are important as they provide an overview of the user profile and help explain usage behavior and transaction patterns among Generation Z QRIS users.

Table 1.
Research Data Obtained

Day, Date	Total
Monday, April 13, 2026	40 People
Tuesday, April 14, 2026	60 People

Source: processed primary data, 2026

The data collected from 100 respondents were analyzed using SPSS version 22, and the respondent characteristics are presented in the following table based on gender and age classification.

Table 2.
Respondent Characteristics Based on Gender and Age

Category	Sub-category	Frequency	Percentage
Gender	Male	24	24%
	Female	76	76%
Age	15–20 years	30	30%
	21–25 years	65	65%
	25–30 years	5	5%
Total		100	100%

Source: Processed primary data, 2026

The table shows that the majority of respondents are female (76%), while male respondents account for 24%. Based on age distribution, most respondents are in the 21–25 age group (65%), followed by 15–20 years (30%), and a small proportion aged 25–30 years (5%). Overall, the findings indicate that QRIS users in this study are predominantly young adults, particularly females within the 21–25 age range, which reflects the strong adoption of digital payment systems among younger Generation Z users.

PLS Program Scheme

Hypothesis assessment employed a variance-based structural equation modeling approach using the Partial Least Squares (PLS) method, executed with SmartPLS version 3.2 software. The analytical framework underlying the estimation procedure is presented in the following schematic model:

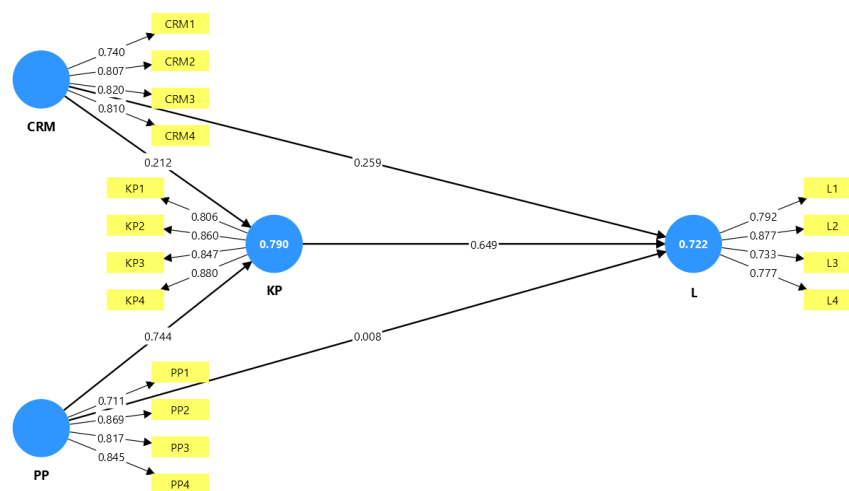


Figure 1.
Outer Model

Outer model testing is conducted to determine the extent to which the indicators represent the latent variables. This process includes testing for validity, reliability, and multicollinearity.

Outer Model Analysis Convergent Validity

An indicator is considered to meet the convergent validity criteria with a good category if its outer loading value is greater than 0.70. The higher the outer loading value, the stronger the indicator is in representing its construct or latent variable. The following presents the outer loading values for each indicator in this research variable.

Table 3.
Outer Loading Values

Variable	Indicator	Outer Loading
Customer Relationship Management	X1.1	0.740
	X1.2	0.807
	X1.3	0.820
	X1.4	0.810
Customer Satisfaction	X2.1	0.806
	X2.2	0.860
	X2.3	0.847
	X2.4	0.880
User Experience	Z1	0.711
	Z2	0.869
	Z3	0.817
	Z4	0.845
Loyalty	Y.1	0.792
	Y.2	0.877
	Y.3	0.733
	Y.4	0.777

Source: processed primary data, 2026

Evidence supporting the adequacy of the measurement model was first established through the Average Variance Extracted (AVE) criterion, for which values exceeding 0.50 indicate satisfactory convergent validity, as recommended by Ghazali and Latan (2022). To complement this assessment, the indicator reliability was subsequently evaluated using outer loading coefficients. Although the majority of observed indicators exhibited loading estimates greater than 0.70, Ghazali and Latan (2022) acknowledge that coefficients ranging from 0.50 to 0.60 remain methodologically acceptable during the initial stages of model specification because they continue to capture the intended latent constructs with sufficient accuracy. Furthermore, none of the measurement items produced loading coefficients below the minimum threshold of 0.50, confirming that every indicator fulfilled the required validity criteria and could therefore be retained for subsequent statistical procedures. The corresponding AVE values for each latent variable are consequently reported to provide additional empirical verification of convergent validity within the proposed measurement framework:

