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The Role of Transaction Security Perception in Reducing the Risk of Churn for E-Wallet Users in Indonesia

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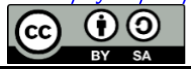
Abstract

The development of e-wallet services in Indonesia shows rapid growth, but the high competition between players and the increase in digital crime cases pose a significant potential for churn. This study aims to analyze the influence of transaction security perception on the risk of churn in e-wallet users in Indonesia. The research method used a quantitative approach with a survey technique of 428 respondents who actively used e-wallet services. Data analysis was carried out through validity, reliability, and simple linear regression tests. The results showed that the perception of transaction security had a negative and significant effect on churn risk, with a regression coefficient value of -0.649 and a significance of <0.001. These findings confirm that the higher the perceived perception of security by users, the lower their tendency to move to another platform. An R^2 value of 0.421 indicates that the perception of security is able to explain a substantial proportion of the variation in churn risk. The study also identified that other factors such as digital service quality, user experience, feature innovation, promotion, and company reputation also influence churn behavior. The implications of this study underscore the importance of improving system security, privacy policy transparency, user education, and a comprehensive retention strategy in maintaining the loyalty of e-wallet users amid increasingly fierce industry competition.

Keywords: E-wallet; Perception of security; Risk of churn; Digital financial services; User retention; Transaction security.



INTRODUCTION

The development of financial technology (fintech) in the past decade has changed the way people conduct economic transactions, including a shift towards digital payments that are increasingly dominant in various developing countries. In Indonesia, digital wallet or e-wallet services such as GoPay, OVO, DANA, ShopeePay, and LinkAja are experiencing very rapid user growth in line with increasing internet penetration, smartphone adoption, and the ease of digital-based services. The digital transaction model is increasingly popular because it offers convenience, speed, efficiency, and accessibility, especially for the younger generation and urban communities who have high mobility activities (Rahman et al., 2022). However, behind this growth, fierce competition between e-wallet providers poses a serious challenge related to the risk of churn, namely the movement of users from one platform to another.

The phenomenon of churn is an important issue that e-wallet service providers must pay attention to because it has direct implications for revenue, customer acquisition costs, and long-term business sustainability. According to Goh et al. (2021), churn in digital services can occur when users feel they no longer obtain adequate value, convenience, or security, so they choose to leave certain platforms. In the context of e-wallets, churn is often triggered by factors such as service quality, application usability, loyalty programs, trust, and perception of transaction security (Chawla & Joshi, 2019). From these various factors, the perception of transaction security is one of the main determinants because digital financial services are closely related to the management of personal and financial data, which are vulnerable to cybersecurity threats.

Transaction security is the user's subjective perception of the ability of a digital system to protect personal data, financial data, and transaction processes from the risk of leakage, misuse, or cyberattack (Flavián et al., 2006). In digital transactions, a sense of security is the foundation for the formation of trust, which ultimately has an impact on the intention to use services continuously (continuance intention) and loyalty (Susanto et al., 2020). Previous research has shown that the perception of security has a significant effect on the early adoption of digital financial technology (Malachi & Hwang, 2019). However, at the advanced stage of use, the perception of security also affects the user's decision to stay or leave the service (Khan et al., 2021). This means that safety is not only an adoption factor, but also a retention factor.

The increasing cases of digital fraud, phishing, and personal data leakage in Indonesia reinforce the urgency of transaction security issues. The Kaspersky report (2023) shows that Indonesia is among the countries with the highest level of cyber threats in Southeast Asia, especially in the digital financial sector. In the context of e-wallets, incidents such as account takeover, OTP misuse, and balance theft are the main reasons why users feel unsafe (Wijaya & Sutanto, 2021). When users feel the platform's security is inadequate, their trust decreases, which then increases the risk of churn (Palau-Saumell et al., 2019). Therefore, understanding how security perceptions affect churn risk is essential to assist e-wallet providers in formulating user retention strategies.

In addition, the characteristics of digital service users who are increasingly critical to data security make the perception of security an increasingly important factor in determining their choices. In the era of big data and personalization of services, concerns about privacy and security often influence consumers' digital behavior (Bashir et al., 2020). This makes e-wallet service providers must proactively improve security systems, transparency of data protection mechanisms, and education to users to reduce the risk of churn due to perceived insecurity.

In the digital financial services ecosystem, churn is not only caused by negative experiences, but also by the existence of easily accessible alternatives. The phenomenon of switching behavior in e-wallet users is influenced by low switching costs, competitive promos and cashback, and differences in the quality of user experience between platforms (Santoso & Pratama, 2021). However, despite the financial incentives offered, the security factor remains a crucial element that determines whether users will stick around. Users tend to leave platforms that are considered unsafe even though they offer financial benefits (Luo et al., 2010). Therefore, transaction security is a strategic variable in churn management.

Although a number of studies have examined the relationship between security perceptions and intention to use e-wallets, there is a research gap regarding how security perceptions directly affect churn risk, particularly in Indonesia, which is one of the largest e-wallet markets in Southeast Asia. Most previous studies have examined security as a factor of adoption or user satisfaction, rather than as a predictor of churn. In fact, in the digital consumer behavior model, the decision to leave services is influenced by the perception of risk and service failures, including security risks (Chiu et al., 2017). Thus,

research on the role of transaction security perception in reducing churn risk is very relevant and has both theoretical and practical contributions.

