

MORE THAN CONVENIENCE: SOCIAL INFLUENCE SHAPES THE PATH FROM PERCEIVED USEFULNESS TO ACTUAL E-WALLET USE

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Abstract:

Purpose - This study extends the Technology Acceptance Model to explain Indonesian e-wallet continuance by examining perceived usefulness, perceived ease of use, gamification effectiveness, trust in provider, loyalty program intensity, social influence, intention to continue use, and actual usage frequency.

Methods - A quantitative survey of 290 Indonesian e-wallet users was analyzed using partial least squares structural equation modeling.

Findings - The findings show that perceived usefulness, perceived ease of use, gamification, trust, and loyalty programs have a positive effect on intention to continue use. Intention to continue use also has a significant effect on actual usage frequency. Social influence strengthens the association between perceived usefulness and the intention to continue using it but does not significantly moderate perceived ease of use.

Research Implications - The study adds to the body of knowledge on post-adoption behavior for sustainable digital payment usage and to strengthening the cashless payment ecosystem in Indonesia.

Originality - This research extends the Technology Acceptance Model by incorporating actual usage frequency as the final behavioral outcome in Indonesian e-wallet users.

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INTRODUCTION

There has been a massive change in the manner in which people conduct their financial dealings because of the rapid development of financial technology (fintech). Fintech innovations not only enhance access to financial services but also reshape how users make financial decisions in a digital environment (Cuandra et al., 2024). Fintech has emerged as a major innovation in the financial industry by providing more efficient, accessible and convenient financial services and promoting the transition to digital payments (Candy et al., 2022). The digital wallet (e-wallet), which makes online buying, transfers, and payments easier, is one of the most popular technologies. Nevertheless, long-term user involvement is still uneven despite the increasing use of e-wallets.

The [IDN Research Institute \(2025\)](#) reports that Indonesian Millennials and Gen Z show high e-wallet usage, with GoPay (88%), OVO (79%), ShopeePay (77%), DANA (71%), and Doku (48%) among the leading services. The main drivers of use include ease of use (63%), preference for cashless transactions (57%), transaction speed (40%), and promotional incentives (37%). Nevertheless, promotional incentives may encourage short-term or opportunistic transactions rather than stable, habitual use. This condition is important in Indonesia because e-wallet continuance is part of wider digital payment efficiency, QRIS adoption, and financial inclusion. The growing utilization of e-wallets increases transaction efficiency, reduces dependence on cash, and improves financial inclusion, particularly in developing countries like Indonesia. Moreover, sustainable e-wallet usage behavior enhances the resilience of the digital payment ecosystem and supports digital economic activities among consumers and MSMEs.

The Technology Acceptance Model (TAM) ([Davis, 1989](#)), which focuses on PU and PEOU as important factors of behavioral intention, has been heavily relied upon in previous research. Nevertheless, few studies have examined ICU as a mediator between user perceptions and actual use ([Al Amin et al., 2024](#)). TAM has also been criticized for its limited ability to explain post-adoption behavior. By adding trust, gamification, and loyalty programs, this study expands TAM to improve understanding of long-term engagement. Recent research indicates that these factors are important for e-wallet acceptance. Trust increases user confidence and privacy security, leading to continued use. Gamification improves user experience and encourages continued use ([Akhtar et al., 2024](#); [Gómez-Hurtado et al., 2024](#); [Matar & Aloqaily, 2025](#)). Loyalty schemes such as cashback and reward points help keep users. Nevertheless, most prior studies examine these factors independently, limiting a comprehensive understanding.

Furthermore, there is conflicting evidence regarding social influence within Theory of Planned Behavior (TPB) ([Ajzen, 1991](#)) and Social Influence Theory ([Kelman, 1958](#)). Social influence is associated with subjective norms that shape behavioral intention through compliance, identification, and internalization. Some studies report no significant influence on intention in different conditions ([Che Nawi et al., 2024](#); [Hendrajaya et al., 2024](#)), while others find significant effects ([Teow et al., 2025](#); [Verma et al., 2025](#)). These inconsistencies imply that social influence is context-dependent and may function better as a moderator rather than a direct predictor.

A closer comparison of prior studies clarifies the research gap. [Al Amin et al. \(2024\)](#) examined on mobile payment continuance and e-loyalty but not actual usage frequency as the final outcome. [Che Nawi et al. \(2024\)](#) focused on intention only. [Gómez-Hurtado et al. \(2024\)](#) did not assess whether intention translates into repeated use. [Akhtar et al. \(2024\)](#) and [Tam et al. \(2024\)](#) investigated gamification in mobile payment or digital banking contexts, but did not integrate trust, loyalty programs, social influence moderation, and actual frequency in one model. [Hendrajaya et al. \(2024\)](#) considered actual use in Indonesian social commerce, yet the setting differs from e-wallet payments. Therefore, this study proposes an integrated post-adoption model where ICU the path from TAM-related and service-related factors to actual usage frequency, and social influence acts as a moderator.

The literature as a whole points to three key gaps: (i) the limited study of AUF as a post-adoption behavioral outcome in TAM-based e-wallet studies, (ii) the underexplored moderation effect of social influence on TAM relationships, and (iii) a comprehensive model does not exist to explain the continued usage behavior with key constructs like trust, gamification and loyalty programs. To guide the investigation, the following research questions are proposed: (RQ1) Do PU, PEOU, gamification effectiveness, trust in provider, and loyalty program intensity positively influence ICU? (RQ2) Does ICU mediate the path from these antecedents to AUF? (RQ3) Does social influence moderate the relationship between PU and ICU, and between PEOU and ICU?