Table 4.
Average Variance Extracted Value

Variable	AVE	Description
Customer Relationship Management	0.632	Valid

Customer Satisfaction	0.720	Valid
Loyalty	0.634	Valid
User Experience	0.661	Valid

Source: processed primary data, 2026

Based on Table 4, all research variables have Average Variance Extracted (AVE) values above 0.50, namely Customer Relationship Management (0.632), Customer Satisfaction (0.720), Customer Loyalty (0.634), and User Experience (0.661). According to Ghazali and Latan (2022), an AVE value greater than 0.50 indicates that the construct has achieved convergent validity, meaning that the indicators adequately represent the underlying variables. Therefore, all variables in this study are considered valid and suitable for further analysis.

Discriminant Validity

Discriminant validity was assessed by examining the cross-loading values of each indicator. An indicator is considered to meet the criteria of discriminant validity if its loading on the associated construct is higher than its loadings on other constructs (Ghozali & Latan, 2022). The results show that each indicator has the highest cross-loading value on its respective construct, indicating that all indicators in this study satisfy the requirements of discriminant validity. Therefore, all measurement items are confirmed to be valid in distinguishing their intended constructs, and the detailed cross-loading results are presented accordingly:

Table 5.
Cross Loading

No	Customer Relationship Management (X1)	Customer Satisfaction (X2)	Loyalty (Z)	User Experience (X3)
Customer Relationship Management	0.795			
Customer Satisfaction	0.665	0.849		
Loyalty	0.695	0.827	0.796	
User Experience	0.609	0.839	0.731	0.813

Source: processed primary data, 2026

The assessment of discriminant validity demonstrates that every latent variable is represented more strongly by its designated measurement items than by indicators associated with other constructs. As presented in Table 5, the highest cross-loading coefficients were recorded for Customer Relationship Management (0.795), Customer Satisfaction (0.849), Loyalty (0.796), and User Experience (0.813), confirming adequate construct differentiation. Ghazali and Latan (2022) argue that satisfactory discriminant validity is evidenced when the association between a construct and its corresponding indicators exceeds the relationships observed with alternative constructs. Complementing this perspective, Hair et al. (2022) propose that cross-loading coefficients above 0.70 indicate strong construct specificity, whereas values ranging from 0.50 to 0.60 remain permissible during preliminary stages of measurement model refinement. Considering these established benchmarks, the

measurement model employed in this research fulfills the required discriminant validity criteria, thereby demonstrating that all constructs and their respective indicators possess sufficient uniqueness, validity, and measurement adequacy for subsequent structural model evaluation.

Reliability Test

Reliability testing is conducted to assess the consistency and stability of research instruments in measuring the study constructs. In this study, reliability is evaluated using two main measures: Composite Reliability and Cronbach's Alpha (Hair et al., 2022). Composite Reliability is used to examine the internal consistency of indicators within a construct, where a variable is considered reliable if it has a Composite Reliability value greater than 0.70. This indicates that the indicators consistently measure the same construct, and higher values reflect stronger reliability and better internal consistency of the measurement items.

Table 6.
Composite Reliability

Variable	Composite Reliability
Customer Relationship Management	0.873
Customer Satisfaction	0.911
Loyalty	0.873
User Experience	0.873

Source: processed primary data, 2026

Based on Table 6, the Composite Reliability results indicate that all research variables exceed the threshold value of 0.70, namely Customer Relationship Management (0.873), Customer Satisfaction (0.911), Customer Loyalty (0.873), and User Experience (0.873). According to Ghozali and Latan (2022), a construct is considered reliable when its Composite Reliability value is greater than 0.70. Therefore, all variables in this study meet the reliability criteria, indicating that the research instruments have a good level of internal consistency and are suitable for further analysis.

Cronbachs Alpha

An assessment of measurement reliability was performed before hypothesis testing by examining the degree of internal consistency among the observed indicators representing each latent construct through Cronbach's Alpha coefficients, a procedure recommended for verifying the stability and dependability of research instruments (Hair et al., 2022). According to the established evaluation criterion, coefficient values greater than 0.60 demonstrate an acceptable level of reliability, whereas progressively higher scores reflect stronger consistency across measurement items. The empirical findings indicate that every construct investigated in this research surpassed the prescribed cutoff value, confirming the adequacy of all measurement scales for subsequent statistical analysis.