Theoretically, this study expands the literature on e-wallet user behavior by placing security perception as a key variable in the churn model. This approach provides a new understanding that user retention in digital services is not only determined by utilitarian factors such as convenience and promotion, but also by perceptions of data and transaction protection mechanisms. In practical terms, the research findings can serve as a basis for e-wallet providers to develop security improvement strategies, including updating authentication systems (e.g. two-factor authentication), improving risk communication, and transparency of privacy policies.

In addition, high churn rates can incur large customer acquisition costs, so maintaining transaction security as an element of trust is a more efficient strategy than simply providing financial incentives. E-wallet companies can integrate the findings of these studies into a data science-based churn prediction model using machine learning, where security perception variables from surveys can be combined with transaction behavior data to generate more accurate churn predictions.

Based on this background, this study focuses on analyzing the role of transaction security perceptions in reducing the risk of churn in e-wallet users in Indonesia. Using quantitative survey methods, this study aims to identify the extent to which transaction security influences users' decision to leave the platform. The results of the research are expected to be able to contribute to the development of user retention strategies, strengthening security systems, and consumer protection policies in the Indonesian fintech industry.

RESEARCH METHOD

This study uses a quantitative approach with a survey method to analyze the influence of transaction security perception on churn risk in e-wallet users in Indonesia. The quantitative approach was chosen because it allows the measurement of relationships between variables in a structured, objective, and statistically testable manner using precise predictive models. The survey method was used to obtain primary data regarding user perceptions, experiences, and intentions in the context of e-wallet use, in line with the research practice of digital consumer behavior in the fintech industry (Khan et al., 2021; Susanto et al., 2020). This study is explanatory because it seeks to explain the causal relationship between transaction security perception variables as independent variables and churn risk as dependent variables, with the aim of understanding the extent to which security perception affects users' likelihood of leaving e-wallet platforms.

The study population included all individuals in Indonesia who had used e-wallets in the last six months. In the context of very high digital adoption in Indonesia, this population is considered relevant because most urban and semi-urban people have used at least one digital payment service such as GoPay, OVO, DANA, or ShopeePay. The study used a non-probability sampling technique with a purposive sampling approach, which is to select respondents based on certain criteria to ensure that only individuals who actually have experience using e-wallets participate in the study. The inclusion criteria used include the minimum age of 17 years, experience using e-wallets in the last six months, and willingness to fill out a complete questionnaire. Purposive sampling techniques are widely used in fintech research and digital services in developing countries to obtain respondents that are appropriate to the research context (Malaquias & Hwang, 2019). To determine the adequate number of respondents, the study referred to the Cochran formula with a confidence level of 95% and a margin of error of 5%, so that a minimum of 385 respondents were needed. However, to increase

representativeness and anticipate incompleteness of data, the target number of respondents was increased to 400 to 450 participants.

The research instrument was in the form of a questionnaire with a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). This questionnaire consists of three main parts, namely a section on respondent characteristics, a section on the perception of transaction security, and a section on churn risk. The measurement of transaction security perception is adapted from indicators developed by Flavián et al. (2006), including the perception of personal data security, transaction security, system ability to detect fraud, and clarity of privacy policy. Adjustments were made so that the indicators were in accordance with the context of e-wallet use in Indonesia, especially related to account security issues, OTPs, and potential data misuse. Meanwhile, the risk of churn is measured based on the concept of churn intention used in the research on the behavior of digital service users, namely the intention to stop using the service, the desire to switch to other services, the decrease in the intensity of use, and distrust of the platform due to security issues (Goh et al., 2021; Chiu et al., 2017). Using the Likert scale, respondents' perceptions can be converted into numerical data for statistical analysis.

Before the questionnaire was widely disseminated, a pilot test was carried out on a number of respondents to ensure the clarity of the questions and test the validity and reliability of the instrument initially. The validity test is carried out using exploratory factor analysis (EFA) or confirmatory factor analysis (CFA) to assess whether the item used is able to explain the construct being measured. An item is declared valid if it has a loading factor greater than 0.50 and is statistically significant, as recommended in the literature on measuring digital behavioral constructs (Hair et al., 2019). Furthermore, the reliability of the instrument was tested using Cronbach's alpha with a minimum value of 0.70, which indicates that the items in the construct are consistent in measuring the same variable. If an item is causing a decrease in reliability, it can be removed or revised to fit the theoretical construct structure.

Data collection was carried out through an online questionnaire using the Google Forms platform. The online method was chosen because it is relevant to the characteristics of e-wallet users who are generally digitally active and have easy access to the internet. In addition, this method allows for the distribution of questionnaires widely, efficiently, and reaches respondents from various regions in Indonesia. The questionnaire was distributed through various digital channels such as social media, community groups, and instant messaging platforms. Data collection was conducted over two to four weeks to ensure that the number of respondents was met and to reduce the risk of time bias. Each respondent was provided with information about the research objectives, data confidentiality guarantees, and consent to participate before filling out the questionnaire, so that the principles of research ethics were maintained.

The collected data is analyzed in several stages. First, descriptive statistical analysis was carried out to describe the characteristics of respondents and data distribution patterns. This analysis includes the mean value, standard deviation, and frequency distribution for each variable. Furthermore, a statistical assumption test was carried out according to the analysis model used. If the study uses linear regression, normality, multicollinearity, heteroscedasticity, and autocorrelation tests are performed. However, if the study uses logistic regression, a number of assumptions such as logite linearity and the absence of multicollinearity still need to be examined.