Therefore, the study extends TAM by examining the relationship between intention to continue use and actual usage frequency and proposes social influence as a moderating variable. The study offers two main contributions. First, it contributes theoretically by integrating perceived usefulness, perceived ease of use, gamification effectiveness, trust in provider, and loyalty program intensity into a post-adoption model and treating AUF as a behavioral outcome rather than stopping at intention. Second, it contributes to digital payment economics by linking e-wallet continuance to transaction efficiency, QRIS adoption, and sustainable cashless behavior in Indonesia. Practically, the findings are expected to help e-wallet providers and policy stakeholders design retention strategies that are not merely promotional but also capable of supporting consistent digital payment use.

THEORETICAL REVIEW

Technology Acceptance Model (TAM)

Fintech, or financial technology, is a digital invention that makes financial transactions easier to understand and more safe, efficient, and useful. The Technology Acceptance Model (TAM) theory, developed by [Davis \(1989\)](#), illustrates the influence of PU and PEOU on people's desire to stick with a technology. Numerous studies by [Al Amin et al. \(2024\)](#) show that PU and PEOU are significant in influencing customers' willingness to continue with fintech services. In this research, the TAM model is constructed using variables for trust, gamification, and loyalty programs, as well as social influence as moderating variables, in line with recent fintech research that integrates psychological and social aspects ([Che Nawi et al., 2024](#); [Hammouri et al., 2023](#); [Herzallah et al., 2025](#); [Matar & Alogaili, 2025](#)).

Theory of Planned Behavior and Social Influence Theory

[Ajzen \(1991\)](#) developed the Theory of Planned Behavior (TPB), which describes how attitudes and social influence variables shape an individual's conduct through the development of intention. According to TPB, attitude toward the activity, subjective norm, and perceived behavioral control are the three key determinants of behavioral intention, which in turn predicts actual behavior. Consequently, TPB offers a pertinent theoretical foundation for elucidating the connection between AUF and ICU.

According to the Social Influence Theory ([Kelman, 1958](#)), social influence influences an individual's behavior through internalization, identification, and compliance. Technology adoption social influence refers to instances where individuals use a system as a result of pressure, advice, or encouragement from their

social surroundings. This idea aligns with the concept of subjective norms in [Ajzen \(1991\)](#) TPB, which highlights how social expectations influence conduct.

Perceived Usefulness (PU)

Perceived usefulness (PU) indicates how individuals perceive adopting a technology can increase effectiveness ([Davis, 1989](#)). Numerous studies have proven that consumers' intention to use fintech relies greatly on PU ([Gómez-Hurtado et al., 2024](#); [Hesniati & Limgestu, 2023](#); [Matar & Aloqaily, 2025](#); [Verma et al., 2025](#); [Winanti & Fernando, 2024](#)). [Akhtar et al. \(2024\)](#) found that perceived usefulness strongly influences intention to continue using digital financial services. This implies that consumers' propensity to continue using e-wallets increases with perceived benefits.

Perceived usefulness may have an impact on actual usage behavior in addition to intention. According to [Matar and Aloqaily \(2025\)](#), people who believe a product to be more beneficial typically use it more frequently. [Siagian et al. \(2021\)](#) also stress that actual conduct is highly affected by perceived usefulness through trust. While the majority of earlier research focuses on the connection between intention and PU ([Gómez-Hurtado et al., 2024](#); [Verma et al., 2025](#)), theoretical reasoning suggests that perceived benefits also contribute to actual usage frequency, as individuals are more likely to sustain behaviors that consistently deliver positive outcomes. The hypothesis is expressed as follows:

H1a: Perceived usefulness positively affects intention to continue use.

H1b: Perceived usefulness has a positive indirect effect on actual usage frequency through intention to continue use.

Perceived Ease of Use (PEOU)

How easy someone perceives the task of using the system to be is termed perceived ease of use (PEOU) ([Davis, 1989](#)). PEOU lowers cognitive barriers and affects consumers' intention to stick with digital financial services. According to earlier research ([Che Nawi et al., 2024](#); [Gómez-Hurtado et al., 2024](#); [Hesniati & Limgestu, 2023](#); [Siagian et al., 2021](#); [Verma et al., 2025](#)), it was found that PEOU has a significant impact on the ICU. According to [Matar and Aloqaily \(2025\)](#), PU is strengthened by PEOU, which in turn raises ICU.

Furthermore, actual usage may affect PEOU. A user tends to make frequent transactions if they perceive the e-wallet programs are easy to use, accessible, and uncomplicated. The majority of earlier research ([Che Nawi et al., 2024](#); [Gómez-Hurtado et al., 2024](#); [Winanti & Fernando, 2024](#)) only examined intention to continue usage. On the other hand, it is theoretically possible that PEOU increases user loyalty and usage frequency. The hypothesis is expressed as follows:

H2a: Perceived ease of use positively affects intention to continue use.

H2b: Perceived ease of use has a positive indirect effect on actual usage frequency through intention to continue use.

Gamification Effectiveness (GAM)

Gamification creates interactive experiences that enhance user motivation in digital platforms. Previous research suggests that gamification components like challenges, points, and prizes might have a big impact on user behavior in the financial industry. Gamified systems increase consumers' intention to utilize digital payment apps, according to [Akhtar et al. \(2024\)](#). [Habachi et al. \(2024\)](#) indicate that

gameful experiences enhance user loyalty and emotional engagement. Similarly, [Tam et al. \(2024\)](#) demonstrate that gamification in digital banking improves perceived value and intention to continue use. Well-designed gamification features can therefore reinforce motivation and support sustained user behavior ([Dzandu et al., 2022](#); [Liu et al., 2024](#)).