Table 7.
Cronbach's Alpha

Variable	Cronbach's Alpha
Customer Relationship Management	0.807
Customer Satisfaction	0.870
Loyalty	0.810

User Experience 0.807

Source: processed primary data, 2026

Assessment of measurement reliability was subsequently performed by calculating Cronbach's Alpha, an index used to evaluate the degree of internal consistency among observed indicators representing the same latent construct and to verify the stability of the measurement instrument across responses (Hair et al., 2022). Reliability adequacy is established when the resulting Cronbach's Alpha coefficient exceeds 0.60, with progressively larger coefficients reflecting greater homogeneity among indicators and stronger overall consistency in the instrument's measurement performance.

Multicollinearity Test

An assessment of predictor independence was performed to verify that the explanatory variables did not exhibit excessive linear interrelationships capable of distorting the regression estimates. This diagnostic relied on the simultaneous evaluation of the Variance Inflation Factor (VIF) together with tolerance statistics. The absence of multicollinearity was inferred when tolerance exceeded the threshold of 0.10, which corresponded to VIF values remaining below the critical limit of 5, thereby indicating acceptable levels of shared variance among the predictors.

Table 8.
Collinearity Statistics (VIF)

	Customer Relationship Management (X1)	Customer Satisfaction (X2)	Loyalty (Z)	User Experience (X3)
Customer Relationship Management			3.841	3.700
Customer Satisfaction			4.965	3.700
Loyalty				
User Experience			1.685	

Source: processed primary data, 2026

Based on Table 8, the Collinearity Statistics (VIF) results show that all Variance Inflation Factor values are below 5, including Customer Relationship Management to Loyalty (3.841), Customer Relationship Management to User Experience (3.700), Customer Satisfaction to Loyalty (4.965), Customer Satisfaction to User Experience (3.700), and User Experience to Loyalty (1.685). According to Ghazali and Latan (2022), a model is considered free from multicollinearity problems when VIF values are below 5. Therefore, all variables in this study do not indicate any multicollinearity issues, meaning the research model meets the collinearity criteria and is suitable for further analysis.

Inner Model Analysis

Goodness of fit test

Assessment of the structural component of the proposed model focuses on examining the explanatory relationships linking exogenous, mediating, and endogenous latent constructs represented by their respective measurement indicators. Model adequacy is subsequently determined through the interpretation of the coefficient of determination (R^2) together with predictive relevance (Q^2), both of which provide evidence regarding the model's capacity to account for variance and generate reliable predictions (Hair et al., 2022).

The coefficient of determination specifically reflects the proportion of variance in each endogenous construct that can be attributed to the corresponding exogenous constructs, with increasing values signifying stronger explanatory capability. As suggested by Sofyani and Survei (2025), R^2 values reaching 0.75 represent substantial explanatory power, values around 0.50 indicate a moderate level, whereas values of 0.25 demonstrate relatively limited explanatory performance. The calculated R-Square coefficients obtained from the present investigation are summarized below.

Table 9.
R-Square Value.

	R Square	R Square Adjusted
Customer Satisfaction	0.790	0.786
Loyalty	0.722	0.713

Source: processed primary data, 2026

As presented in Table 9, the structural model demonstrates substantial explanatory capability for Customer Satisfaction. Specifically, the coefficient of determination (R -Square) reaches 0.790, while the Adjusted R -Square is recorded at 0.786, indicating that the proposed exogenous constructs collectively account for 79.0% of the observed variance in Customer Satisfaction. The unexplained proportion, amounting to 21.0%, may therefore be attributed to additional determinants that were not incorporated into the current analytical framework. Furthermore, Customer Loyalty shows an R -Square value of 0.722 and an Adjusted R -Square of 0.713, indicating that 72.2% of the variation in Customer Loyalty is explained by the variables in the model, while 27.8% is influenced by other external factors. According to Ghozali and Latan (2022), R -Square values of 0.75, 0.50, and 0.25 indicate strong, moderate, and weak explanatory power respectively; thus, the R -Square for Customer Satisfaction is categorized as strong, while Customer Loyalty also demonstrates strong explanatory power. Overall, these results suggest that the research model has good predictive ability in explaining endogenous variables. Additionally, the Q -Square (Q^2) test is used to assess predictive relevance, where a Q^2 value greater than zero indicates that the model has acceptable predictive relevance, while values below zero indicate poor predictive capability (Ghozali & Latan, 2022).