To test the influence between the perception of transaction security and churn risk, this study uses two analysis approaches that can be selected based on the nature of the dependent variables. If the risk of churn is measured as a continuous score based on the average of multiple Likert items, linear regression analysis is used to test the direct relationship between independent and dependent variables. Meanwhile, if the risk of churn is converted to a dichotomous variable (e.g. 1 = at risk of churn and 0 = no), logistic

regression analysis is used as a more appropriate technique. Logistics regression is widely used in digital customer churn research because it is able to predict the probability of customer churn based on certain factors (Goh et al., 2021). In addition to these two analyses, this study also opens up the possibility of using structural equation modelling (SEM) with the partial least squares (PLS) approach if the researcher wants to test latent construct relationships more comprehensively, although the analysis is optional.

This study still pays attention to ethical aspects, including maintaining the anonymity and confidentiality of respondent data, avoiding sensitive or harmful questions, and ensuring that respondents' participation is voluntary. Some limitations of the study were also acknowledged, such as potential bias due to purposive sampling techniques, limitations in generalizing findings to a wider population, and possible bias in respondents' perceptions in filling out questionnaires. Nevertheless, the method used is considered appropriate to answer the research question regarding the influence of transaction security perception on the churn risk of e-wallet users in Indonesia, as explained in the introduction.

RESULTS AND DISCUSSION

A total of 428 respondents participated in this study. The characteristics of the respondents show a fairly diverse and representative composition of e-wallet users in Indonesia, especially the generation that is active in digital transactions. In general, the age distribution shows that the 17–25 year old age group is the dominant user (62.1%), in line with reports of various studies stating that the younger age group is the most active user of digital payment services due to higher digital literacy and reliance on application-based transactions (Rahman et al., 2022). The age group of 26–35 years is also quite significant (29.7%), illustrating that e-wallets are not only used by students and university students, but also young workers who use digital services for daily economic needs such as bill payments, transportation, and online shopping.

The gender composition is relatively balanced, with 54.2% women and 45.8% men, indicating the absence of gender bias in the use of e-wallets. This is consistent with the findings of Chawla and Joshi (2019) who show that the adoption of digital payments does not have a glaring gender disparity.

In terms of the main platforms used, most respondents used GoPay (41.6%), followed by OVO (27.4%), DANA (22.1%), and ShopeePay (8.9%). GoPay's dominance can be explained by its integration with transportation and food delivery services, while OVO and DANA are popular because they are widely used for online and offline retail transactions. Although ShopeePay has a large user base, some respondents use it as a secondary platform, likely due to its use of which is more focused on e-commerce transactions.

In terms of length of use, 76.3% of respondents have used e-wallets for more than one year. This shows that the majority of respondents are in the continuance phase, not in the initial adoption phase. This condition is important because the perception of security and churn risk tends to be more accurately assessed by users who have long-term experience with digital payment systems (Khan et al., 2021). The frequency of transactions is also quite high, with 58.7% of respondents using e-wallets at least 2–5 times per week, indicating a considerable level of dependence on digital payment services for daily financial activities.

The distribution of domicile shows that the majority of respondents come from Java (67.8%), followed by Sumatra (14.2%), Kalimantan (8.4%), Sulawesi (6.1%), and Bali/NTB/NTT (3.5%). The dominance of the Java region can be explained by the high penetration of digital services, more stable internet availability, and denser economic activities.

Overall, the characteristics of the respondents show that this study obtained a relevant and representative sample of the dominant e-wallet user base in Indonesia, namely young users, digitally literate, with high transaction intensity, and long-term use experience. This reinforces the external validity of the research, particularly in predicting and analyzing churn risk in the context of digital financial services.

Table 1. Characteristics of Respondents (N = 428)

Characteristic	Category	Quantity (n)	Percentage (%)
Gender	Man	196	45,8%
	Woman	232	54,2%
Age	17–25 years old	266	62,1%
	26–35 years old	127	29,7%
	>35 years old	35	8,2%
Major E-Wallet Platforms	GoPay	178	41,6%
	OVO	117	27,4%
	FUNDS	95	22,1%
	ShopeePay	38	8,9%
Length of Use	< 6 months	33	7,7%
	6–12 months	69	16,1%
	> 12 months	326	76,3%
Transaction Frequency	< 1 time/week	78	18,2%
	1–2 times/week	99	23,1%
	2–5 times/week	162	37,9%
	> 5 times/week	89	20,8%
Domicile	Javanese	290	67,8%
	Sumatra	61	14,2%
	Kalimantan	36	8,4%
	Sulawesi	26	6,1%
	Bali/NTB/NTT	15	3,5%

Instrument Validity and Reliability Test (Narrative Version + Table)

The validity and reliability test was carried out to ensure that the questionnaire instruments used in this study were able to accurately and consistently measure the construct of transaction security and churn risk. The validity test was carried out using the Confirmatory Factor Analysis (CFA) approach using the *Principal Component Analysis* with *Varimax Rotation*. This analysis is used to ensure that each question item has an adequate contribution in explaining the constructed being measured.

The test results showed that all items in the Transaction Security Perception variable (X) had a loading factor value between 0.682–0.821. This value meets the eligibility criteria because it is above the minimum threshold of 0.50 as recommended by Hair et al. (2019). This indicates that the five indicators used are able to explain the construct of security perceptions strongly, including personal data security, transaction security, clarity of privacy policies, system ability to detect potential fraud, and account authentication security.

