

MAPPING IDEA & LITERATURE FORMAT | RESEARCH ARTICLE

The Effect of Perceived Usefulness of the Tring Application and Digital Service Quality on Customer Loyalty through Customer Satisfaction

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ABSTRACT

Digital transformation in the financial services sector has encouraged PT Pegadaian to develop the TRING application as a digital service platform to enhance customer satisfaction and loyalty. This study aims to analyze the effects of perceived usefulness of the TRING application and digital service quality on customer loyalty through customer satisfaction at PT Pegadaian, Mamuju Branch. This study employed a quantitative approach using a survey of 100 respondents who use the TRING application. Data were analyzed using Partial Least Squares-Structural Equation Modeling (PLS-SEM) with the assistance of SmartPLS software. The results indicate that: (1) perceived usefulness of the TRING application has a positive and significant effect on customer satisfaction; (2) digital service quality has a positive and significant effect on customer satisfaction; (3) perceived usefulness of the TRING application has a positive but insignificant effect on customer loyalty; (4) digital service quality has a positive and significant effect on customer loyalty; (5) customer satisfaction has a positive but insignificant effect on customer loyalty; (6) perceived usefulness of the TRING application does not have a significant effect on customer loyalty through customer satisfaction; and (7) digital service quality does not have a significant effect on customer loyalty through customer satisfaction. The findings indicate that digital service quality is the most dominant factor in enhancing the loyalty of TRING application users, while customer satisfaction does not yet function as a mediating variable in the research model. Therefore, PT Pegadaian should prioritize improving digital service quality, particularly in terms of system reliability, security, ease of use, and service responsiveness, to strengthen customer loyalty.

Keywords: Perceived Usefulness, Digital Service Quality, Customer Satisfaction, Customer Loyalty, TRING, PLS-SEM.

I. Introduction

The era of technological disruption, accelerated by the waves of Society 5.0 and the Fourth Industrial Revolution, has fundamentally transformed the architecture of the financial services sector at both the global and national levels. Information technology within the landscape of financial institutions can no longer be regarded merely as a peripheral operational instrument or back-office support. Instead, it has evolved into the epicenter of business sustainability strategies and value creation (Laudon, 2024). According to Laudon (2024), modern organizations are required to transform into digital firms, namely organizations that integrate

business processes, customer services, and decision-making through interconnected digital platforms operating in real time. In the financial sector, this transformation encourages financial institutions to develop integrated, responsive, and user-oriented digital service ecosystems. Customer loyalty is a strategic intangible asset that directly influences the market valuation and long-term sustainability of a financial institution. Various studies in strategic marketing management emphasize that retaining existing customers (customer retention) is financially more efficient, generating significant cost savings compared with acquiring new customers (customer acquisition). In the digital context, loyalty represents a deep psychological and emotional commitment to a company. Loyal customers tend to be more resistant to competitors' attempts to attract them and are more willing to act as brand advocates through voluntary recommendations or electronic word-of-mouth (Kotler & Keller, 2016). The development of customer loyalty is closely associated with the establishment of customer satisfaction. Satisfaction functions as a cognitive and affective evaluative mechanism. When customers perceive that the actual performance of a service exceeds their expectations formed prior to using the service, trust and positive emotional bonds are likely to develop organically (Tjiptono, 2019). In Indonesia, the dynamics of customer satisfaction and loyalty occur amid a substantial increase in financial inclusion. According to the National Survey on Financial Literacy and Inclusion (SNLIK), conducted by the Financial Services Authority (OJK) in collaboration with Statistics Indonesia (BPS) in 2024 and 2025, the national financial landscape has demonstrated considerable progress. Indonesia's financial inclusion index reached 75.02%, accompanied by an increase in the national financial literacy index to 66.46% (Financial Services Authority, 2025). These improvements indicate that Indonesian society is becoming increasingly adaptive and receptive to financial innovations based on advanced technologies and is developing the cognitive foundations necessary to adopt such innovations.

Kotler and Keller (2016) found that satisfied customers are more likely to reuse a service and recommend it to others. This finding is reinforced by Rahi et al. (2019), who stated that user satisfaction serves as an important mediator in enhancing loyalty, particularly through increased trust and perceived value. In the context of increasingly rapid digital transformation, users' perceptions of the benefits of technology have become an important factor in determining the acceptance of a service. According to Makbul et al. (2025), perceived usefulness of digital technology is not merely related to technical features but also to the extent to which the technology provides added value to users. Alalwan et al. (2017) found that the higher users' perceived usefulness of a digital service, the higher their level of satisfaction with the service. This finding is consistent with Rahi and Ghani (2019), who reported that perceived usefulness has a positive and significant effect on customer satisfaction in the use of digital banking services. In addition, perceived usefulness has also been shown to have a direct relationship with user loyalty. Sharma and Sharma (2019) found that users who perceive a system as highly beneficial tend to develop a stronger commitment to continue using the service. This finding is supported by Chawla and Joshi (2020), who found that perceived usefulness significantly contributes to user loyalty, both directly and through mediating variables such as satisfaction and trust. Digital Service Quality (E-Service Quality) refers to the extent to which a website or application facilitates the delivery of products or services effectively and efficiently. According to Irawan and Wabiser (2025), digital service quality is largely determined by efficiency. This includes customers' ability to access a website or application, find the products or services they need, and complete transactions with minimal steps. Good service quality can be reflected in fast application loading times and an intuitive interface that does not confuse users. According to Aritonang et al. (2024), security and privacy are among the most crucial pillars of digital financial service ecosystems.

Digital service quality is considered high when a system is capable of protecting personal information and securing transactions against hacking risks. Without strong security guarantees, other aspects of service quality, such as application aesthetics, become less relevant to customers. Putri et al. (2025) emphasized the importance of providing assistance when technical problems occur. Superior digital service quality is reflected in the responsiveness of customer support services, such as live chat or AI-powered chatbots, as well as the accuracy and reliability of service delivery, including timely transaction data synchronization and real-time notification delivery. Sari and Utomo (2026) found that digital service quality has a positive and significant

effect on user satisfaction. PT Pegadaian in Indonesia has undergone a long historical development, beginning in the colonial era in 1746 and eventually becoming a state-owned enterprise (BUMN) that is currently part of the Ultra Micro Holding. According to Kurniawan and Rahayu (2024), the history of Pegadaian has been characterized by an evolution from a lending institution providing loans secured by movable assets to a provider of inclusive financial solutions. This transformation reached a significant stage during the era of digitalization, when Pegadaian began shifting from manual administrative processes involving physical documents toward an integrated system designed to accelerate customer services. The TRING application, which in some recent research contexts has been associated with the TRIM system or digital service management platforms within Pegadaian's internal and external ecosystem, is an innovation designed to facilitate online pawn and non-pawn transactions. The application enables users to monitor gold savings balances and loan maturity dates, as well as redeem or extend pawn loans without having to visit an outlet. Its primary focus is to increase Outstanding Loans (OSL) by providing greater accessibility. PT Pegadaian has developed its digital-based service platform through the transition from the Pegadaian Digital Service (PDS) application to the TRING by Pegadaian application. The TRING application was officially launched on October 7, 2025, as a more integrated and modern platform oriented toward improving the user experience.