Furthermore, to influencing intention, gamification may also affect actual usage. Gamified features increase user engagement and encourage more frequent interactions with the application. According to empirical research, entertaining game mechanics increase user engagement and retention ([Akhtar et al., 2024](#); [Habachi et al., 2024](#); [Tam et al., 2024](#)). Users are inclined to access and use e-wallet services more frequently when they feel rewarded and challenged. The hypothesis is expressed as follows:

H3a: Gamification effectiveness positively affects intention to continue use.

H3b: Gamification effectiveness has a positive indirect effect on actual usage frequency through intention to continue use.

Trust in Provider

Trust in the service provider is a critical factor in sustaining e-wallet usage. Higher trust directly increases users' intention to continue use with digital payment apps, according to earlier research ([Al-Dwairi & Al-Ali, 2022](#); [Gómez-Hurtado et al., 2024](#); [Yang et al., 2021](#)). Additionally, user loyalty and retention are positively impacted by trust ([Che Nawi et al., 2024](#); [Matar & Aloqaily, 2025](#)). Additionally, trust serves as a mediator between user attitudes and ICU services by reinforcing perceived usefulness (PU) and perceived ease of use (PEOU) ([Siagian et al., 2021](#); [Winanti & Fernando, 2024](#)).

Users feel more at ease during repeated transactions when they have high levels of trust, and trust plays a big role in increasing user loyalty, which is reflected in more frequent usage behavior ([Al-Dwairi & Al-Ali, 2022](#); [Gómez-Hurtado et al., 2024](#); [Matar & Aloqaily, 2025](#); [Winanti & Fernando, 2024](#)). Additionally, trust and actual use of payment applications were found to be positively correlated by [Akhtar et al. \(2024\)](#) and [Siagian et al. \(2021\)](#). The hypothesis is expressed as follows:

H4a: Trust in provider positively affects intention to continue use.

H4b: Trust in provider has a positive indirect effect on actual usage frequency through intention to continue use.

Loyalty Program Intensity

Loyalty Program Intensity refers to the extent and attractiveness of loyalty incentives offered by service providers, such as points, cashback, discounts, and rewards, which are designed to enhance user engagement and encourage repeated usage. These program provide additional value to users and motivate them to continue making transactions in order to gain the offered benefits ([Fourie et al., 2023](#)). [Habachi et al. \(2024\)](#) also state that a mix of gamification elements and loyalty program can create a more enjoyable experience, increase users' desire to continue using the application, and encourage repeated usage. [Le \(2021\)](#) explains that tangible benefits such as incentives and loyalty rewards can enhance perceptions of usefulness and trust in digital finance. Continuous adaption of digital apps is strongly influenced by positive experiences and tangible benefits perceived by users ([Al Amin et al., 2024](#)).

The likelihood is inclined to using e-wallets over the long run if the loyalty program is appealing and innovative. The hypothesis is expressed as follows:

H5a: Loyalty program intensity positively affects intention to continue use.

H5b: Loyalty program intensity has a positive indirect effect on actual usage frequency through intention to continue use.

Intention to Continue Use

Actual behavior follows logically from sustained intention. While testing at the stage of actual behavior is still limited, the majority of studies on the topic of technology adoption concentrate around intention to use ([Akhtar et al., 2024](#); [Che Nawi et al., 2024](#); [Gómez-Hurtado et al., 2024](#); [Hammouri et al., 2023](#); [Winanti & Fernando, 2024](#)). Intention is directly related to real behavior as per TPB ([Ajzen, 1991](#)) and the TAM ([Davis, 1989](#)). [Tam et al. \(2024\)](#) validate the theory through practical evidence which demonstrates that the intention to continue using digital services plays a significant role in determining actual behavior. Similarly, [Pertiwi et al. \(2025\)](#) find that the actual use of the feature is motivated by users' intentions to use it efficiently. Therefore, the intention to use e-wallets influences the rate of usage among users. The hypothesis is expressed as follows:

H6: Intention to continue use positively affects actual usage frequency.

The Role of Social Influence as a Moderator

The pressure or encouragement from the social environment that moulds people's views and behavioral intentions is reflected in social influence (SI). According to TPB ([Ajzen, 1991](#)), social influence is equivalent to subjective norms, which influence behavioral intention. Social Influence Theory ([Kelman, 1958](#)), which suggests social influence's strong effect on behavior. Prior research underlines its importance for continued use of digital finance ([Foroughi et al., 2023](#); [Hammouri et al., 2023](#); [Herzallah et al., 2025](#)). However, findings remain conflicting. [Saleem et al. \(2024\)](#) find social influence significantly affects perceived usefulness but not ease of use, indicating stronger influence on PU than PEOU. Similarly, [Teow et al. \(2025\)](#) confirmed a negative correlation between social influence and PEOU, suggesting experienced users rely less on social cues. In Indonesian social commerce, trust has a greater impact than social influence ([Hendrajaya et al., 2024](#)), and social influence may be negligible when mediated by other variables ([Li et al., 2022](#)). These inconsistencies imply a context-dependent role. Therefore, social influence is positioned as a moderating factor affecting the strength of relationships between user perceptions and behavioral intention. In this context, intention to continue use may be strengthened when users perceive usefulness and ease of use, especially when encouraged or recommended by others.