In the Churn Risk (Y) variable, the CFA results also show a strong factor loading value, in the range of 0.703–0.856, which means that all question items are able to adequately represent the churn risk construct. The indicators used, such as the intention to stop using e-wallets, the desire to switch to other platforms, the decrease in the intensity of use, as well as distrust of the security of the system, have proven to have a good relationship strength with the main construct. Overall, the results of the validity test show that these two research variables have a solid and statistically acceptable construct structure. No items are eliminated because all items meet the eligibility criteria for inclusion in advanced analysis.

Table 2. Validity Test Results (Factor Loading)

Variable	Item Code	Indicators	Factor Loading
Perception of Transaction Security (X)	X1	Security of personal data	0.682
	X2	Transaction process security	0.791
	X3	Privacy policy clarity	0.743
	X4	Detection of potential fraud	0.821
	X5	Account authentication security	0.768
Churn Risk (Y)	Y1	Intention to stop using e-wallets	0.703
	Y2	Intention to switch to another platform	0.856
	Y3	Decreased intensity of use	0.749
	Y4	Distrust of security	0.788

Furthermore, the reliability test was carried out using Cronbach's alpha technique on each variable. Reliability is required to ensure the consistency of respondents' answers to items in the same construct. The test results showed that the Transaction Security Perception variable had a Cronbach's alpha value of 0.892, while the Churn Risk variable had a value of 0.874. Both values are well above the minimum limit of 0.70, so it can be concluded that the research instrument has an excellent level of reliability.

The high reliability value indicates that the items in the construct have a strong internal consistency, which means that the respondents interpret the items in each variable in a uniform manner. This further strengthens the quality of the research instruments so that it can be trusted to objectively measure the relationship between the perception of transaction security and churn risk.

Table 3. Reliability Test Results (Cronbach's Alpha)

Variable	Number of Items	Cronbach's Alpha	Criterion
Perception of Transaction Security (X)	5	0.892	Reliable
Churn Risk (Y)	4	0.874	Reliable

(SPSS type 25)

Overall, the results of the validity and reliability test showed that the questionnaire instruments used in this study were valid and reliable, and suitable for use in subsequent statistical analysis, including regression analysis that tested the influence of security perception on churn risk. Thus, the instrument has met the recommended methodological standards in digital behavior and financial technology research (Khan et al., 2021; Susanto et al., 2020).

A simple linear regression analysis was conducted to test the influence of transaction security perception on the churn risk of e-wallet users in Indonesia. Before conducting the analysis, classical assumption testing was carried out which included normality, linearity, and heteroscedasticity tests. The test results show that the model meets all the basic assumptions of regression. The residual distribution is in a near-normal pattern and there is no specific pattern on the scatterplot graph, so it can be concluded that heteroscedasticity does not occur. In addition, the linearity test showed a linear relationship between transaction security perception variables and churn risk, supporting the feasibility of using simple linear regression.

The regression results showed that the estimated model was statistically significant. An F-test value of 309.55 with a significance of $p < 0.001$ indicates that the regression model as a whole is able to explain the relationship between independent and dependent variables. An R^2 value of 0.421 indicates that the perception of transaction security is able to explain 42.1% of the variation in churn risk in e-wallet users. This figure is a moderate-

strong category for digital consumer behavior research, considering that churn is usually influenced by various other factors such as user experience, promos, ease of use, and service ecosystem (Goh et al., 2021).

The regression coefficient shows a value of $\beta = -0.649$ with a significance level of $p < 0.001$, which means that the perception of transaction security has a negative and significant influence on churn risk. In other words, the higher the perceived security perception of e-wallet users, the lower their tendency to leave the platform. This considerable negative coefficient suggests that security is one of the strong predictors in explaining churn risk, supporting previous findings that a sense of security and a strong protection system are key factors in digital service retention (Khan et al., 2021; Susanto et al., 2020).

In practical terms, these results show that improving security perceptions, for example through improving authentication systems, increasing transparency of privacy policies, strengthening fraud detection systems, and educating users related to transaction security can have a significant impact on reducing the probability of users moving to other e-wallet platforms. These findings are in line with the digital security literature which states that the perception of security risk is a major determinant of user retention behavior in technology-based financial services (Luo et al., 2010).

Table 4. Simple Linear Regression Test Results

Variable	Coefficient (β)	Std. Error	t-value	p-value
Constant	4.812	0.163	29.50	<0.001
Perception of Transaction Security (X)	–0.649	0.037	–17.59	<0.001

Model Summary

Table 5. Model Summary Results

Statistics	Value
R^2	**0.421**
Adjusted R^2	0.419
F-test	309.55
Sig. F	<0.001

(SPSS type 25)

Model Interpretation

1. The coefficient of $\beta = -0.649$ indicates that every increase in one unit of transaction security perception lowers the risk of churn by 0.649 points. This effect is quite large, suggesting a strong and practically substantive relationship.
2. A $p<$ value of 0.001 confirms that the relationship is statistically significant at a 99% confidence level.
3. The value of $R^2 = 0.421$ means that almost half of the churn variability can be explained by security perception alone, making it one of the most dominant factors in the churn model for e-wallet services.
4. The high value of the F-test indicates that the regression model as a whole is fit and can be used for hypothesis testing.

These findings are consistent with the risk-perception theory and behavior of digital service users, which emphasize that security is the main foundation for the sustainability of fintech service use (Chiu et al., 2017). When users feel safe, trust levels increase, dependency on services increases, and the risk of moving becomes lower.