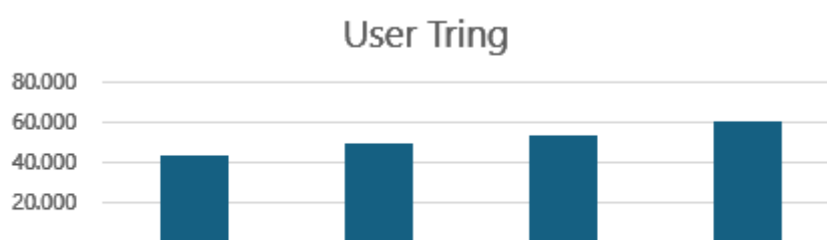


Figure 1. Number of TRING Users at PT Pegadaian, Mamuju Branch, 2022–2025

Source: PT Pegadaian (2025), processed from the company's digital transaction data.

Based on Figure 1, the number of TRING users at PT Pegadaian, Mamuju Branch, showed a consistent upward trend from 2022 to 2025. The increase continued through 2025, when the number of TRING users reached its highest level of 60,832 users.

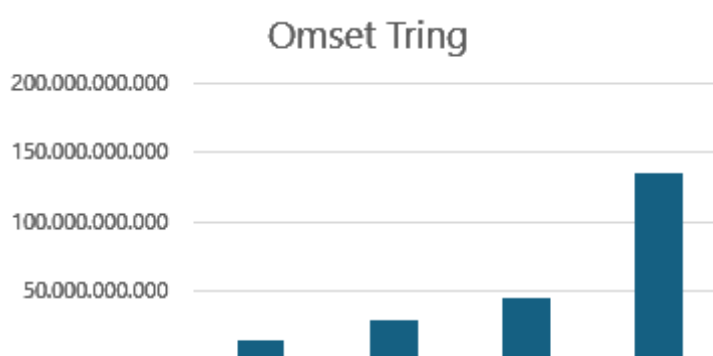


Figure 2. TRING Revenue at PT Pegadaian, Mamuju Branch, 2022–2025

Source: PT Pegadaian (2025), processed from the company's digital transaction data.

Based on Figure 2, TRING revenue at PT Pegadaian, Mamuju Branch, showed a highly significant upward trend from 2022 to 2025. In 2022, revenue remained relatively low and subsequently increased

gradually in 2023 and 2024. The largest increase occurred in 2025, when revenue rose dramatically compared with the previous year.

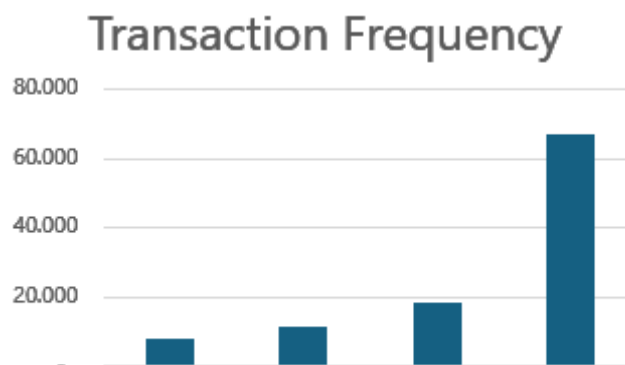


Figure 3. Number of TRING Transactions at PT Pegadaian, Mamuju Branch, 2022–2025

Source: PT Pegadaian (2025), processed from the company's digital transaction data.

Based on Figure 3, the number of TRING transactions at PT Pegadaian, Mamuju Branch, experienced a significant increase from 2022 to 2025. In 2022, the transaction frequency was relatively low and subsequently increased gradually in 2023 and 2024. The most significant increase occurred in 2025, indicating a substantial rise in the utilization of digital services. The data above indicate that the number of users, revenue, and transaction frequency of the TRING application at PT Pegadaian, Mamuju Branch, increased significantly from 2022 to 2025, indicating a high level of digital service adoption among the public. However, the increase in usage does not necessarily guarantee the development of customer loyalty because, in the context of digital services, loyalty is strongly influenced by users' perceptions of usefulness and the quality of services they experience. Amid increasingly intense competition in digital financial services, customers have numerous alternatives and may switch easily when their expectations are not met. This phenomenon creates an interesting gap between quantitative growth, as reflected in the number of users and transactions, and the quality of long-term customer relationships, as reflected in loyalty. Therefore, it is important to examine more deeply the factors influencing customer satisfaction and loyalty in the use of the TRING application. Based on the background of the problem, the observed business phenomena, and the theoretical foundations described above, the researcher is interested in conducting an in-depth scientific study through a thesis research proposal entitled: "The Effect of Perceived Usefulness of the TRING Application and Digital Service Quality on Customer Loyalty through Customer Satisfaction at PT Pegadaian, Mamuju Branch."

II. Literature Review and Hypothesis Development

2.1. Grand Theory

Consumer behavior involves the interaction of internal and external factors that shape consumers' evaluations and subsequent behavioral decisions (Schiffman & Wisenblit, 2019). Internal factors include motivation, perception, and knowledge, while external factors include technological developments and service quality. In the context of financial services, digitalization, service quality, and financial literacy influence customers' perceptions and experiences, which subsequently shape satisfaction and decisions regarding investment or continued use of financial services. The Expectation-Confirmation Model (ECM), proposed by Bhattacharjee (2001), complements this framework by explaining post-adoption behavior. Unlike the Technology Acceptance Model (TAM), which primarily focuses on initial acceptance, ECM emphasizes continued use based on customer satisfaction. Satisfaction results from the confirmation process, which

compares customers' initial expectations with their actual experience after using a service. The integration of TAM and ECM provides a causal framework in which application quality and perceived usefulness contribute to confirmation, which enhances satisfaction and ultimately encourages continued use and customer loyalty.

2.2. Customer Loyalty

Customer loyalty is an important concept in service marketing, particularly in the increasingly competitive digital service environment. It reflects not only repeated use but also customers' positive attitudes and commitment toward a service. Kotler and Keller (2016) define customer loyalty as a strong commitment to repurchase or continuously use a preferred product or service despite situational factors or competitors' marketing efforts that may encourage switching. Similarly, Tjiptono and Chandra (2016) describe loyalty as a customer's commitment to a brand or company, reflected in positive attitudes and consistent repurchase behavior. Griffin (2016) classifies loyalty into two types: behavioral loyalty and attitudinal loyalty. Behavioral loyalty is reflected in observable actions, such as frequency of use, repeat purchases, and the duration of the customer relationship with a service provider, whereas attitudinal loyalty refers to customers' feelings, preferences, and commitment, including their willingness to recommend the service to others. Griffin (2016) further identifies three indicators of customer loyalty: repeat purchase, retention or immunity to competitors, and referrals or word of mouth. Repeat purchase refers to customers' intention to continuously use the same service to meet their needs, retention reflects their resistance to competitors' offers and switching behavior, and referrals or word of mouth refers to their willingness to recommend the service to others based on positive experiences.

