
**Continuance Intention of Mobile Banking Applications in Indonesia:
Integrated TAM-Delone and Mclean Model**

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Abstract

This study attempts to explain the continuance intention of mobile banking applications using the integrated technology acceptance model (TAM) and Delone and Mclean's information systems success model. A total of 258 responses were collected from mobile banking users in Indonesia. PLS-SEM was used to analyze the data and test the proposed hypotheses. The results showed that perceived ease of use has a significant influence on perceived usefulness but not satisfaction. Perceived usefulness, system quality, and service quality positively influence satisfaction, but perceived security and information quality are not significant determinants of satisfaction. This study confirmed the positive effects of perceived usefulness and satisfaction toward the continued intention to use mobile banking apps. This study is one of the first to integrate two popular information system theories, specifically TAM and Delone's and Mclean's IS success models, to explain the post-adoption behavior of mobile banking users, which is still relatively under explored.

Keywords: Technology Acceptance Model, Delone and Mclean IS Success Model, Perceived Security, Continuance intention, Mobile Banking

1. Introduction

The digitalization of financial services is one of the most exciting innovations of the 21st century. The digitalization of financial services may improve the transparency, accessibility, and efficiency of conventional financial services (Pazarbasioglu et al., 2020). The banking system is one such financial service that has embraced digitalization. The Indonesian banking industry has offered various digitalized financial products in recent years to provide a faster and more personalized service for bank customers. The rapid digital transformation in the Indonesian banking industry is a response to the sudden emergence of various financial technology (fintech) platforms, such as digital banks, that are characterized by the absence of tangible offices and are only accessible through a smartphone application (Ghifari, 2022). Established banking corporations started offering their own version of mobile banking applications by means of collaboration, merger, and acquisition to counter this phenomenon, and thus mobile banking applications have become popular in Indonesia. Mobile banking transaction value in Indonesia reached a record high of Rp 3,888.09 trillion and rose by 43,76% year-on-year by the second quarter of 2022 (Walfajri, 2022). The massive increase in mobile banking transaction value and

number of users indicate the initial success of mobile banking technology; however, initial acceptance of a technology does not guarantee the technology's success in the long term. Moreover, a nation-wide survey on the usage of financial services conducted by the Ministry of Communication and Information Technology of Indonesia in collaboration with Katadata Insight Center in 2021 painted a different picture. According to the survey, only 1.7% out of 10,000 respondents are categorized as very active users, and 11.4% are regular users of mobile banking applications. Meanwhile, 15.8% of the respondents occasionally use mobile banking, and 8.2% of the respondents hardly ever use mobile banking (Mutia, 2022). This data shows that although the number of mobile banking users has rapidly increased in recent years, the frequency of mobile banking usage remains low.

The success of an information system is better indicated by its continued use than its initial acceptance (Foroughi et al., 2019). Although initial acceptance is an early indicator of success, user retention is more vital for the success of an information system because of the higher costs associated with new user acquisition than retaining existing users (Zhang et al., 2020; Bhattacharjee, 2001). While previous studies on mobile banking focused on the pre-adoption aspect of user behavior, very few studies investigated the post-adoption behavior, namely the continuance intention of mobile banking users (Poromatikul et al., 2019; Yuan et al., 2016). The Technology Acceptance Model (Davis, 1989) and the Information Systems Success Model (Delone and Mclean, 2003) are two theories that are frequently used to explain the users' continued intention to use mobile banking applications. To fill the theoretical gap, the current study integrates the Technology Acceptance Model and the Information Systems Success Model to comprehensively understand the drivers of continued intention for mobile banking applications.

2. Theoretical Background

2.1. Delone and Mclean Information Systems Success Model

Delone and Mclean's Information Systems Success Model is one of the most influential theories in the realm of information systems research. Delone and Mclean's IS Success Model proposed that the effectiveness of an information system stems from the system's quality dimensions, which may improve user satisfaction and consequently the success of the system (Geebren et al., 2020). Adopting the views of Shanon and Weaver (1949) and Mason (1978), the initial IS Success Model (Delone and Mclean, 1992) was postulated to explain the successful implementation of a new information system in the organizational context, which consists of six inter-related constructs: system quality, information quality, information systems use, user satisfaction, individual impact, and organizational impact. In this initial model, "system quality" is a measure of technical level success; "information quality" is a measure of semantic level success; "use", "user satisfaction", "individual impact", and "organizational impact" are measures of success for the effectiveness level of communication.