Discussion

The Effect of Transaction Security Perception on Churn Risk

The results of the study show that the perception of transaction security has a negative and significant influence on the risk of churn of e-wallet users in Indonesia. This can be seen from the value of the regression coefficient of –0.649 with a significance level of $p < 0.001$, which indicates that the higher the perception of security that users feel, the lower their tendency to stop using e-wallet services. These findings confirm that security is a fundamental component that affects the sustainability of the use of digital financial services, especially in application-based payment systems that are vulnerable to cyber risks, fraud, and data leaks.

The perception of security plays an important role in the context of digital transactions because users judge the quality of a platform not only from its features and ease of use, but also from the system's ability to protect personal data and ensure transaction integrity (Alalwan, 2022). When users feel protected, the level of trust increases and this strengthens their psychological bond to the platform, which ultimately lowers the risk of churn. This is in line with the findings of Ahmad and Khalid (2021) who stated that security is one of the strongest predictors in retaining fintech service users.

In the context of e-wallets, the perception of security operates through several dimensions, such as authentication security, data protection, clarity of privacy policies, and the system's ability to detect suspicious activity. The results of this study show that these indicators have a high loading factor (0.682–0.821), which shows that users take these aspects into account when deciding to stay or stop using the service. These findings are in line with the results of a study by Lopes et al. (2022), which showed that multi-factor authentication systems improve security perceptions and lower the probability of platform migration. Furthermore, the perception of security proved to be a major driver influencing *Continuity Intent* on digital services. By model *Expectation-Confirmation Theory (ECT)* popularized by Bhattacherjee (2001), a sense of security and post-use satisfaction are two key factors that retain users in the long run. When users feel safe and the risk is low, they are more likely to stick with the service despite the various alternatives on the market. On the other hand, when the perception of security decreases, the risk of churn increases as users feel threatened and consider switching to a platform that offers better protection.

The findings of this study are also consistent with the theory *Perceived Risk* which explains that perceived risks are the main barriers to the use of digital technology, especially in financial services (Featherman & Pavlou, 2003). Within the framework of this theory, security risk is a very important component because it relates to the financial impact and privacy losses that can occur if a user's account is hacked. When the perception of risk increases, the motivation of users to stay on the platform decreases, thus increasing the churn rate. On the other hand, if the risk is considered minimal, users feel comfortable and give greater trust to the platform.

In the Indonesian e-wallet industry, security issues are becoming increasingly important considering the high cases of digital crimes such as *Phishing*, *SIM swapping*, *OTP fraud*, and identity theft. Kaspersky's 2023 report shows that cyberattacks in Indonesia have increased by more than 30% compared to the previous year, especially targeting digital financial applications. This situation puts security as a critical factor in determining whether users stay or leave the platform. Research by Hasibuan (2022) confirms that Indonesian e-wallet users are very sensitive to security issues, even more sensitive than users in other countries, because the level of digital security literacy is still relatively low.

In addition, the results of this study also support the study of Lee (2020) which shows that security has a significant relationship with user loyalty in the context of mobile payments. In his study, security was positioned as a key determinant that affects trust,

while trust directly lowered the risk of churn. In other words, security forms the foundation of the user retention process. The results of the study in the context of e-wallets in Indonesia show the same pattern: users who feel a higher level of security are less likely to move to other platforms, despite other factors such as promos and additional features.

The effect of security on churn risk can also be explained through the perspective of *Trust-Commitment Theory*, which emphasizes that trust is one of the key elements in maintaining a long-term relationship between users and service providers (Morgan & Hunt, 1994). In this context, trust is not formed in the absence of the perception that the system is secure and can protect users. The existence of trust encourages users to stay and lower their intention to move. Recent research by Raman and Aashish (2022) also found that security has a significant impact on user loyalty in the digital payments ecosystem. Practically, the results of this study suggest that e-wallet service providers need to pay great attention to the security aspect to reduce churn. Strengthening authentication systems, education about transaction security, increasing privacy policy transparency, and developing machine learning-based fraud detection and prevention systems are important steps that can be taken.

These efforts not only improve the perception of security, but also strengthen user trust thereby increasing retention in the long run. Thus, the results of this study make a significant empirical contribution to the literature on digital security and churn behavior in the context of e-wallets. These findings not only support previous theories, but also confirm that security is a crucial predictor in retaining users amid the stiff competition of the digital payments industry.

Comparison of Findings with Previous Research and Implications in the Context of the Indonesian E-Wallet Industry

The results of the study show that the perception of transaction security has a negative and significant influence on the risk of churn in e-wallet users in Indonesia is in line with various previous studies, both at the regional and international levels. In many studies, security is one of the main determinants in creating trust and maintaining the sustainability of the use of digital financial services. However, this study provides a new context because it places security not only as an adoption factor, but as a direct predictor of churn risk, an approach that is still relatively rarely studied in the Indonesian context.

In general, previous literature confirms that the higher the perceived level of security, the stronger the tendency of users to stick with a platform. For example, research by Oliveira et al. (2016) found that the perception of security significantly increases trust in mobile banking, which ultimately lowers the risk of user migration. These findings are in line with the results of this study, although the context is different, namely in digital banking services. Another study by Baptista and Oliveira (2017) shows that security strongly influences continuity intentions in mobile payment services in various European countries.

When compared to the findings of previous research, the results of this study show a strong consistency that security is a fundamental element in the retention of digital service users. Research by Setyowati and Nugroho (2021) on digital wallet users in Indonesia also shows that the perception of security risks is one of the factors that users pay attention to the most when deciding to use an e-wallet application in the long term. Meanwhile, Wu and Wang (2020) found that perceived risk was the dominant predictor influencing customer migration from one digital payment platform to another, especially when data leak incidents occurred.