2.3. Customer Satisfaction

Customer satisfaction refers to the positive or negative feelings that arise when customers compare their perceived performance or service experience with their expectations (Kotler & Keller, 2016). When digital service performance falls below expectations, customers become dissatisfied, whereas performance that meets or exceeds expectations leads to satisfaction. Similarly, Ilhamalimy and Mahaputra (2020) state that customer satisfaction reflects the extent to which perceived product or service performance meets customer expectations. Suryanto et al. (2023) identify several methods for measuring customer satisfaction, including periodic surveys, monitoring customer loss or retention rates, and mystery shopping. Periodic surveys assess satisfaction directly while also examining repurchase intentions and customers' willingness to recommend the company or brand. Customer loss or retention rates provide an indication of customers' continued relationships with the company, while mystery shopping evaluates service performance by observing the strengths and weaknesses of the company's and competitors' services from the customer's perspective. Furthermore, Wiyaldo et al. (2024) identify three indicators of customer satisfaction in digital banking services: satisfaction with service convenience, satisfaction with service speed, and overall satisfaction. Service convenience reflects the ease of accessing, understanding, and using digital services, while service speed concerns the system's ability to process transactions and respond promptly. Overall satisfaction represents customers' general evaluation of their digital banking experience, including convenience, security, speed, and overall service quality.

2.4. Perceived Usefulness

Perceived usefulness is a key construct in the Technology Acceptance Model (TAM) developed by Davis (1989) and remains widely used to explain technology acceptance behavior. It refers to an individual's belief that using a particular system or technology can improve performance, productivity, effectiveness, and efficiency. In digital financial services, perceived usefulness reflects the extent to which users recognize the practical benefits of technology, such as faster transactions, easier access to information, lower transaction

costs, and improved user experience (De Araujo et al., 2025). De Araujo et al. (2025) further explain that perceived usefulness is a consistent predictor of behavioral intention and actual technology use, particularly in financial technology services. Similarly, Putra et al. (2020) define perceived usefulness as the degree to which individuals believe that a system can improve their performance, while Chawla and Joshi (2022) emphasize that perceived benefits include faster, safer, and more efficient transactions than conventional services. Oliveira et al. (2023) also found that perceived usefulness significantly influences the adoption of mobile banking and digital payment services, particularly when users experience direct benefits in their daily financial activities. In this study, perceived usefulness refers to customers' belief that the TRING Pegadaian application provides tangible benefits by improving transaction efficiency, service accessibility, effectiveness, and flexibility, thereby enhancing their overall digital service experience. Based on the updated Unified Theory of Acceptance and Use of Technology (UTAUT) framework proposed by Venkatesh et al. (2022), perceived usefulness is measured through four indicators: time efficiency, referring to the ability of the application to facilitate faster transactions; task effectiveness, referring to its ability to support financial activities such as checking balances, reviewing transaction history, making payments, and accessing Pegadaian services; flexibility, referring to the ability to access services anytime and anywhere through digital devices; and overall performance enhancement, referring to the perceived benefits of the application in improving financial management, accelerating transactions, and facilitating financial activities. These indicators reflect the practical benefits of TRING Pegadaian, with higher perceptions of efficiency, effectiveness, flexibility, and overall benefits indicating greater perceived usefulness.

2.5. Digital Service Quality

Digital transformation, particularly in the financial services sector, has shifted service delivery from conventional systems to technology-based platforms. This development has expanded the concept of service quality into digital service quality or e-service quality, which emphasizes the ability of electronic systems to provide effective, efficient, secure, and reliable services that meet users' expectations. Tjiptono and Chandra (2019) define e-service quality as the ability of websites or applications to facilitate information search, transactions, communication, and service completion effectively and efficiently. Raza et al. (2020) further describe e-service quality as the ability of a digital platform to provide accessible, reliable, responsive, and consistent services while delivering a high-quality user experience. Similarly, Al-Hawari et al. (2022) explain that digital service quality reflects customers' perceptions of a digital system's ability to provide fast, accurate, secure, and accessible services that continuously meet their needs. Shankar and Jebarajakirthy (2023) emphasize that digital service quality is a key determinant of digital transformation success because customers evaluate not only the service outcome but also the overall digital interaction, including accessibility, system speed, transaction security, and customer support. In this study, digital service quality refers to customers' perceptions of the TRING Pegadaian application's ability to provide fast, convenient, secure, reliable, and responsive financial services that effectively meet their transaction needs and create a satisfactory user experience. Based on the development of the E-Service Quality (E-S-QUAL) framework, Parasuraman et al. (2020) identify several dimensions for evaluating digital service quality, which in this study are represented by four indicators: system reliability, referring to the application's ability to operate consistently, accurately, and without technical disruptions; data security, referring to its ability to protect users' personal, financial, and transaction information; ease of use, referring to the simplicity of the interface, clarity of navigation, and ease of completing transactions; and service responsiveness, referring to the provider's ability to respond quickly, accurately, and effectively to customers' questions, needs, and complaints through digital service channels. These indicators represent both the technical and service dimensions experienced directly by users, with higher perceptions of system reliability, data security, ease of use, and responsiveness indicating higher digital service quality.

2.6. Hypothesis Development

a. The Relationship Between Perceived Usefulness of the TRING Application and Customer Satisfaction

Perceived usefulness refers to the extent to which customers believe that using the TRING application can improve the efficiency and effectiveness of their daily financial activities. When customers perceive that the application helps them complete transactions more quickly and conveniently, such as checking balances, making transfers, or paying bills without visiting a branch, their expectations are more likely to be fulfilled, resulting in higher customer satisfaction. Putra and Raharjo (2021) found that perceived usefulness has a positive and significant effect on user satisfaction. Customers who perceive greater benefits from an application tend to report higher levels of satisfaction with its use. This relationship can be explained by the Technology Acceptance Model (TAM) and Expectancy-Disconfirmation Theory (EDT). Ouyang et al. (2019) explain that when the actual performance of technology exceeds users' initial expectations, positive disconfirmation occurs, which subsequently increases satisfaction. In addition, Task-Technology Fit (TTF) Theory suggests that satisfaction is achieved when the technology's capabilities are well aligned with the tasks users need to perform (Tam & Oliveira, 2016).

H1 : The perceived usefulness of the TRING application has a positive and significant effect on customer satisfaction at PT Pegadaian, Mamuju Branch.

b. The Relationship Between Digital Service Quality and Customer Satisfaction (H2)

Digital service quality refers to the overall quality of customers' interactions with a digital application, including system reliability, intuitive interface design, response speed, and data security. High-quality digital services provide customers with a smooth, convenient, and secure experience, thereby reducing frustration and perceived risk and ultimately increasing customer satisfaction. Dharmawan and Sulaeman (2023) found that electronic service quality has a positive and significant effect on customer satisfaction among digital wallet users. Their findings indicate that service quality dimensions, including system reliability, operational availability, and privacy and security assurance, contribute significantly to customer satisfaction. Therefore, when customers experience reliable, responsive, and secure digital services, they are more likely to develop positive evaluations of the service. Conversely, frequent system errors or difficulties in navigating the application may reduce customer satisfaction, even when the application offers a wide range of features.