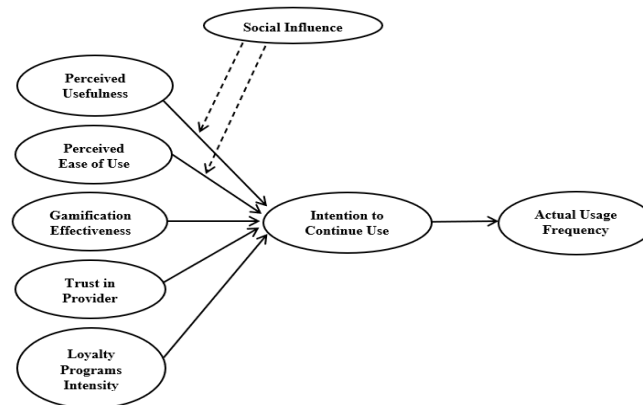
The moderating mechanisms of compliance, identification, and internalization are based on Social Influence Theory ([Kelman, 1958](#)) and TPB ([Ajzen, 1991](#)). Compliance occurs when users engage in or continue behavior to gain social approval or avoid disapproval from their social network. Users associate themselves with the attitudes of reference groups because they want to be associated with that group. Internalization takes place when social beliefs about a technology are integrated into an individual's value system and accepted as personal convictions. Social influence is expected to strengthen the PU-ICU relationship mainly through identification and

internalization, as users internalize socially reinforced benefits of e-wallets such as faster transactions, wider QRIS acceptance, or convenience, users internalize these socially validated beliefs, thereby enhancing perceived usefulness and intention to continue use. In contrast, perceived ease of use is highly affected by direct and repeated personal interaction with the application interface and not by socially transmitted information. Once users are experienced, ease-of-use judgments rely on hands-on interaction, leaving limited influence of social processes on the PEOU-ICU relationship. This supports social influence as a context-dependent moderator more relevant for value-based than skill-based judgments, especially after the initial adoption stage. The hypothesis is expressed as follows:

H7a: The effects of perceived usefulness on intention to continue use are moderated by social influence.

H7b: The effects of perceived ease of use on intention to continue use are moderated by social influence.

Figure 1. Conceptual Framework



Source: Primary data processed, 2026

RESEARCH METHODS

In order to investigate the links between characteristics, e-wallet usage intentions and actual usage frequency, a quantitative method was implemented. This method is chosen as it enables empirical testing of relationships using measurable numerical data ([Creswell & Creswell, 2018](#); [Sahir, 2022](#)). The target group is Indonesian e-wallet users. The data has been collected by an online questionnaire sent via Google Forms through social media channels and personal networks. This study adopts a convenience sampling method, involving the selection of people based on their availability and willingness to participate ([Memon et al., 2025](#)). Screening questions required respondents to confirm that they were Indonesian e-wallet users and had used an e-wallet for transactions. The questionnaire initially received 581 responses. To ensure quality of data, all responses were pre-screened before analysis. Answers with very uniform response patterns, implausible response behavior, or signs of careless answering were excluded from the data set. After screening, 290 responses were deemed valid and consistent enough for further analysis. The screening process was based on three criteria. Responses that did not pass the eligibility screening question ($n = 14$), showed straight-lining or near identical responses indicating inattentive responding ($n = 186$), or had implausibly short completion times or inconsistent answers ($n = 91$) were removed, leaving a final

sample of 290 valid responses. The final sample consisted of 56.21% men and 43.79% women, distributed across different age groups and education levels. No major systematic differences were found between excluded and retained groups, suggesting the screening procedure is unlikely to have introduced material selection bias related to gender, age or education. Nevertheless, convenience sampling creates potential selection bias because respondents are not randomly selected. Therefore, findings should be interpreted as evidence from sampled respondents rather than fully generalizable estimates for all Indonesian e-wallet users, and PLS-SEM results should be understood as associative and predictive rather than definitive causal evidence. Data gathering took place between November 25, 2025, to March 25, 2026. Sample size was determined using G*Power with a priori power analysis based on multiple linear regression ([Kang, 2021](#)). With eight predictors, an alpha level of 0.05, statistical power of 0.95, and an effect size ($f^2 = 0.15$) ([Cohen, 1988](#)), a minimum of 160 respondents was required, while 290 valid responses were obtained. PU, PEOU, gamification effectiveness, trust in provider, and loyalty program intensity were independent variables. Social influence is the moderator, ICU is the mediator, and actual usage frequency is the dependent variable. All constructs were evaluated using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree) ([Hair et al., 2019](#)). Data were analyzed using SmartPLS to execute PLS-SEM, including the measurement model and structural model. The moderating effects of social influence on the PU-ICU and PEOU-ICU paths (H7a and H7b) were estimated using the two-stage approach ([Hair et al., 2021](#); [Henseler & Chin, 2010](#)). In this approach, latent variable scores were first derived, then interaction terms ($SI \times PU$ and $SI \times PEOU$) were computed and added to a second-stage structural model. The two-stage approach was chosen because it preserves reflective measurement properties and is recommended for moderation analysis in PLS-SEM. The measurement indicators for each construct were adapted from established scales. PU was measured with six items, PEOU with four items, GAM with four items, TR with six items, LP with seven items, SI with five items, ICU with six items, and AUF with six items. All indicators were adapted from prior validated studies in TAM and digital payment literature ([Akhtar et al., 2024](#); [Che Nawi et al., 2024](#); [Gómez-Hurtado et al., 2024](#); [Matar & Aloqaily, 2025](#)).

RESULTS AND DISCUSSION

Demographic information gathered for this study is as follows.