Nevertheless, this study contributes further because it not only highlights the perception of security in general, but also shows a direct and strong link between security and churn risk. In many studies, the primary focus is on loyalty or intentional continuous

use, whereas this study focuses on *Churn Risk*—an increasingly important factor amid fierce competition for Indonesia's e-wallet industry, which has more than 10 major players. Another important contribution of the results of this study is its relevance to the context of Indonesia, which experiences the highest e-wallet penetration rate in Southeast Asia, but also faces considerable digital security risks. A Deloitte report (2023) shows that Indonesia ranks at the top in digital transaction fraud cases in Southeast Asia, including *phishing*, *malware injections*, and *credential stuffing*. This makes security issues the center of attention for users, especially for those who often make high-value transactions.

In this context, the results of the study may help explain why e-wallet users in Indonesia show a higher sensitivity to security issues than users in developed countries. The Rahayu study (2022) noted that 61% of e-wallet users in Indonesia have ever felt worried about the security of their accounts, even though they continue to use the service due to convenience and habituation factors. However, when risk perception increases at a certain point, the risk of churn increases, according to the study's findings. In addition, from an industry perspective, the results of this study provide an indication that security factors can be a major differentiator among fiercely competitive e-wallet players. For example, GoPay and DANA tend to emphasize security features such as layered PINs and biometric verification, while some other platforms still have security loopholes related to OTPs and one-factor authentication. This condition shows that platforms that provide a higher level of security tend to have lower churn rates, especially from the segment of users who are active and have regular transactions.

Previous research by Chawla and Joshi (2019) shows that users tend to leave digital platforms when they feel that their personal data is not well protected. This study confirms these results by showing that insecurity not only reduces loyalty, but also becomes a direct trigger for churn in the context of Indonesian e-wallets. Another study by Makanyeza et al. (2021) also confirmed that the perception of digital security risks is strongly correlated with a decrease in usage intensity, which is an early indicator of churn. Seeing the very competitive conditions of the Indonesian market, the implications of this study are becoming increasingly relevant. With competition between major platforms such as GoPay, OVO, DANA, ShopeePay, and LinkAja, service providers are required to not only offer easy-to-use features, but also ensure that users feel high security. When a user encounters a suspicious incident, even as small as an unknown login, the risk of churn increases drastically because the user will look for a platform that feels more secure.

In addition, the results of this study have important implications for consumer protection policies in the digital financial ecosystem. The government through Bank Indonesia and OJK has issued regulations related to the Payment System (PBI 23/2021), but the challenges in the field remain large because the mode of fraud is increasingly varied. In this context, the results of this study confirm the importance of security education and literacy for users, which has been proven to improve security perception and reduce the risk of churn. From a theoretical perspective, the findings of this study expand the understanding of the role of security as a variable predictor of churn in digital financial services. Many previous studies have focused more on aspects of user experience, promotion, or service quality. However, this study shows that security is not just an additional factor, but a core factor in user retention. This strengthens the theory *Perceived Risk* (Featherman & Pavlou, 2003) as well as trust theory in digital marketing, which states that trust is only formed when the risk is low.

In increasingly competitive industry conditions, this finding is a significant contribution for Indonesian e-wallet service providers. By improving the perception of security, the platform not only strengthens the relationship with users, but can also reduce the costs incurred from churn, which is one of the biggest costs in the

subscription-based industry and digital services. Thus, the combination of the results of this study with previous literature shows that security is not just a technical factor, but also a strategic factor in retaining users and preventing churn. An e-wallet platform capable of building a strong security ecosystem will have a significant competitive advantage and lower churn rates.

Theoretical Explanation of the Power of Security Influence

The findings of the study showing that the perception of transaction security has a negative and significant influence on the risk of churn in e-wallet users in Indonesia can be explained through a strong theoretical foundation in the study of digital consumer behavior and financial services. Security in digital payment systems is not just a technical attribute, but a psychological construct that affects risk perception, trust, post-use experience, as well as the long-term relationship between users and platforms. In the context of this study, the large negative regression coefficient illustrates that security has a very strong role in reducing the likelihood of user moving to another platform. This can be explained through various theories such as *Perceived Risk Theory*, *Technology Acceptance Model (TAM)*, *Expectation-Confirmation Model (ECM)*and *Trust-Based Relationship Theory*.

Through perspective *Perceived Risk Theory*, security is seen as a key determinant in user behavior when interacting with high-risk technologies. Bauer (1960) and Cunningham (1967) explain that consumers naturally tend to avoid services that are perceived to contain high risks, especially risks associated with privacy and finances. In e-wallet services, the perception of security risks has direct consequences because potential losses are not only inconvenience, but also loss of funds or leakage of personal data. When users feel safe, they rate the risk as low so the tendency to leave the service also decreases. Conversely, when the sense of security weakens, the risk of churn increases in line with the findings of Gao and Waechter (2017), who affirm that security risk is a strong predictor in digital service avoidance. Thus, perceptual risk theory explains why security is able to exert a direct and strong influence on users' decisions to stay or switch services.