The original IS Success Model was criticized by several researchers for doubting the use of variables as a measure of success and having a notable focus on the product side while neglecting the service side of information systems (Seddon, 1997; Pitt et al., 1995). As a response to the criticism and suggestions from various scholars, a revised IS Success Model was

constructed by extending the original model with the service quality construct and also combining the individual and organizational impact into the net benefits construct (Delone and Mclean, 2003). The revised model suggests that the role of an information system is both as a service provider and as an information provider (Alzahrani et al., 2017).

Although the IS Success Model was initially developed to assess the success of information systems in the context of organizations, it has also been used to investigate the success of information systems based on the general IS user's point of view. The increasing proficiency of the general public in using technology has made information systems research at the individual level more common. The IS Success Model has been used to investigate continuance intention, which is a good measure of information systems success, in various fields such as internet banking (Rahi and Ghani, 2019; Al-Hattami et al., 2021), E-wallet apps (Abbasi et al., 2022; Nookhao and Chaveesuk, 2019), massive open online courses (Gu et al., 2021; Li et al., 2021), telemedicine (Rahi, 2022; Almutairi et al., 2021), and other domains.

2.2. Technology Acceptance Model

The Technology Acceptance Model (TAM) is one of the most prominent theories that has been widely used to understand the mechanism behind the adoption of a new technology. TAM is derived from the Theory of Reasoned Action (TRA) on the premise that an individual's acceptance of a new technology arises from the individual's internal beliefs, attitudes, and intentions (Turner et al., 2010). TRA explains that an individual's intention to take a certain action is a result of the individual's attitude, which is a favorable or unfavorable evaluation toward the action, and the subjective norm, which refers to social pressure (La Barbera and Ajzen, 2020). Unlike TRA, TAM does not include subjective norms in the model and focuses solely on the individual's attitudes and perceptions about the technology (Marangunić and Granić, 2014).

TAM suggests that user acceptance of a technology is most affected by the users' attitude, which is a result of perceived usefulness and ease of use in using the technology (Davis, 1989). TAM also posits that perceived ease of use is a direct antecedent of perceived usefulness in using the technology. However, TAM was later revised by Davis et al. (1989) in order to improve the model's parsimony by excluding attitude, which was found to only partially mediate the effect of perceived usefulness and perceived ease of use on behavioral intention. The Technology Acceptance Model has become a leading theory in explaining user adoption of new technologies, such as educational learning technology (Grani and Maranguni, 2019), fintech (Singh et al., 2020; Hu et al., 2019), telemedicine (Kamal et al., 2020; An et al., 2021), and other technologies.

2.3. Integrated TAM-Delone and Mclean Model

The technology acceptance model (Davis et al., 1989) and the information systems success model (Delone and Mclean, 2003) focused on different aspects of technology adoption. While TAM focuses on the beliefs of a technology user, Delone and Mclean's IS success model focuses on the quality aspects of the technology as the determinants of successful technology adoption. Using the integration of the Technology Acceptance Model (Davis et al., 1989) and the Information Systems Success Model (Delone and Mclean, 2003), this study tries to explain the

mechanism behind the continuous usage of mobile banking apps in Indonesia. An integration of several theoretical models may provide unique insight and a more complete picture of the causal relationships between constructs, which cannot be acquired from a single theory-driven model (Rahi et al., 2018). The integration of the Delone and Mclean model and TAM may provide a more complete account of the mechanism behind the continued intention of mobile banking apps because the model takes into account both the user's internal perceptions and the system's quality dimensions. The proposed model is presented in **Figure 1**.

3. Research Model and Hypotheses Development

3.1. Perceived Ease of Use

Perceived ease of use is a popular construct that comes from the Technology Acceptance Model (Davis, 1989). Perceived ease of use can be defined as the users' perception of whether using the new technology requires minimum effort (Rouibah et al., 2011; Akdim et al., 2022). TAM postulates that perceived ease of use is a significant determinant of both perceived usefulness and attitude (Maranguni and Grani, 2014). Users who perceive a technology as easy to use will have a positive attitude toward the technology. Furthermore, the technology user will only deem the technology useful if they can utilize it well with minimum effort. Past studies on mobile banking and internet banking have confirmed that perceived ease of use is a significant antecedent of perceived usefulness (Rahi et al., 2021; Raza et al., 2017). Some studies have also explored the effect of perceived ease of use on mobile banking user satisfaction. The studies demonstrated that perceived ease of use is a key factor in influencing mobile banking user satisfaction (Yin and Lin, 2022; Albashrawi and Motiwalla, 2019). Mobile banking users are more likely to be satisfied if the mobile banking apps are perceived as easy to use. This study proposes the following hypothesis based on the results of previous studies:

H1: Perceived ease of use has a positive and significant effect on mobile banking user satisfaction.

H2: Perceived ease of use has a positive and significant effect on user's perceived usefulness of mobile banking applications.