$$Q^2 = 1 - (0,425 \times 0,593)$$

$$Q^2 = 1 - 0,252$$

$$Q^2 = 0,748$$

Based on the results obtained, the Q -Square value is 0.748. This indicates that the research model is able to explain 74.8% of the variance in the data, while the remaining 25.2% is explained by other factors outside the model. Therefore, the model demonstrates a good level of goodness of fit and is considered appropriate for further analysis and hypothesis testing.

Hypothesis Testing

Path Coefficient Test

Empirical verification of the hypothesized structural relationships was performed using the path modeling procedure available in SmartPLS 3.0, with bootstrapping employed to determine the significance of both direct pathways and indirect mediation effects:

Table 10.
Path Coefficient

	Path Sample	T statistics	P values
Direct Effect			
CRM -> Customer Satisfaction	0.212	3.718	0.000
CRM -> Loyalty	0.259	3.218	0.001
Customer Satisfaction -> Loyalty	0.649	5.441	0.000
User Experience -> Customer Satisfaction	0.744	16.897	0.000
User Experience -> Loyalty	0.008	0.056	0.955
Indirect Effect			
CRM -> Customer Satisfaction -> Loyalty	0.138	2.835	0.005
User Experience -> Customer Satisfaction -> Loyalty	0.482	5.208	0.000

Source: processed primary data, 2026

The structural model demonstrates that customer loyalty is primarily reinforced through the presence of customer satisfaction, which functions as a pivotal explanatory mechanism linking antecedent variables to behavioral outcomes. Although Customer Relationship Marketing (CRM) contributes directly to strengthening both satisfaction and loyalty, the influence of User Experience follows a different pattern. Its contribution is strongly reflected in improving Customer Satisfaction, whereas no statistically significant direct association with Customer Loyalty is observed. Instead, the effect of User Experience on loyalty is transmitted entirely through Customer Satisfaction, confirming the existence of full mediation. Likewise, the pathway connecting CRM to Customer Loyalty is also significantly explained by the mediating role of Customer Satisfaction, highlighting its essential function in translating relational marketing initiatives and user experience quality into sustained customer loyalty.

The Effect of Customer Relationship Management on Customer Satisfaction

Statistical estimation confirms that Customer Relationship Management (CRM) contributes positively to the enhancement of Customer Satisfaction. The structural model produced a path coefficient of 0.212, accompanied by a T-statistic of 3.718, exceeding the critical threshold of 1.96, while the associated probability value remained at 0.000, well below the accepted significance level of 0.05. These findings provide empirical evidence that more effective CRM practices are associated with greater customer satisfaction, indicating that improvements in relationship management strengthen customers' positive evaluations of the services they receive.

This finding implies that effective CRM enhances the quality of interaction between companies and customers through improved communication, complaint handling, and trust building, which in turn increases customer satisfaction. Previous studies also support this relationship. Aini and Safitri (2022) in *Tabarru' Journal* found that CRM not only affects satisfaction but also improves customer loyalty through satisfaction as a mediating variable. This is further supported by Ensani (2025) in the *International Journal of Review Management Business and Entrepreneurship*, which shows that CRM and customer

satisfaction jointly contribute to increasing customer loyalty, where satisfaction acts as a key mediating factor.

The Effect of User Experience on Customer Satisfaction

The results show that User Experience has a positive and significant effect on Customer Satisfaction. This is indicated by a coefficient value of 0.744, a T-statistic of 16.897 (>1.96), and a p-value of 0.000 (<0.05). This means that the better the user experience perceived by users, the higher the level of customer satisfaction.

The strong influence suggests that user experience is a dominant factor in shaping customer satisfaction. It reflects how users directly evaluate service aspects such as ease of use, speed, comfort, and system interaction quality. When users experience services that meet or exceed their expectations, their satisfaction increases significantly. This is consistent with Oliver (2010), who states that satisfaction arises from the match between expectations and actual experience. Lemon and Verhoef (2016) also emphasize that customer experience is a key determinant of satisfaction, while Sharma et al. (2021) confirm that user experience has a dominant influence on customer satisfaction in digital service environments.