From the point of view *Technology Acceptance Model (TAM)*, security is an external component that influences the formation of trust in the use of digital technology. Although TAM initially emphasized the perception of usability and ease of use (Davis, 1989), the development of this model placed security as one of the main determinants in building user attitudes and trust. Venkatesh and Bala (2008) emphasized that security is a critical factor that affects the cognitive evaluation of a digital platform, especially in the context of financial services. The research of Kim et al. (2010) reinforces this idea by showing that the perception of security is a key indicator of trust in digital payment systems, which directly influences users' sustainable decisions. The results of this study are in line with these findings, where the high perception of security has a direct impact on decreasing the risk of churn due to the formation of strong trust in the reliability of the e-wallet system.

Other theoretical contributions come from *Expectation-Confirmation Model (ECM)*, which emphasizes the importance of post-use experience in determining the sustainability of digital service use. According to Bhattacherjee (2001), users will continue to use a service if their experience meets or exceeds previous expectations. In the context of e-wallets, security is a core part of the user experience. When users don't encounter negative events such as mysterious transactions or suspicious login attempts, they feel that the service meets security expectations, thus reinforcing satisfaction and lowering the intention to move. Conversely, the slightest security glitch can result in dissatisfaction and drive users to leave the platform. Zhou (2013) research corroborates this view by showing that security is a key component in confirming the experience in

mobile payments. Thus, ECM explains how the security experience affects retention through satisfaction and confirmation of expectations.

Another important perspective comes from the theory of trust in the user–platform relationship, as described in *Trust-Based Relationship Theory*. According to Morgan and Hunt (1994), trust is the basis of a long-term and sustainable relationship between users and service providers. Such trust can only be formed when users are confident that the platform is capable of protecting their interests, especially when it comes to privacy and security. Gefen et al. (2003) added that in the digital environment, the perception of security is the foundation of the formation of trust. The results of this study show a very consistent relationship with the theory: the stronger the perception of security, the more trust is formed, and the less likely users are to leave the service. Research by McKnight et al. (2011) also shows that the perception of security has a direct influence on user trust and commitment in digital services, thus clarifying the role of security as a core factor in user retention.

Conceptually, the findings of this study can also be explained through *Switching Behavior Theory*, explaining that service migration is often triggered by *Push Factors*, which is a factor that pushes users out of the platform used (Bansal et al., 2005). In the context of e-wallets, insecurity is one of the most powerful push factors. When users feel that a platform has a security gap or fails to protect their data, they will be forced to look for alternative services that offer better protection. Xu et al. (2021) emphasized that security issues are the main reason for service migration in digital financial services. The findings of this study confirm that the higher the perception of security, the less influence the push factor will be, so the risk of churn decreases.

If these theories are integrated, it is understandable why security exerts such a strong influence on churn risk. Security has a multi-level effect: it influences the perception of risk, builds trust, increases satisfaction, reduces uncertainty, and retains users from moving platforms. In contrast to other factors such as price or promotion, security touches on the emotional and psychological aspects of users because it is directly related to the threat of financial loss and privacy. Thus, in a highly competitive e-wallet industry, security is not only a technical advantage, but a strategic factor in retaining users and lowering churn rates.

Other Factors That May Affect Churn Risk

Although this study shows that the perception of transaction security has a significant influence on the risk of churn in e-wallet users, it should be understood that churn is a multidimensional phenomenon that is influenced by various other factors beyond the security aspect. An R^2 value of 0.421 indicates that there is still a 58% variability of churn risk affected by other factors not included in this model. This is in line with the view in the digital consumer behavior literature, which shows that a user's decision to leave a platform is influenced by a combination of psychological, functional, situational, emotional, and competitive factors. Therefore, a discussion of other factors that can contribute to churn risk is important to understand the dynamics of user retention in the context of the highly competitive Indonesian e-wallet industry.

One of the factors that has a lot of influence on the risk of churn is the quality of digital services. In theory *E-Service Quality*, Zeithaml et al. (2002) emphasize that the quality of interactions, system reliability, efficiency, and customer service responsiveness have a major impact on user satisfaction and loyalty. In the context of e-wallets, technical glitches such as frequent app crashes, failed transactions, or slow balance processing can directly increase users' frustration and encourage them to move to another platform. Research by Parasuraman et al. (2005) shows that the quality of digital services is one of the main determinants of the intention to move in application-based financial services.

In addition, user experience is an important factor that affects churn. In the digital industry, the user experience includes not only the appearance of the interface, but also the ease of navigation, responsiveness of the app, and the simplicity of the transaction process. Davis and Venkatesh (2004) state that the perception of ease of use can increase user attachment to the platform. If users find the app difficult to use or unintuitive, the risk of churn increases significantly. Research by Ozturk et al. (2016) on mobile payment users also confirms that a poor or complicated interface can drive a user's move to a platform with a better user experience.

In addition to functional factors, feature innovations and added value offered by the platform also have an effect on retaining users. In the Indonesian e-wallet market, features such as QRIS, cashback, loyalty programs, integration with online transportation, and bill payments are the differentiators between one platform and another. Rogers (2003) in theory *Diffusion of Innovation* emphasizing that users tend to maintain services that have a high level of innovation and provide additional benefits that competitors do not offer. The study of Hung et al. (2012) supports this view by showing that innovation is a significant determinant of mobile banking user retention.

In addition to innovation, the intensity of promotions and incentives is also an important factor. In the e-wallet ecosystem in Indonesia, promotions such as cashback, merchant discounts, or free admin fee features are the main attraction for many users. When promotions are reduced or redirected to other platforms, users often exhibit switching behavior. Research by Danaher and Dagger (2013) shows that inconsistent financial incentives are one of the most powerful churn drivers in digital services. In the Indonesian context, changes in promo policies also often cause a big shift in the e-wallet market share.