Table 1. Demographic Data of Respondents

Demographic	Category	Frequency (n=290)	Percentage (%)
Gender	Men	163	56.21%
	Women	127	43.79%
Age	< 18	11	3.79%
	18-25	164	56.55%
	26-35	115	39.66%
Last Education	Junior High School	11	3.79%
	Senior High School	106	36.55%
	Diploma	106	36.55%

Income per Month	Bachelor's Degree	65	22.41%
	< Rp. 5.000.000	73	25.17%
	Rp. 5.000.000 – Rp. 10.000.000	194	66.90%
	Rp. 10.000.000 – Rp. 15.000.000	21	7.24%
	> Rp. 15.000.000	2	0.69%
Occupation	Student	26	8.97%
	Freelancer	8	2.76%
	Government Employee	30	10.34%
	Private Employee	182	62.76%
	Entrepreneur	44	15.17%
E-Wallet Most Frequently Used	GoPay	113	38.97%
	ShopeePay	161	55.52%
	OVO	124	42.76%
	DANA	160	55.17%
	Others	9	3.10%
E-Wallet Usage Frequency per Week	1-2 times	8	2.76%
	3-4 times	86	29.66%
	5-6 times	131	45.17%
	> 7 times	65	22.41%

Source: Primary data processed, 2026

According to the data collection results, men constituted the majority of respondents (56.21%), while women accounted for 43.79%. Most participants were aged 18–25 years (56.55%), indicating the dominance of young users who are highly familiar with digital technology and commonly use digital financial services such as e-wallets. In terms of usage behavior, most respondents reported using e-wallets 5–6 times per week (45.17%), followed by 3–4 times (29.66%) and more than 7 times (22.41%), indicating that e-wallet services have become an essential part of daily transactions. These figures describe the sample composition and usage profile and should not be interpreted as evidence of a statistical correlation between age, digital literacy, and e-wallet use, as no correlation test was conducted. The demographic results indicate that the sample mainly consisted of young, digitally literate users who frequently used e-wallet services in their daily transactions, reflecting the high adoption of digital payment technologies among younger Indonesian users.

Common Method Biases (CMB)

The VIF is used to measure the CMB utilizing the whole collinearity technique. According to the findings, no evidence of CMB was found, and all VIF values are below the 3.3 threshold ([Kock, 2015](#)), suggesting CMB is not a major issue.

Table 2. Full Collinearity VIF Test

Construct	VIF
AUF1	1.822
AUF2	1.641
AUF3	1.611
AUF4	1.749
AUF5	1.570

AUF6	1.657
GAM1	1.720
GAM2	1.644
GAM3	1.567
GAM4	1.810
ICU1	3.133
ICU2	3.048
ICU3	2.307
ICU4	2.470
ICU5	1.832
ICU6	1.767
LP1	2.428
LP2	2.443
LP3	1.841
LP4	1.872
LP5	2.351
LP6	2.259
LP7	2.325
PEOU1	1.770
PEOU2	1.571
PEOU3	1.918
PEOU4	2.012
PU1	2.634
PU2	1.894
PU3	1.561
PU4	1.976
PU5	1.721
PU6	1.768
SI1	1.776
SI2	1.983
SI3	1.900
SI4	2.029
SI5	1.723
TR1	1.606
TR2	1.818
TR3	2.038
TR4	1.912
TR5	1.612
TR6	1.797
SI x PEOU	1.000
SI x PU	1.000

Source: Primary data processed, 2026

As a result, the data are regarded as reliable and appropriate for additional research, such as measurement model and structural model assessment.

Table 3. Measurement Model

Construct	Indicator	Outer Loading	AVE	Cronbach's Alpha	Composite Reliability
Actual Usage Frequency	AUF1	0.790	0.560	0.843	0.845
	AUF2	0.745			
	AUF3	0.731			
	AUF4	0.768			
	AUF5	0.718			
	AUF6	0.737			
Gamification Effectiveness	GAM1	0.800	0.640	0.813	0.813
	GAM2	0.800			
	GAM3	0.783			
	GAM4	0.818			
Intention to Continue Use	ICU1	0.886	0.679	0.905	0.910
	ICU2	0.876			
	ICU3	0.827			
	ICU4	0.841			
	ICU5	0.763			
	ICU6	0.741			
Loyalty Program Intensity	LP1	0.840	0.653	0.911	0.915
	LP2	0.835			
	LP3	0.754			
	LP4	0.764			
	LP5	0.823			
	LP6	0.811			
	LP7	0.826			
Perceived Ease of Use	PEOU1	0.851	0.640	0.823	0.876
	PEOU2	0.834			
	PEOU3	0.744			
	PEOU4	0.767			
Perceived Usefulness	PU1	0.858	0.597	0.864	0.871
	PU2	0.785			
	PU3	0.703			
	PU4	0.759			
	PU5	0.760			
	PU6	0.764			
Social Influence	SI1	0.791	0.641	0.860	0.864
	SI2	0.824			
	SI3	0.802			
	SI4	0.826			
	SI5	0.757			

Trust in Provider	TR1	0.748	0.556	0.841	0.853
	TR2	0.802			
	TR3	0.799			
	TR4	0.746			
	TR5	0.660			
	TR6	0.710			

Source: Primary data processed, 2026

Outer Loading

According to [Hair et al. \(2021\)](#), a reflective measurement model is acceptable if the factor loadings exceed 0.70. Indicators with loadings between 0.60 and 0.70 are also acceptable if supported by theoretical relevance ([Hair et al., 2019, 2021, 2017](#)). Therefore, all indicators were retained for further analysis. For the Loyalty Program Intensity (LP) construct, all seven indicators (LP1-LP7) had outer loadings ranging from 0.754 to 0.840, exceeding 0.70. The construct achieved an AVE of 0.653, Cronbach's alpha of 0.911, and composite reliability of 0.915. Since all indicators had acceptable loadings and represented conceptually distinct facets of loyalty-program design, none was removed from the final measurement and structural models.