H2 : Digital service quality has a positive and significant effect on customer satisfaction at PT Pegadaian, Mamuju Branch.

c. The Relationship Between Perceived Usefulness of the TRING Application and Customer Loyalty

Perceived usefulness may also influence customer loyalty by encouraging continued use of the application. Customers who consider the TRING application useful and relevant to their financial needs are more likely to integrate it into their daily routines. The functional value provided by the application may encourage customers to continue using it over the long term. Gotama Putra and Raharjo (2022) found that perceived usefulness has a positive effect on loyalty toward digital services. When users perceive tangible benefits, such as transaction convenience, time efficiency, increased productivity, and easier access to their daily financial needs, they tend to maintain their use of the application. Thus, higher perceived usefulness is expected to be associated with higher customer loyalty toward digital services.

H3 : The perceived usefulness of the TRING application has a positive and significant effect on customer loyalty at PT Pegadaian, Mamuju Branch.

d. The Relationship Between Digital Service Quality and Customer Loyalty

Consistently high digital service quality plays an important role in building customer trust and loyalty. In financial applications such as TRING, customers are particularly concerned with system reliability and security. Reliable, secure, and user-friendly digital services can create positive experiences that encourage customers to continue using the service. Arcand et al. (2017) found that electronic service quality has a positive and significant effect on customer loyalty in digital banking services. Their findings indicate that customers who perceive digital services as reliable, secure, easy to use, and efficient tend to demonstrate higher loyalty. High-quality digital services can foster trust and positive customer experiences, encouraging customers to continue using the same service and reducing their tendency to switch to alternative providers.

H4 : Digital service quality has a positive and significant effect on customer loyalty at PT Pegadaian, Mamuju Branch.

e. The Relationship Between Customer Satisfaction and Customer Loyalty

Damiani and Timotius (2021) found that customer satisfaction has a positive and significant effect on loyalty among digital service users. Customers who are satisfied with the services they receive tend to develop stronger intentions to continue using the service. Positive experiences can encourage repeat usage, reduce switching intentions, and increase customers' willingness to recommend the service to others. Therefore, higher satisfaction with the TRING application is expected to be associated with higher customer loyalty.

H5 : Customer satisfaction has a positive and significant effect on customer loyalty at PT Pegadaian, Mamuju Branch.

f. The Relationship Between Perceived Usefulness of the TRING Application and Customer Loyalty through Customer Satisfaction

Perceived usefulness does not necessarily lead directly to consistent customer loyalty but may influence loyalty through customer satisfaction. A useful application such as TRING can initially provide functional benefits, including easier access, time efficiency, and faster transactions, which may increase customer satisfaction. This satisfaction can subsequently strengthen customers' commitment to continue using the service. Rahi and Ghani (2019) found that perceived usefulness has a positive effect on customer loyalty through customer satisfaction in digital banking services. Their findings indicate that customers who perceive greater benefits from digital services tend to experience higher satisfaction, which subsequently contributes to stronger loyalty. Thus, customer satisfaction may serve as an important mechanism linking perceived usefulness to customer loyalty.

H6 : Customer satisfaction mediates the effect of perceived usefulness of the TRING application on customer loyalty at PT Pegadaian, Mamuju Branch.

g. The Relationship Between Digital Service Quality and Customer Loyalty through Customer Satisfaction

In digital financial services, high service quality, particularly in terms of transaction security and data privacy, can reduce customers' perceived risk and foster trust. Consistently safe, reliable, and convenient service experiences can strengthen customers' confidence in the provider and encourage long-term loyalty. Ubaidillah and Pratiwi (2023) found that customer satisfaction mediates the relationship between digital system quality and customer loyalty. This suggests that high-quality technology alone may not necessarily create long-term loyalty unless customers also experience satisfaction when using the service. This relationship can also be explained through Trust-Commitment Theory, adapted from Morgan and Hunt. Contemporary studies of electronic banking and mobile applications, such as Arcand et al. (2017), use this perspective to explain the relationship between service quality and loyalty. Consistent electronic service

quality, particularly responsiveness, reliability, and security, can strengthen e-trust, which subsequently supports relationship commitment and continued customer loyalty.

H7: Customer satisfaction mediates the effect of digital service quality on customer loyalty at PT Pegadaian, Mamuju Branch

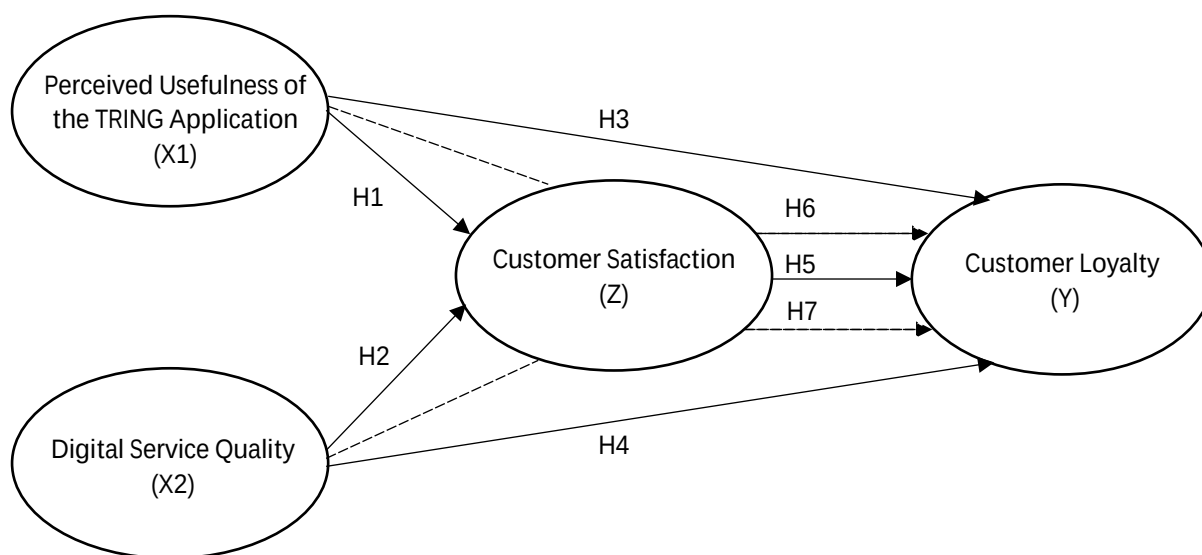


Figure 4. Conceptual Framework

III. Research Method

3.1. Research Type and Design

This study employs a quantitative approach using an explanatory research design. The quantitative approach is used to examine the relationships among the variables formulated in the hypotheses, while explanatory research aims to explain the causal effects of the independent variables on the dependent variable through a mediating variable. The data are analyzed using Partial Least Squares-Structural Equation Modeling (PLS-SEM). This method is selected because it can simultaneously examine complex relationships among variables, including mediation effects, without requiring strict adherence to multivariate normality assumptions.