In addition, transaction fee factors and fee transparency also influence users' decision to stay. When the cost of the service increases or the user feels the fee is not transparent, the risk of churn increases. Kim et al. (2021) revealed that the perception of high costs in financial digital services can reduce satisfaction and increase intention to leave the platform. In the e-wallet industry, interbank transfer fees or top-up fees are often the difference between one platform and another.

Another factor that is no less important is the quality of customer service. In digital financial services, issues such as non-credited balances, failed transactions, or locked accounts are highly sensitive events and require a quick response from the service provider. If users have difficulty contacting customer service or feel their complaints are being ignored, the risk of churn increases. Research by Holloway et al. (2005) confirms that the quality of customer service is a significant predictor of user retention in digital financial services.

In addition to technical and functional factors, social influence and friend recommendations also play a role in increasing churn. Theory *Social Influence* by Venkatesh et al. (2003) show that recommendations from the social environment influence technology use decisions. In the context of e-wallets, users often switch platforms to fit into their social ecosystem, for example because co-workers use certain platforms more often. Research by Lu et al. (2011) shows that social influences play a significant role in the use and movement of mobile payment platforms.

Another factor that also affects churn is the ease of integration of the ecosystem, such as the platform's ability to connect with other services, including e-commerce, online transportation, or bill payments. Verhoef et al. (2015) emphasize that customers are more likely to stick to platforms that provide a complete and integrated ecosystem of services. When integrations are reduced or inadequate, the risk of churn increases as users look for platforms that offer a more seamless experience.

Finally, trust in the service provider as an institution also influences users' decisions to stay. If an e-wallet company is involved in a security scandal, data breach, or

fraud, users are likely to leave the platform even if it doesn't experience an immediate incident. This is in line with the findings of Bapna et al. (2017) which show that corporate reputation plays a large role in switching behavior in digital financial services.

Thus, in addition to security, there are many other factors that affect the risk of churn in e-wallet services. These factors include the quality of digital services, user experience, feature innovation, promotion intensity, transaction costs, quality of customer service, social influence, ecosystem integration, and company credibility. These findings underscore that user retention is the result of a combination of various factors, so e-wallet service providers need to implement a holistic strategy in retaining users.

Implications of the Study

The findings of this study provide important contributions to the existing literature on digital financial service user behavior, particularly in the context of e-wallets. First, the study expands theoretical understanding by positioning transaction security perception not merely as an adoption or satisfaction factor, but as a direct predictor of churn risk. This reinforces the relevance of *Perceived Risk Theory*, the *Expectation-Confirmation Model (ECM)*, and *Trust-Based Relationship Theory*, which emphasize that trust and psychological assurance play central roles in sustaining the use of digital platforms. Second, the strong negative relationship found between security perception and churn risk enriches theoretical models of digital finance by demonstrating that security exerts a substantial influence on long-term user retention, beyond utilitarian dimensions such as convenience, usability, or promotional incentives.

Practically, the results of this study offer strategic guidance for e-wallet service providers operating in a highly competitive Indonesian market. First, companies must prioritize strengthening their security infrastructure, including multi-layer authentication, robust data encryption, and advanced fraud detection systems powered by artificial intelligence. Second, enhancing transparency in privacy policies and delivering clear, user-friendly security education can significantly improve users' perceived safety. Third, e-wallet providers can optimize churn management by integrating security-related perception data into predictive models, enabling early identification of users who may be at risk of switching due to security concerns. By elevating the security dimension, e-wallet platforms can build stronger trust, reduce churn, and maintain long-term customer loyalty.

From a policy perspective, this study highlights the need for stronger regulatory oversight and standardized security requirements for digital financial services in Indonesia. Regulatory bodies such as Bank Indonesia and the Financial Services Authority (OJK) should ensure that e-wallet providers comply with stringent security standards, including personal data protection, secure authentication mechanisms, and responsive incident-handling procedures. Additionally, enhancing digital security literacy among the public is crucial to reducing vulnerability to cybercrime. The findings also underscore the importance of developing effective risk communication guidelines that enable service providers to communicate security-related issues clearly—promoting awareness without causing unnecessary alarm.

CONCLUSION

The results of this study show that the perception of transaction security has a significant and negative influence on the risk of churn in e-wallet users in Indonesia. Key findings show that the higher the level of security perceived by users, the lower their likelihood of leaving the platform. A regression coefficient value of –0.649 indicates a strong and meaningful influence, while an R^2 value of 0.421 confirms that the security perception variable is able to explain more than 40% of the variation in churn risk. This confirms that security is not only a technical element, but also a strategic factor that

determines user retention in digital financial services. These findings are also in line with various theories such as *Perceived Risk Theory*, *Technology Acceptance Model (TAM), Expectation-Confirmation Model (ECM),* and *Trust-Based Relationship Theory*, which emphasizes that security is the foundation of trust, satisfaction, and sustainable decisions in the context of technology-based services.

In addition to security, the study identified other factors that can also affect churn risk, including digital service quality, user experience, promotions, transaction fees, feature innovation, customer service quality, ecosystem integration, social influence, and service provider reputation. These findings confirm that churn is a multifactorial phenomenon that cannot be explained by a single variable, so service providers need to apply a holistic approach in maintaining their user base. Overall, the study makes a theoretical contribution by emphasizing the role of security as an important factor in preventing churn in e-wallet services, while expanding the understanding that churn behavior is not only triggered by economic or convenience factors, but also by the perception of risk formed during the user experience.

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