Average Variance Extracted (AVE)

The research indicates good all constructs' while AVE is in the range >0.50, thus suggesting that the constructs have been validated through convergent validity successfully ([Hair et al., 2019, 2021, 2017](#)).

Cronbach's Alpha and Composite Reliability

Cronbach's alpha and composite reliability > 0.70 indicate excellent reliability, while a range of 0.60–0.70 indicates sufficient internal consistency and is still acceptable, suggesting that the measuring tools are dependable and exhibit adequate internal consistency. Reliability scores greater than 0.90 are regarded as satisfactory, while values that reach or beyond 0.95 indicate possible redundancy across indicators ([Hair et al., 2019](#)).

Discriminant Validity Test

Table 4. Heterotrait-Monotrait Ratio (HTMT)

	AUF	GAM	ICU	LP	PEOU	PU	SI	TR
AUF								
GAM	0.555							
ICU	0.816	0.657						
LP	0.655	0.594	0.630					
PEOU	0.291	0.128	0.383	0.204				
PU	0.438	0.431	0.621	0.166	0.106			
SI	0.788	0.471	0.831	0.626	0.422	0.459		
TR	0.400	0.223	0.502	0.092	0.133	0.197	0.437	

Source: Primary data processed, 2026

In accordance with [Hair et al. \(2021, 2017\)](#) and [Henseler et al. \(2015\)](#), HTMT was used for discriminant validity, indicating that the construct is below the suggested threshold of 0.90 (and 0.85 for a more conservative criterion), according to the data shown in Table 4, discriminant validity is demonstrated for all constructs in this investigation ([Hair et al., 2021, 2017; Henseler et al., 2015](#)).

Table 5. Fornell-Larcker

	AUF	GAM	ICU	LP	PEOU	PU	SI	TR
AUF	0.748							
GAM	0.459	0.800						
ICU	0.714	0.563	0.824					
LP	0.577	0.510	0.569	0.808				
PEOU	0.267	0.120	0.370	0.198	0.800			
PU	0.373	0.359	0.549	0.152	-0.043	0.773		
SI	0.672	0.394	0.742	0.560	0.374	0.391	0.800	
TR	0.347	0.183	0.454	0.077	0.122	0.175	0.384	0.746

Source: Primary data processed, 2026

Additionally, discriminant validity was evaluated based on the Fornell-Larcker approach. The results indicate that the square root of the AVE for each variable is higher than its correlation with other constructs. This suggests that each construct is capable of better explaining its indicators than other variables. These findings are successful with the requirement of the Fornell-Larcker approach ([Fornell & Larcker, 1981](#); [Hair et al., 2021](#)).

Hypothesis Test Results

Table 6. Direct Effect

Variable	β	T-statistics	P-values	Result
H1a: PU -> ICU	0.410	6.534	0.000	Significant
H2a: PEOU -> ICU	0.247	3.269	0.001	Significant
H3a: GAM -> ICU	0.150	2.471	0.014	Significant
H4a: TR -> ICU	0.194	3.450	0.001	Significant
H5a: LP -> ICU	0.213	3.152	0.002	Significant
H6: ICU -> AUF	0.714	13.425	0.000	Significant
H7a: SI x PU -> ICU	0.087	2.490	0.013	Significant
H7b: SI x PEOU -> ICU	0.073	1.834	0.067	Insignificant

Source: Primary data processed, 2026

Table 6 findings of the structural model. According to [Hair et al. \(2017\)](#), the t-statistic (>1.96) and p-values (<0.05) were used to assess significance. As a result, H1a and H2a indicate that ICU is positively and significantly influenced by PU ($\beta = 0.410$, $t = 6.534$, $p < 0.001$) and PEOU ($\beta = 0.247$, $t = 3.269$, $p = 0.001$). The results indicate that users in the Indonesian e-wallet environment are driven by functional benefits such as payment efficiency and transaction speed, as well as simplicity and ease of use. This suggests that e-wallet adoption in Indonesia has moved beyond initial acceptance into a habit stage, where utility and usability remain important for continued engagement. The strong effect of perceived usefulness is particularly significant in QRIS-based digital payment ecosystems, where customers prioritize faster transactions, broader merchant acceptance, and daily payment convenience. These results are similar to earlier studies by [Gómez-Hurtado et al. \(2024\)](#), [Matar and Aloqaily \(2025\)](#), [Siagian et al. \(2021\)](#) and [Winanti and Fernando \(2024\)](#). H3a, H4a, and H5a show ICU is significantly improved by gamification effectiveness (GAM), trust in provider (TR), and loyalty programs (LP). Gamification elements such as points, awards, and interactive challenges enhance user involvement by offering a more engaging and habit-forming experience for digital payment activities rather than a purely transactional one. The result supports previous research by [Akhtar et al. \(2024\)](#),