3.2. Types and Sources of Data

This study uses quantitative data, which consist of numerical information that can be statistically measured and analyzed. According to Sugiyono (2019), quantitative data are measured in numerical units and are used to test predetermined hypotheses. The quantitative data in this study were obtained through questionnaires distributed to customers of the Mamuju Branch of Pegadaian and were subsequently processed and analyzed using statistical methods to examine the relationships and effects among the research variables. The data sources consist of primary and secondary data. Primary data were obtained directly from respondents through questionnaires covering perceived usefulness, digital service quality, customer satisfaction, and customer loyalty. Secondary data were obtained indirectly from various relevant sources, including books, scientific journal articles, research reports, and official publications, to support the theoretical foundation and discussion of the study.

3.3. Data Collection Technique

Data were collected using a questionnaire as the primary research instrument. The questionnaire was selected because it provides an efficient means of collecting a large amount of data within a relatively short period and is appropriate for the quantitative approach employed in this study. The questionnaire items were developed based on the indicators of each research variable and measured using a five-point Likert scale, ranging from 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, to 1 = Strongly Disagree. The questionnaires were distributed directly to customers of PT Pegadaian, Mamuju Branch. Respondents were asked to rate each statement based on their perceptions and experiences while using the TRING application.

3.4. Population, Sample, and Sampling Technique

a. Research Population

A population refers to the entire group of subjects or objects to which the research findings are intended to be generalized (Sugiyono, 2018). The population of this study consists of all customers of PT Pegadaian, Mamuju Branch, who use the TRING application, totaling 60,832 users.

b. Research Sample

A sample is a subset of a population selected to represent its characteristics (Sugiyono, 2018). This study employs purposive sampling, in which respondents are selected based on specific criteria to ensure that the data are relevant to the research objectives. The sample consists of customers who have officially registered and have an active account on the TRING application, have used the application for at least three months to ensure sufficient experience in evaluating the service, and have actively conducted transactions or used application features at least twice within the past three months.

c. Sample Size Determination

The sample size was determined using the Slovin formula with a 10% margin of error:

$$n = \frac{N}{1 + N e^2}$$

Where:

n = sample size

N = population size

e = margin of error, set at 0.10 or 10%

Using a population of 60,832 users, the calculation is:

$$n = \frac{60,832}{1 + (60,832 \times 0.10^2)}$$

$$n = 99.83$$

Based on the calculation, the sample size was rounded to 100 respondents.

3.5. Research Location and Period

This study was conducted at PT Pegadaian, Mamuju Branch, with customers who use the TRING mobile application as the research subjects. The research was carried out over approximately two months, from May to June 2026.

3.6. Data Analysis

This study uses variance-based Structural Equation Modeling (SEM) with the Partial Least Squares (PLS) approach as the data analysis technique. SEM is a multivariate statistical technique that combines factor and regression analyses to examine relationships among variables, including relationships between indicators and their constructs and among latent constructs (Santoso, 2014). According to Hair et al. (2021), SEM can be categorized into Covariance-Based SEM (CB-SEM) and Partial Least Squares SEM (PLS-SEM). CB-SEM primarily focuses on theory and hypothesis testing, whereas PLS-SEM emphasizes prediction and the explanation of variance in endogenous constructs. PLS-SEM was selected for this study because it is suitable for predictive modeling and can be applied to relatively small samples. The analysis was performed using SmartPLS, which applies bootstrapping to estimate the significance of relationships without requiring strict multivariate normality assumptions. The PLS-SEM model consists of two components: the outer model (measurement model), which assesses the relationships between indicators and latent constructs, and the inner model (structural model), which examines relationships among latent constructs (Abdillah & Jogiyanto, 2015).

a. Measurement Model (Outer Model)

The outer model is evaluated to assess the validity and reliability of the measurement instruments. Validity testing determines whether the indicators accurately measure their intended constructs, while reliability testing assesses the consistency of the measurement instruments. The evaluation includes convergent validity, discriminant validity, and construct reliability. Reliability is assessed using Cronbach's alpha and composite reliability, with values greater than 0.70 indicating acceptable reliability (Abdillah & Jogiyanto, 2015).

b. Structural Model (Inner Model)

The inner model is evaluated to examine the relationships among exogenous and endogenous constructs and the predictive capability of the research model. The evaluation includes R-square (R^2) and Q-square (Q^2). R^2 indicates the proportion of variance in an endogenous construct explained by its predictor variables, with higher values indicating greater explanatory power. Q^2 assesses the predictive relevance of the model, where a value greater than 0 indicates predictive relevance, while a value less than or equal to 0 indicates limited predictive relevance (Abdillah & Jogiyanto, 2015).

c. Hypothesis Testing

The hypotheses are tested at a 5% significance level ($\alpha = 0.05$) with a 95% confidence level. A hypothesis is supported when the p-value is less than 0.05, indicating a statistically significant effect. Conversely, a p-value greater than 0.05 indicates that the effect is not statistically significant.

IV. Results and Discussion

4.1. Characteristics of Research Respondents

The respondent description aims to provide an overview of the characteristics of the respondents included in the research sample. The characteristics examined in this study include gender, age, and highest educational attainment. The study involved a total of 100 active PT Pegadaian customers who use the TRING application.

a. Respondent Characteristics by Gender

The characteristics of respondents based on gender are presented to determine the composition of respondents who participated in the study. The distribution of respondents by gender is presented in Table 1.

Table 1. Distribution of Respondents by Gender



Gender	Frequency	Percentage (%)
Male	55	55.0
Female	45	45.0
Total	100	100.0

Source: Processed data (2026)

Based on Table 1, of the 100 respondents included in the research sample, 55 respondents, or 55.0%, were male, while 45 respondents, or 45.0%, were female. These results indicate that male respondents constituted the majority of the respondents in this study. This condition indicates that the use of the TRING application among the research sample was more prevalent among male respondents than female respondents, although the difference was relatively small.

b. Respondent Characteristics by Age

The characteristics of respondents based on age are presented to identify the age group that dominates the use of the TRING application. The distribution of respondents by age is presented in Table 2.

Table 2. Distribution of Respondents by Age

Age	Frequency	Percentage (%)
20–30 years	48	48.0
>30–40 years	37	37.0
>40–50 years	13	13.0
>50 years	2	2.0
Total	100	100.0

Source: Primary data, processed (2026)

Based on Table 2, the majority of respondents were aged 20–30 years, comprising 48 respondents, or 48.0%, followed by those aged >30–40 years, comprising 37 respondents, or 37.0%. Meanwhile, 13 respondents, or 13.0%, were aged >40–50 years, while 2 respondents, or 2.0%, were over 50 years old. These findings indicate that TRING application users in the research sample were predominantly within the productive age group, which tends to be more familiar with the use of digital technology in financial activities.

c. Respondent Characteristics by Highest Educational Attainment

The characteristics of respondents based on their highest educational attainment are presented to identify the educational background of the respondents. The distribution of respondents by highest educational attainment is presented in Table 3.