The Effect of CRM on Customer Loyalty

Statistical estimation confirms that Customer Relationship Management (CRM) exerts a statistically significant positive influence on customer loyalty, as evidenced by a path coefficient of 0.259, a T-statistic reaching 3.218, which exceeds the critical threshold of 1.96, and a probability value of 0.001, remaining well below the 0.05 significance level. These findings imply that strengthening CRM initiatives contributes meaningfully to increasing customers' commitment toward maintaining relationships with the company. Such an outcome may be attributed to organizational capabilities in fostering relational trust, delivering responsive communication, and resolving customer complaints effectively, thereby enhancing customers' perceptions of relational value.

As these favorable experiences accumulate over time, the likelihood of repeated service utilization increases, while customers simultaneously become less inclined to consider alternative providers. This is supported by Pratiwi and Yasa (2021), who found that CRM significantly influences customer loyalty through emotional attachment and trust. Sari and Setiawan (2022) also highlight that communication quality plays a key role in shaping loyalty in digital services, while Kurniawan et al. (2020) emphasize that CRM strengthens loyalty through consistent customer satisfaction and experience.

Effect of User Experience on Customer Loyalty

The statistical results indicate that User Experience does not have a significant direct effect on Customer Loyalty. The estimated path coefficient is 0.008, with a *t*-statistic of 0.056, which is below the critical value of 1.96, and a *p*-value of 0.955, which exceeds the 0.05 significance level. Therefore, H4 is not supported. This finding indicates that differences in perceived User Experience do not directly translate into differences in Customer Loyalty among Generation Z QRIS users.

This result is particularly noteworthy because User Experience has a strong and significant effect on Customer Satisfaction, yet it fails to directly influence Customer Loyalty. One possible explanation is that ease of use, transaction speed, interface convenience, and system responsiveness have become basic expectations rather than distinctive advantages in digital payment services. For Generation Z users who are highly accustomed to digital platforms, a smooth digital experience may be perceived as a minimum

service requirement. Consequently, a positive User Experience may make users satisfied with a service without necessarily creating sufficient commitment to remain loyal to a particular payment application.

The characteristics of the QRIS ecosystem may further explain this result. QRIS operates through an interoperable payment system in which users can perform similar transactions using different digital wallets and mobile banking applications. Therefore, even when users perceive a particular application as easy and convenient to use, they can still switch to another provider without losing access to the core QRIS payment function. Loyalty may consequently depend on additional considerations such as promotional benefits, ecosystem integration, relationship quality, perceived value, or other service attributes rather than on User Experience alone. This condition is especially relevant for Generation Z, who can easily compare competing digital services and change applications according to situational benefits.

From the Stimulus–Organism–Response perspective, this finding suggests that User Experience as a stimulus may not be sufficiently strong to generate Customer Loyalty as a behavioral response directly. Instead, the experiential stimulus must first be internally evaluated by customers and transformed into Customer Satisfaction before it produces a loyalty response. Thus, the insignificant direct effect should not be interpreted as indicating that User Experience is unimportant. Rather, its contribution to loyalty appears to operate primarily through customers' satisfaction with their overall service experience.

Effect of Customer Satisfaction on Customer Loyalty

The results indicate that Customer Satisfaction has a positive and significant effect on Customer Loyalty. This is supported by a coefficient value of 0.649, a t-statistic of 5.441 (> 1.96), and a p-value of 0.000 (< 0.05). This means that higher levels of Customer Satisfaction lead to stronger Customer Loyalty.

This positive effect implies that satisfied customers tend to show stronger commitment to continue using a service. Satisfaction generated from positive experiences, service quality, and expectation alignment encourages long-term loyalty behavior, including repeat usage and positive word-of-mouth. These findings are consistent with Tjiptono (2020), Kotler and Keller (2021), and Sari et al. (2022), who emphasize that Customer Satisfaction is a key determinant of Customer Loyalty in both traditional and digital service contexts.

Effect of Customer Relationship Management (CRM) on Customer Loyalty through Customer Satisfaction as an Intervening Variable

The results show that the indirect effect of Customer Relationship Management (CRM) on Customer Loyalty through Customer Satisfaction is significant. This is evidenced by a coefficient value of 0.138, a t-statistic of 2.835 (> 1.96), and a p-value of 0.005 (< 0.05), indicating that Customer Satisfaction significantly mediates the relationship between CRM and Customer Loyalty.