[Dzandu et al. \(2022\)](#), and [Tam et al. \(2024\)](#). It is noteworthy, however, that gamification yields a comparatively smaller effect size on ICU ($\beta = 0.150$, $f^2 = 0.067$) relative to perceived usefulness ($\beta = 0.410$, $f^2 = 0.305$) and trust ($\beta = 0.194$, $f^2 = 0.133$). This disparity can be attributed to the nature of gamification features in Indonesian e-wallets, which typically function as supplementary engagement tools rather than core functional utilities. In daily payment decisions, Indonesian users tend to prioritize transactional efficiency, reliability, and financial benefits over entertainment, and the novelty effect of gamification may decline over time. Thus, gamification is best understood as a complementary motivational factor in mature e-wallet markets. Trust remains a key determinant of continued usage, as users are more likely to persist when they perceive strong security, reliability, and data protection. Previous research by [Al-Dwairi and Al-Ali \(2022\)](#), [Gómez-Hurtado et al. \(2024\)](#), and [Yang et al. \(2021\)](#) supports this conclusion. Meanwhile, loyalty programs also encourage repeated platform use through incentives such as cashback and rewards, reinforcing long-term engagement. The results reveal that functional evaluation, emotional engagement, and perceived long-term value affect the intention to continue using them ([Al Amin et al., 2024](#); [Fourie et al., 2023](#); [Le, 2021](#)). H6 shows that AUF is strongly and significantly impacted by ICU ($t = 13.425$, $p = 0.000$), confirming ICU as a behavioral mechanism translating intention into actual usage behavior. This means that higher intention leads to more frequent daily transactions, emphasizing the importance of sustaining long-term engagement beyond initial adoption. This research of this study is supported by [Hendrajaya et al. \(2024\)](#), [Pertiwi et al. \(2025\)](#), and [Tam et al. \(2024\)](#). Regarding moderation, H7a shows that ICU is positively and significantly influenced by the interaction between SI and PU ($t = 2.490$, $p = 0.013$), although the effect size was small ($f^2 = 0.045$). This suggests that social influence strengthens perceived usefulness when supported by social proof, such as peer or merchant endorsement of QRIS payments, transfers, or promotions. These results align with earlier studies by [Hendrajaya et al. \(2024\)](#) and [Saleem et al. \(2024\)](#). However, H7b indicates that the interaction between SI and PEOU does not support ICU ($t = 1.834$, $p = 0.067$, $f^2 = 0.037$). This suggests that the interaction between PEOU and ICU is not moderated by social influence. These results align with earlier research ([Saleem et al., 2024](#); [Teow et al., 2025](#)). One explanation is that ease of use has become a standardized expectation among mature Indonesian e-wallet users, maybe because they are already familiar with e-wallet. Therefore, users judge ease based on direct experience with the application rather than on social recommendations. Social influence appears more relevant for validating usefulness than for validating ease of use. Although the interaction effect for H7b was not significant at the 5% level, the p-value of 0.067 indicates that the moderating effect of social influence on the PEOU-ICU relationship approaches significance at the 10% level. This effect may become significant in studies with a larger or more diverse sample. Thus, the finding should be interpreted with caution and not as conclusive evidence that social influence has no part in the PEOU-ICU relationship.

Table 7. Indirect Effect

Variable	β	T-Statistics	P-Values	Result
H1b: PU -> ICU -> AUF	0.293	5.594	0.000	Significant

H2b: PEOU -> ICU -> AUF	0.176	3.403	0.001	Significant
H3b: GAM -> ICU -> AUF	0.107	2.482	0.013	Significant
H4b: TR -> ICU -> AUF	0.139	3.328	0.001	Significant
H5b: LP -> ICU -> AUF	0.152	2.891	0.004	Significant

Source: Primary data processed, 2026

Table 7 displays the findings of the indirect effect study. As advised by [Hair et al. \(2017\)](#), t-statistic (>1.96) and p-values (<0.05) were used to assess significance. The indirect effects support the mediating role of intention to continue use (ICU) in converting the effects of perceived usefulness, perceived ease of use, gamification effectiveness, trust, and loyalty programs into actual usage frequency (AUF). This indicates that these factors do not directly influence usage behavior but rather strengthen users' intention to continue using e-wallet services. Both perceived usefulness and perceived ease of use had significant indirect effects on AUF via ICU. This indicates that in the Indonesian e-wallet context, functional benefits and system usability first shape psychological intention, which then leads to repeat transaction behavior. Perceived usefulness has a stronger indirect effect, especially in terms of transaction speed, QRIS acceptance, and convenience of payment on the ICU. Gamification effectiveness influences the actual use frequency through the intention to continue to use it, but the effect is relatively small. This suggests that gamification is more of an additional engagement mechanism to increase user motivation and interaction than a principal driver for behavioral change. Trust in the provider indirectly affects usage behavior. Clearly, perceived security and reliability create intention before they lead to consistent usage. Loyalty programs promote ICU and improve the frequency of use. This suggests that reward-based incentives work for long-term engagement in competitive digital payment markets. In general, the results verify that ICU serves as a critical psychological mechanism linking user perceptions and actual behavior. Adoption in the Indonesian e-wallet ecosystem is not only determined by system characteristics but also by internalized intention shaped by functional value and motivational factors. This study extends prior research ([Akhtar et al., 2024](#); [Al Amin et al., 2024](#); [Fourie et al., 2023](#); [Gómez-Hurtado et al., 2024](#); [Hesniati & Lingestu, 2023](#); [Matar & Aloqaily, 2025](#); [Verma et al., 2025](#)) by demonstrating that ICU serves as a behavioral bridge toward AUF.