3.2. Perceived Security

The security of the information system and the user data that it stores is a critical concern in today's digital landscape. As people become increasingly dependent on technology to store and exchange information, concerns about how companies store user data have risen in recent years. This issue is particularly relevant in mobile banking applications because the application stores sensitive financial information about the users, which may have serious consequences in the event of a data breach. Users are more likely to be satisfied with mobile banking if they believe that the financial information stored in the mobile banking apps is secure. Furthermore, users will only consider mobile banking useful in their daily lives if they believe that mobile banking apps are safe to use and free from unease. The effect of perceived security on satisfaction has been shown to be positive and significant in previous studies on various technologies such as mobile banking (Susanto et al., 2016), e-commerce (Wilson et al., 2021; Tran, 2020), and mobile payments (Nan et al., 2020). Moreover, the positive and significant effect of perceived security on perceived usefulness has also been documented by several studies, such as in fintech services

(Lim et al., 2018), e-learning (Farooq et al., 2020), and cloud computing (Hassan et al., 2022). Thus, this study proposes the following hypotheses:

H3: Perceived security has a positive and significant effect on mobile banking user satisfaction.

H4: Perceived security has a positive and significant effect on perceived usefulness of mobile banking applications.

3.3. System Quality

An information system with good system quality is of utmost importance to improving customer satisfaction. System quality refers to the features and overall support that a system provides to its users (Bashiri et al., 2023). System quality is related to the performance aspects of the information system, such as functionality, ease of access, and responsiveness (elik and Ayaz, 2022; Urbach and Müller, 2012). Past studies have been inconclusive regarding the effect of system quality on the satisfaction of mobile banking users. A study by Bouhlel et al. (2023) found that system quality is a direct antecedent of satisfaction in mobile banking usage. Another study by Sharma and Sharma (2019) found that system quality is an insignificant antecedent of mobile banking user satisfaction because most of the respondents had high-end smartphones, which made the system quality of mobile banking not as important for the users. As an emerging country, many Indonesian mobile banking users do not own higher-end smartphones, and thus the system quality of mobile banking apps should still be important to improve the user experience. This study, in accordance with the Delone and Mclean IS success model, postulates the following hypothesis:

H5: System quality has a positive and significant effect on mobile banking user satisfaction.

Good system quality can also indicate the usefulness of an information system. An information system can only be considered useful if it provides a good user experience, such as a smooth user interface. Meanwhile, an information system that is lacking in quality will make the users feel frustrated and therefore deem the system useless. Past studies have observed a positive and significant effect of system quality on the perceived usefulness of information systems in the context of organizations (Trang and Tuan, 2019; Al-Okaily et al., 2021). Although the effect of system quality on perceived usefulness is commonly investigated in the context of organizational information technology, the same rationale can still be applied to mobile banking applications that are used by individual users. Accordingly, this study proposes the following hypothesis:

H6: System quality has a positive and significant effect on perceived usefulness of mobile banking applications.

3.4. Information Quality

Information quality is concerned with aspects such as accuracy, relevance, timeliness, and reliability of the information provided by an information system (Al-Okaily et al., 2020; Delone and Mclean, 2016; Seddon and Kiew, 1996). Banking customers demand Information about the latest financial products from the bank or the latest bank account transaction report on a regular basis. With the presence of mobile banking that can be accessed anytime, users can easily download important reports about their bank account in a timely and accurate manner. Some

studies found that the effect of information quality on mobile banking user satisfaction is minimal (Bouhleb et al., 2023; Damabi et al., 2018), while other studies found a significant effect of information quality on mobile banking user satisfaction (Minh et al., 2023; Tam and Oliveira, 2017). Supposedly, mobile banking customers who are informed regularly about relevant financial products and their account report will most likely be satisfied with mobile banking use. Moreover, information quality was observed as a significant antecedent of the perceived usefulness of various information systems (Kim et al., 2019; Trang and Tuan, 2019; Al-Mamary, 2019; Song et al., 2021). This study suggests the following hypothesis:

H7: Information quality has a positive and significant effect on mobile banking user satisfaction.

H8: Information quality has a positive and significant effect on perceived usefulness of mobile banking applications.

3.5. Service Quality

Service quality refers to the ability of an organization to lend support to its customers in using the information system it provides (Pour et al., 2021). The banking industry is a service-oriented industry, and mobile banking is no exception. The availability of customer service staff whenever a mobile banking user inquires about financial products or encounters difficulties is supposedly one of the main considerations in using mobile banking applications (Jun and Palacios, 2016; Lin, 2013). Although mobile banking applications are self-service applications in which users can access their bank accounts whenever and wherever they need them, not all users' needs can be satisfied by the features provided by the applications alone. As the problems and complaints are unique to each user, the presence of a real customer service staff that can resolve any problems encountered by mobile banking users is important.