Table 3. Respondent Characteristics by Highest Educational Attainment

Highest Educational Attainment	Frequency	Percentage (%)
Senior High School	48	48.0
Diploma	6	6.0
Bachelor's Degree	43	43.0
Master's Degree	1	1.0
Other	2	2.0
Total	100	100.0

Source: Primary data, processed (2026)

Based on Table 3, most respondents had completed senior high school, comprising 48 respondents or 48.0%, followed by respondents with a bachelor's degree, comprising 43 respondents or 43.0%.

Furthermore, 6 respondents or 6.0% held a diploma, 1 respondent or 1.0% held a master's degree, and 2 respondents or 2.0% fell into the other category. These results indicate that the majority of TRING application users in the sample had secondary to higher education, which may support their ability to understand and utilize the digital services available through the application.

4.2. Measurement Model Evaluation (Outer Model)

a. Convergent Validity Test

Convergent validity measures the extent to which indicators within a construct are highly correlated. It is assessed based on the outer loading values, with indicators considered valid when their loading values exceed 0.70.

Table 4. Outer Loading Values

Variable	Indicator	Outer Loading
X1	X1.1	0.858
X1	X1.2	0.864
X1	X1.3	0.850
X1	X1.4	0.899
X2	X2.1	0.856
X2	X2.2	0.890
X2	X2.3	0.905
X2	X2.4	0.889
Z	Z1	0.914
Z	Z2	0.907
Z	Z3	0.904
Y	Y1	0.918
Y	Y2	0.905
Y	Y3	0.854

Based on Table 4, all indicators have outer loading values above 0.70. The highest loading value is observed for indicator Y1 at 0.918, while the lowest is observed for X1.3 at 0.850. Therefore, all indicators are considered valid and adequately represent their respective constructs, satisfying the criteria for convergent validity. In addition to outer loading values, convergent validity can be assessed using the Average Variance Extracted (AVE). A construct is considered to meet the convergent validity criterion when its AVE value exceeds 0.50.

Table 5. Average Variance Extracted (AVE)

Variable	AVE
X1	0.754
X2	0.783
Z	0.825
Y	0.797

Based on Table 5, all constructs have AVE values above 0.50. Construct Z has the highest AVE value at 0.825, while construct X1 has an AVE value of 0.754. These results indicate that all constructs explain more than 50% of the variance in their respective indicators and therefore meet the criteria for convergent validity. Discriminant validity aims to ensure that each construct is sufficiently distinct from the other constructs. In this study, discriminant validity was assessed using the Fornell-Larcker criterion.

Table 6. Fornell-Larcker Criterion

Variable	X1	X2	Z	Y
X1	0.868			
X2	0.794	0.885		
Z	0.829	0.812	0.908	
Y	0.663	0.779	0.705	0.893

Based on Table 6, the square root of AVE for each construct, represented by the bold diagonal values, is greater than its correlations with the other constructs. This indicates that each construct demonstrates adequate discriminant validity and is sufficiently distinct from the other constructs. Therefore, all constructs meet the discriminant validity criteria based on the Fornell-Larcker criterion.

b. Reliability Test

Construct reliability is used to assess the internal consistency of indicators in measuring a construct. Reliability testing was conducted using Cronbach's Alpha and Composite Reliability values.

Table 7. Reliability Test Results

Variable	Cronbach's Alpha	Composite Reliability
X1	0.891	0.924
X2	0.908	0.935
Z	0.894	0.934
Y	0.872	0.922

Source: SmartPLS output, 2026

Based on Table 7, all variables have Cronbach's Alpha and Composite Reliability values above 0.70. Variable X2 has the highest Composite Reliability value at 0.935, while variable Y has a Composite Reliability value of 0.922. These results indicate that all constructs have a high level of internal consistency and can therefore be considered reliable.

4.3. Structural Model Evaluation (Inner Model)

a. Coefficient of Determination (R-Square)

The R-Square (R^2) value is used to measure the ability of the independent variables to explain the dependent variables. A higher R^2 value indicates a greater ability of the exogenous variables to explain the endogenous variables.

Table 8. R-Square Values

Endogenous Variable	R-Square	Category
Z	0.751	Strong
Y	0.622	Moderate-Strong

Based on Table 8, variable Z has an R-Square value of 0.751. This indicates that 75.1% of the variance in variable Z can be explained by the independent variables in the model, while the remaining 24.9% is explained by other factors outside the research model. Meanwhile, variable Y has an R-Square value of 0.622, indicating that 62.2% of the variance in variable Y can be explained by the constructs in the model, while the remaining 37.8% is explained by other variables not examined in this study. Thus, the research model demonstrates a good level of explanatory and predictive capability in describing the relationships among the variables.

b. Effect Size (f-Square) Analysis

The effect size (f-Square) analysis is conducted to determine the contribution of each exogenous variable to the endogenous variables. According to Hair et al. (2022), an f^2 value of 0.02 indicates a small effect, 0.15 indicates a medium effect, and 0.35 indicates a large effect.

Table 9. f-Square Values

Variable Relationship	f^2	Category
$X1 \rightarrow Y$	0.000	Very Small
$X1 \rightarrow Z$	0.369	Large
$X2 \rightarrow Y$	0.277	Medium
$X2 \rightarrow Z$	0.260	Medium
$Z \rightarrow Y$	0.027	Small

Source: SmartPLS output, 2026

Based on Table 9, the relationship between X1 and Z has an f^2 value of 0.369, which falls into the large-effect category. This result indicates that X1 makes a substantial contribution to explaining changes in Z. Furthermore, the relationship between X2 and Y has an f^2 value of 0.277, while the relationship between X2 and Z has an f^2 value of 0.260. Both values fall into the medium-effect category, indicating that X2 makes a relatively substantial contribution to explaining changes in both Y and Z. Meanwhile, the relationship between Z and Y has an f^2 value of 0.027, which falls into the small-effect category. This indicates that the contribution of Z to Y is relatively low, although it still contributes to the research model. The relationship between X1 and Y has an f^2 value of 0.000, indicating that the contribution of X1 to Y is very small or has virtually no effect in explaining changes in Y. This finding is consistent with the hypothesis testing results, which indicate that the effect of X1 on Y is not statistically significant. Based on these results, $X1 \rightarrow Z$ has the largest effect size in the research model, while $X1 \rightarrow Y$ has the smallest effect size. Thus, X1 plays a greater role in explaining Z than in directly explaining Y, while X2 makes a relatively important contribution to both endogenous variables in the research model.

4.4. Hypothesis Testing

Hypothesis testing was conducted using the bootstrapping method in SmartPLS to assess the significance of relationships among the variables. A hypothesis was considered supported when the T-statistic > 1.96 and P-value < 0.05 .

a. Direct Effects

Hypothesis testing was conducted to examine the effects among the variables in the research model. The analysis used the bootstrapping method in SmartPLS by comparing the T-statistic and P-value. A hypothesis was considered supported when the T-statistic exceeded 1.96 and the P-value was below 0.05 at the 5% significance level. The results are presented in Table 10.