Table 8. F-Square

Variable	F-Square
H1a: PU -> ICU	0.305
H2a: PEOU -> ICU	0.148
H3a: GAM -> ICU	0.067
H4a: TR -> ICU	0.133
H5a: LP -> ICU	0.111
H6: ICU -> AUF	1.043
H7a: SI x PU -> ICU	0.045
H7b: SI x PEOU -> ICU	0.037

Source: Primary data processed. 2026

According to [Cohen \(1988\)](#), the f^2 statistics can be classified as small (0.02), medium (0.15), and large (0.35). The f^2 value for ICU $\rightarrow$ AUF was 1.043, which is substantially higher than the conventional benchmark of 0.35 for a large effect. This

unusually high effect size should be interpreted carefully. However, multicollinearity was not indicated, as VIF values were below the recommended threshold, while discriminant validity remained acceptable, with HTMT between ICU and AUF below the recommended threshold (0.816) and the Fornell-Larcker correlation of 0.714. The large f^2 value mainly reflects that ICU was the only direct predictor of AUF in the structural model, meaning that removing ICU would substantially reduce the explanatory power of AUF. At the same time, this unusually large effect size may be attributable to shared variance and not a purely substantive relationship, because both ICU and AUF were measured through self-reported items collected from the same respondents in a single cross-sectional survey. This association can be inflated by common-method variance, where respondents who rate ICU highly may also tend to rate AUF highly regardless of actual behavior. This is consistent with the high R^2 for ICU (0.785) and AUF (0.510), which support explanatory power but also suggest shared variance may partly stem from common-method effects. Conceptually, ICU and AUF remain distinct constructs, where ICU reflects future-oriented willingness and AUF captures self-reported usage frequency. Future studies may benefit from incorporating objective transaction log data and triangulating self-reported intention with platform-recorded usage to better separate behavioral effects from shared-method variance.

Table 9. R-Square

Variable	R-Square (R^2)	R-Square Adjusted
Actual Usage Frequency	0.510	0.509
Intention to Continue Use	0.785	0.779

Source: Primary data processed, 2026

R^2 values are classified as weak if they are less than 0.25, moderate if they are between 0.25 and 0.50, and considerable if they are greater than 0.50 ([Hair et al., 2019](#)). The R^2 results for Actual Usage Frequency show an R^2 value of 0.510, indicating considerable explanatory value. This means that the independent variables account for around 51.0% of the variability of AUF, with other variables not included in the model affecting AUF. Furthermore, the R^2 value for intention to continue use is 0.785, indicating that the model accounts for 78.5% of the variation in users' intentions to continue using the system.

Table 10. SRMR

	SRMR
Saturated Model	0.064
Estimated Model	0.070

Source: Primary data processed, 2026

According to the findings, the estimated model yields an SRMR value of 0.070, while the saturated model provides an SRMR value of 0.064. It is evident that the structural model is regarded as having a good fit because both values are below the cut-off point of 0.08 ([Hair et al., 2019, 2017](#)). This indicates that the model and the actual data do not differ much in terms of correlations, implying that the structural model is appropriate for the observed data.

CONCLUSION

This study investigated the determinants of intention to continue use and actual usage frequency of e-wallet services by extending the Technology Acceptance Model. The results show that perceived usefulness, perceived ease of use, gamification effectiveness, trust in provider and loyalty program intensity had a positive and significant effect on intention to continue use. Intention to continue use was a significant predictor of actual usage frequency and mediated the relationships between the five antecedents and actual usage frequency. Social influence strengthened the relationship between perceived usefulness and intention to continue use but did not significantly moderate the relationship between perceived ease of use and intention to continue use. These findings fulfill the research objective demonstrating that functional value, usability, trust, engagement, and incentives influence Indonesian e-wallet continuance, and actual usage is highly dependent on intention to continue use. From a theoretical standpoint, this study contributes to the TAM literature in three ways. First, it enriches TAM by demonstrating that gamification effectiveness, trust in provider, and loyalty program intensity serve as meaningful antecedents of ICU alongside PU and PEOU, collectively explaining 78.5% of the variance in ICU ($R^2 = 0.785$). Second, it advances post-adoption research by confirming that ICU strongly predicts AUF ($\beta = 0.714$, $t = 13.425$, $p < 0.001$), establishing actual usage frequency as a distinct and important outcome beyond intention. Third, it extends Social Influence Theory by demonstrating that social influence functions as a conditional moderator: strengthening the PU-ICU relationship ($\beta = 0.087$, $p = 0.013$) but not the PEOU-ICU relationship ($\beta = 0.073$, $p = 0.067$). This suggests social influence is more effective in amplifying utilitarian value perceptions than reducing the cognitive cost of technology use among post-adoption users. E-wallet providers should focus on speed of transactions, merchant acceptance, QRIS interoperability, bill payment integration, and reliability during peak transactions to enhance perceived usefulness. They should also design loyalty programs that reward repeated practical usage, use gamification to reinforce financial routines, and communicate security features to build trust. Social influence increases usefulness, not ease of use, so marketing should emphasize social proof of tangible benefits such as faster QRIS payments, easier transfers, and wider merchant coverage. The results support Bank Indonesia's efforts to strengthen the national digital payment ecosystem through QRIS expansion and financial digitalization. Sustainable cashless payment behavior depends not only on adoption but also on continued meaningful usage. Policymakers should improve digital literacy, consumer protection, dispute resolution mechanisms, and inclusion of MSMEs and non-urban users in the QRIS ecosystem, which can enhance transaction efficiency and financial inclusion in Indonesia. This study has several limitations. Convenience sampling and the dominance of younger respondent limit generalizability, and the cross-sectional design prevents observation of behavioral change over time. Actual usage frequency was self-reported, so future studies should use transaction-log data. Future research should also consider perceived risk, satisfaction, technology readiness, financial literacy, and habit to better explain repeated e-wallet usage behavior.

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