This finding suggests that CRM does not only influence loyalty directly but also works indirectly by improving Customer Satisfaction. Effective CRM implementation enhances interaction quality, trust, and service responsiveness, which in turn increases customer satisfaction and ultimately strengthens loyalty. These results are in line with Setiawan and Kurniawati (2021), Aini and Safitri (2022), and Pratiwi et al. (2020), who also confirm the mediating role of Customer Satisfaction in the relationship between CRM and Customer Loyalty.

The Effect of User Experience on Customer Loyalty through Customer Satisfaction as an Intervening Variable

The mediation analysis demonstrates that User Experience has a positive and significant indirect effect on Customer Loyalty through Customer Satisfaction. The indirect path coefficient is 0.482, with a t -statistic of 5.208 and a p -value of 0.000. Therefore, H7 is supported. This result indicates that a better User Experience increases Customer Satisfaction, which subsequently strengthens Customer Loyalty among Generation Z QRIS users.

Importantly, the mediation result should be distinguished from merely identifying a statistically significant indirect effect. In this study, the direct effect of User Experience on Customer Loyalty is not significant ($\beta = 0.008$; $p = 0.955$), whereas the indirect effect through Customer Satisfaction is positive and significant ($\beta = 0.482$; $p < 0.001$). This pattern indicates indirect-only mediation, commonly referred to as full mediation, because the influence of User Experience on Customer Loyalty operates through Customer Satisfaction rather than through a meaningful direct pathway.

This finding provides a more specific explanation of how User Experience contributes to loyalty. Ease of use, transaction speed, convenience, interface quality, and system responsiveness may create favorable evaluations during QRIS transactions, but these characteristics do not automatically generate long-term commitment to a particular payment service provider. They must first produce a feeling of satisfaction by meeting or exceeding users' expectations. Once users become satisfied with their accumulated service experiences, they are more likely to continue using the service, prefer it over alternatives, and develop stronger loyalty.

The result is theoretically consistent with the Stimulus–Organism–Response framework adopted in this study. User Experience functions as the stimulus, Customer Satisfaction represents the internal evaluative state or organism, and Customer Loyalty constitutes the behavioral response. The absence of a significant direct UX–loyalty relationship, together with the significant indirect pathway, reinforces the role of Customer Satisfaction as the psychological mechanism through which experiential evaluations are converted into loyalty behavior.

The magnitude of the indirect coefficient ($\beta = 0.482$) compared with the negligible direct coefficient ($\beta = 0.008$) further demonstrates the substantive importance of Customer Satisfaction in this relationship. Accordingly, service providers should not assume that improving technical or interface-related aspects alone will automatically retain Generation Z users. Improvements in User Experience should be directed toward creating experiences that genuinely increase satisfaction, because satisfaction is the mechanism through which positive digital interactions are transformed into sustained loyalty.

This finding is consistent with Nasution and Adiwijaya (2024), who reported that Customer Satisfaction mediates the relationship between User Experience and Customer Loyalty in digital services. Similarly, Putri and Canggi (2023) found that positive customer experiences contribute to loyalty through increased satisfaction. Lemon and Verhoef (2016) also emphasize that customer experiences shape customers' evaluations across service interactions, which subsequently influence longer-term behavioral outcomes.

CONCLUSION

Empirical evidence generated through SmartPLS modeling demonstrates that relationship-oriented marketing initiatives constitute a significant antecedent of both customer satisfaction and customer loyalty among Generation Z users of QRIS, suggesting that stronger CRM implementation contributes to more favorable post-purchase evaluations and enduring customer commitment. Although user experience substantially improves customer satisfaction, its direct contribution to loyalty fails to reach statistical significance, implying that positive interaction quality alone is insufficient to secure sustained behavioral commitment in the absence of complementary determinants. The findings further identify customer satisfaction as a pivotal explanatory mechanism, exerting a significant positive influence on loyalty while simultaneously transmitting and reinforcing the effects of Customer Relationship Marketing and User Experience on loyal behavioral intentions. Nevertheless, the generalizability of these findings should be interpreted cautiously because the investigation relied on only 100 respondents, concentrated exclusively on Generation Z QRIS users, and incorporated a relatively restricted set of explanatory constructs. Future investigations are therefore encouraged to broaden the conceptual framework by integrating additional determinants, including trust, perceived value, and switching cost, to achieve a more comprehensive explanation of the processes underlying customer loyalty development.

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