Table 10. Direct Effect Test Results

Hypothesis	Variable Relationship	Original Sample (β)	T-Statistics	P-Values	Decision
H1	$X1 \rightarrow Z$	0.497	3.758	0.000	Supported
H2	$X2 \rightarrow Z$	0.418	3.191	0.001	Supported
H3	$X1 \rightarrow Y$	0.022	0.147	0.883	Not Supported
H4	$X2 \rightarrow Y$	0.597	3.908	0.000	Supported
H5	$Z \rightarrow Y$	0.202	1.421	0.155	Not Supported

Based on Table 10, three of the five proposed hypotheses are supported, namely H1, H2, and H4, while H3 and H5 are not supported because they do not meet the specified significance criteria.

b. Indirect Effects

The indirect effect analysis was conducted to determine whether Z mediates the relationships between X1 and X2 and Y. The analysis used the bootstrapping method in SmartPLS by examining the T-statistic and P-value. An indirect effect is considered significant when the T-statistic exceeds 1.96 and the P-value is below 0.05.

Table 11. Indirect Effect Test Results

Indirect Relationship	Original Sample (β)	T-Statistics	P-Values	Decision
X1 $\rightarrow$ Z $\rightarrow$ Y	0.101	1.304	0.192	Not Significant
X2 $\rightarrow$ Z $\rightarrow$ Y	0.084	1.267	0.205	

Based on Table 11, both indirect relationships have P-values greater than 0.05 and T-statistics below 1.96. Therefore, neither indirect effect is statistically significant.

4.5. Discussion

a. The Effect of Perceived Usefulness of the TRING Application on Customer Satisfaction

The results show that perceived usefulness of the TRING application has a positive and significant effect on customer satisfaction, as indicated by a coefficient of 0.497, a T-statistic of 3.758, and a P-value of 0.000. This finding indicates that the greater the perceived benefits of using the TRING application, the higher the level of customer satisfaction. The TRING application provides various features, including gold purchases, gold sales, gold installments, and gold transfers, allowing customers to conduct transactions without visiting a Pegadaian branch. The application also provides real-time price updates, enabling customers to make informed gold investment decisions. In addition, customers can conduct transactions 24 hours a day and convert their digital gold savings into physical gold, which can be collected at the selected Pegadaian branch. These features provide greater convenience, flexibility, and efficiency in conducting transactions. This finding is consistent with De Araujo et al. (2025), who stated that perceived usefulness reflects users' belief that technology provides tangible benefits and improves the effectiveness of their activities. It is also consistent with Alalwan et al. (2017), Rahi and Ghani (2019), and Putra and Raharjo (2021), who found that perceived usefulness positively affects user satisfaction with digital and mobile banking services. However, Ouyang et al. (2019) found that customer satisfaction in digital services is also influenced by service and system quality. Therefore, the usefulness of an application needs to be supported by good service quality to maximize customer satisfaction. The findings imply that Pegadaian should continue to enhance the usefulness of the TRING application by simplifying transaction processes, reducing unnecessary steps, improving accessibility, and providing time-saving features. A convenient and efficient user experience can contribute to higher customer satisfaction.

b. The Effect of Digital Service Quality on Customer Satisfaction

The results show that digital service quality has a positive and significant effect on customer satisfaction, with a coefficient of 0.418 and a P-value of 0.001. This finding indicates that better digital service quality contributes to a more positive customer experience when using the TRING application. Reliable system performance, data security, ease of use, and fast transaction processing enable customers to complete various transactions efficiently without visiting a Pegadaian branch. A stable and user-friendly application that protects customer data and processes transactions accurately can create a positive digital experience and strengthen customers' perceptions of service quality. Thus, digital service quality serves not only as a means of supporting transactions but also as an important factor in shaping positive perceptions and increasing

customer satisfaction. This finding supports the DeLone and McLean model, which identifies system quality and information quality as important factors influencing user satisfaction. The result is also consistent with Dharmawan (2023), Almaiah et al. (2016), and Sari and Utomo (2026), who found that digital service quality significantly affects satisfaction among users of digital financial services. The findings imply that Pegadaian should continuously improve digital service quality by minimizing system disruptions, accelerating transaction processing, simplifying the application interface, and providing accessible customer complaint services. A positive digital experience can strengthen customers' perceptions of service quality and subsequently increase satisfaction with the TRING application.

c. The Effect of Perceived Usefulness of the TRING Application on Customer Loyalty

The results show that perceived usefulness of the TRING application has a positive but insignificant effect on customer loyalty at PT Pegadaian, Mamuju Branch. This is indicated by a path coefficient of 0.022, a T-statistic of 0.147, and a P-value of 0.883, which is greater than 0.05. This finding indicates that although customers perceive the application as useful, its functional benefits are not sufficient to directly establish customer loyalty. The benefits provided by TRING, such as convenient transactions, remote access to services, and time efficiency, may encourage continued use but do not necessarily create long-term loyalty. This finding contradicts Sharma and Sharma (2019) and Chawla and Joshi (2020), who found that perceived usefulness positively influences digital service loyalty and long-term usage commitment. However, it is consistent with Baabdullah et al. (2019), who argued that technological benefits do not always have a direct effect on loyalty because users may consider such benefits to be basic requirements of digital services. The relatively weak effect may also be related to the characteristics of the respondents, who were predominantly aged 20–40 years. Although this group is generally familiar with digital technology, some customers may not yet have a strong intention to invest in gold. Limited financial and digital literacy may also influence how customers perceive the long-term value of the application. Therefore, TRING should not rely solely on functional benefits but should also strengthen user experience, service quality, personalization, and loyalty programs. The practical implication is that PT Pegadaian should ensure that TRING features provide clear and relevant benefits in customers' daily financial activities, such as installment payments, Gold Savings top-ups, bill payments, and real-time transaction information. Developing features based on customers' actual needs may increase the perceived value of the application and encourage continued use.

d. The Effect of Digital Service Quality on Customer Loyalty

The results show that digital service quality has a positive and significant effect on customer loyalty, with a path coefficient of 0.597. This is the largest coefficient in the research model, indicating that digital service quality plays an important role in shaping customer loyalty toward the TRING application. The finding indicates that customers pay close attention to system reliability, data security, ease of use, and service responsiveness. Better digital service quality increases customers' tendency to continue using TRING rather than switching to competing digital services. This finding supports the E-Service Quality theory developed by Parasuraman et al. and the Trust-Commitment Theory, which emphasize that high service quality can strengthen customer trust and commitment. The result is also consistent with Rita et al. (2019), Shankar and Jebarajakirthy (2020), and Arcand et al. (2017), who found that digital service quality significantly influences loyalty among users of digital financial services. However, Slack and Singh (2020) found that the effect of service quality on loyalty may occur through customer satisfaction, suggesting that service quality does not always create loyalty directly. In this study, digital service quality was found to have a direct effect on loyalty. This indicates that customers at PT Pegadaian, Mamuju Branch, place considerable importance on their experience when using the TRING application, particularly in terms of speed, security, and accessibility. The practical implication is that PT Pegadaian should maintain system stability, strengthen customer data security, improve application access speed, and provide responsive customer support. A secure, reliable, and convenient digital service experience can strengthen customer trust and encourage long-term loyalty to the TRING application.

e. The Effect of Customer Satisfaction on Customer Loyalty

The results show that customer satisfaction does not have a significant effect on customer loyalty. This is indicated by a P-value of 0.155, which is greater than 0.05. Although customer satisfaction is generally considered an important antecedent of loyalty, the findings of this study indicate that satisfaction alone is not sufficient to establish strong customer loyalty toward the TRING application. This finding differs from Damiani and Timotius (2021), Rahi et al. (2019), and Ubaidillah and Pratiwi (2023), who found that customer satisfaction significantly influences loyalty. However, the result may reflect the characteristics of digital financial services, where customers have access to various alternative platforms offering similar features and benefits. Thus, customers may be satisfied with TRING while continuing to use other digital financial applications that provide more attractive features or promotional benefits. The finding may also be related to the fact that some customers at the Mamuju Branch may still prefer conducting transactions directly at the Pegadaian branch. Limited digital literacy may contribute to this preference. Therefore, customer loyalty may depend more strongly on digital service quality than on satisfaction alone. The practical implication is that PT Pegadaian should strengthen its customer loyalty strategy by continuously improving digital service quality, developing innovative features, implementing customer retention programs, and expanding digital literacy initiatives. Customer satisfaction should also be monitored regularly through surveys, complaint monitoring, and user experience evaluations to identify areas requiring improvement.

f. The Effect of Perceived Usefulness of the TRING Application on Customer Loyalty through Customer Satisfaction

The indirect effect test shows that customer satisfaction does not significantly mediate the relationship between perceived usefulness of the TRING application and customer loyalty. This is indicated by an indirect effect coefficient of 0.101, a T-statistic of 1.304, and a P-value of 0.192, which does not meet the significance criterion. Although perceived usefulness significantly increases customer satisfaction, the resulting satisfaction does not translate into higher customer loyalty. This suggests that the functional benefits of TRING can create positive evaluations and satisfaction but are not sufficient to establish long-term commitment to the application. The finding does not fully support the Expectation Confirmation Model (ECM) proposed by Bhattacharjee (2001), which suggests that perceived usefulness contributes to satisfaction and that satisfaction subsequently encourages continuance intention. In this study, the first relationship was significant, whereas the effect of satisfaction on loyalty was not significant, preventing a significant mediating effect. This result differs from Rahi et al. (2019) and Baabdullah et al. (2019), who found that satisfaction mediates the relationship between perceived usefulness and customer loyalty. However, it is consistent with Foroughi et al. (2019), who suggested that the benefits provided by digital services may be perceived as basic requirements when competing platforms offer similar functionality. In the context of PT Pegadaian, Mamuju Branch, customers may perceive TRING as a practical and efficient transaction platform without developing a strong attachment to it. Therefore, PT Pegadaian should not only provide useful features but also create a positive and distinctive user experience. This may help transform perceived usefulness and satisfaction into stronger long-term loyalty.

g. The Effect of Digital Service Quality on Customer Loyalty through Customer Satisfaction

The results show that customer satisfaction does not significantly mediate the effect of digital service quality on customer loyalty. The indirect effect has a coefficient of 0.084, a T-statistic of 1.267, and a P-value of 0.205, indicating that the relationship is not statistically significant. These findings indicate that although digital service quality significantly improves customer satisfaction, increased satisfaction does not automatically result in higher customer loyalty. In this study, digital service quality has a stronger direct relationship with customer loyalty than its indirect relationship through satisfaction. The finding does not fully support the Stimulus-Organism-Response (S-O-R) framework, which proposes that service quality as an external stimulus affects users' internal states, such as satisfaction, which subsequently produces behavioral

responses such as loyalty. In this study, the relationship between digital service quality and satisfaction was significant, whereas the relationship between satisfaction and loyalty was not significant. Consequently, the proposed mediation effect was not established. This result differs from Ubaidillah and Pratiwi (2023) and Damiani and Timotius (2021), who found that customer satisfaction mediates the relationship between digital service quality and customer loyalty. However, it is consistent with Shankar and Jebarajakirthy (2020), who found that digital service quality can have a stronger direct effect on loyalty than an indirect effect through satisfaction. Users of digital services may directly consider factors such as speed, security, reliability, and ease of use when deciding whether to continue using an application. For the TRING application, system reliability, transaction security, ease of use, and service responsiveness are important aspects associated with customer loyalty. Therefore, PT Pegadaian should integrate improvements in system quality with enhancements in the overall user experience, including stronger transaction security, faster service, easier navigation, and responsive digital customer support. Overall, the findings indicate that customer satisfaction does not function as a mediating variable in the relationship between digital service quality and customer loyalty at PT Pegadaian, Mamuju Branch. Nevertheless, maintaining high service quality and improving the customer experience remain important for supporting sustained use of the TRING application.

V. Conclusions

Based on the findings of the study on the effect of perceived usefulness of the TRING application and digital service quality on customer loyalty through customer satisfaction at PT Pegadaian, Mamuju Branch, using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach, several conclusions can be drawn. First, perceived usefulness of the TRING application has a positive and significant effect on customer satisfaction, while digital service quality also has a positive and significant effect on customer satisfaction. Second, perceived usefulness of the TRING application does not have a significant effect on customer loyalty, whereas digital service quality has a positive and significant effect on customer loyalty. Third, customer satisfaction does not have a significant effect on customer loyalty. Furthermore, customer satisfaction does not significantly mediate the effects of either perceived usefulness of the TRING application or digital service quality on customer loyalty. These findings indicate that digital service quality plays a more direct role in customer loyalty, while customer satisfaction does not function as a significant mediating variable in the research model. Based on these findings, PT Pegadaian, Mamuju Branch, should continuously improve the digital service quality of the TRING application, particularly system reliability, data security, ease of use, and service speed, as these aspects are directly associated with customer loyalty in this study. The company should also continuously develop and innovate application features according to customers' actual needs to enhance the overall user experience. In addition, customer loyalty programs, such as rewards, cashback, transaction points, and special promotions for active TRING users, may be considered to strengthen customer engagement. Digital-based Customer Relationship Management (CRM) should also be strengthened through personalized communication, service education, and relevant information delivered regularly. Since customer satisfaction was not found to significantly influence loyalty, future strategies should also consider other potential factors, such as trust, brand image, perceived security, user experience, and customer value. For future research, additional variables that may influence customer loyalty should be considered, including trust, perceived risk, brand image, user experience, and customer value. Future studies may also involve larger samples and customers from multiple PT Pegadaian branches in different regions to improve the generalizability of the findings. A mixed-methods approach combining quantitative and qualitative methods could also be applied to explore the underlying reasons for customer loyalty behavior in greater depth. Furthermore, future research may re-examine the mediating role of customer satisfaction in other digital financial service contexts to provide broader empirical evidence regarding the relationships among digital service quality, perceived usefulness, customer satisfaction, and customer loyalty. These efforts are expected to contribute to the continuous improvement of the TRING application's digital services and support stronger customer loyalty amid increasing competition in the digital financial services industry.

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