While information and system quality are excellent measures of the success of an individual system, service quality is the main determinant of the overall success of information systems (Geebren et al., 2020). Previous studies in the context of internet banking and mobile banking supported the proposition that service quality is a significant driver of user satisfaction (Bouhleb et al., 2023; Al-Hattami et al., 2021; Khan and Alhumoudi, 2022). Service quality is also a proven antecedent of perceived usefulness in various information system studies (Song et al., 2021; Chen et al., 2022; Zha et al., 2015). Thus, in line with previous findings, this study proposes the following hypotheses:

H9: Service quality has a positive and significant effect on mobile banking user satisfaction.

H10: Service quality has a positive and significant effect on perceived usefulness of mobile banking applications.

3.6. Perceived Usefulness

Perceived usefulness is another construct aside from perceived ease of use that comes from the technology acceptance model. Perceived usefulness refers to the usefulness of a technology in performing a certain task (Singh and Sinha, 2020; Madan and Yadav, 2016). Perceived usefulness is the degree to which an individual perceives the technology as being able to improve

his or her performance (Rahi et al., 2021; Davis et al., 1989). Several studies on mobile banking user behavior have investigated the effect of perceived usefulness on satisfaction (Hidayat-ur-Rehman et al., 2021; Yin and Lin, 2022; Bouhleb et al., 2023). Results from previous studies show that perceived usefulness is a significant predictor of user satisfaction with mobile banking. Mobile banking users will feel more satisfied using mobile banking applications when they perceive that the application is useful for them. Based on the findings from previous studies, this study hypothesizes:

H11. Perceived usefulness has a positive and significant effect on mobile banking apps user satisfaction.

Previous studies have also investigated the role of perceived usefulness as an antecedent of continuation intention. However, the effect of perceived usefulness on mobile banking continuation intentions has been inconsistent. While some studies demonstrated a positive impact of perceived usefulness on continuance intention (Le et al., 2020; Zhou, 2014), others proposed a non-significant relationship between perceived usefulness and continuance intention to use mobile banking (Bouhleb et al., 2023; Asnakew, 2020). Although the effect of perceived usefulness on continuance intention has been inconclusive thus far, this study proposes that users only continue using mobile banking applications if they perceive that the technology is beneficial. This study proposes the following hypothesis:

H12. Perceived usefulness has a positive and significant effect on continuance intention to use mobile banking.

3.7. Satisfaction

Satisfaction is a positive feeling that emerges after the usage of information technology (Hsiao and Chen, 2022). A technology user will feel satisfied if their experience using the technology exceeds their expectations (Foroughi et al., 2023; Rust and Oliver, 1994). Satisfaction is a key construct that is postulated as the main antecedent of post-adoption behavior in various theories, such as continuance intention in the IS Continuance Model (Bhattacharjee, 2001) and net benefits in the DeLone and McLean IS Success Model (DeLone and Mclean, 2003). Past studies have confirmed the positive effect of satisfaction on continuance intention in various technologies, such as MOOCs (Lu et al., 2019; Rekha et al., 2022), internet banking (Rahi et al., 2021; Alghamdi et al., 2018; Ofori et al., 2017), and mobile banking (Poromatikul et al., 2019; Foroughi et al., 2019; Yuan et al., 2016). Backed by previous studies, this study proposes the following hypothesis:

H13. Satisfaction has a positive and significant effect on continuance intention to use mobile banking.

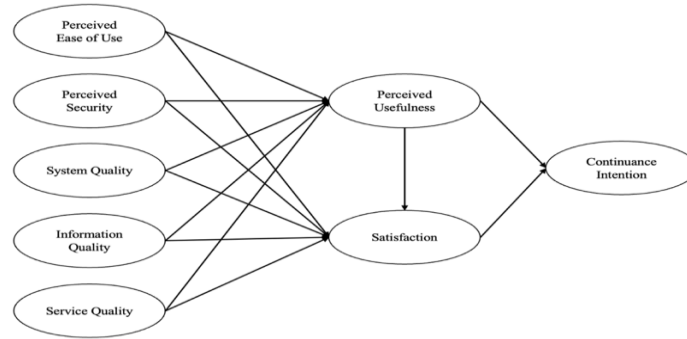


Figure 1. Research Model

4. Research Method

4.1. Research instruments

This study adopted mature measurement scales from previous studies to measure the constructs in the proposed model. The items were translated from English to Indonesian and adapted into the context of mobile banking apps. Each of the items was measured using a five-point Likert scale, ranging from (1) "Strongly Disagree" to (5) "Strongly Agree".

4.2. Data Collection

This study employed purposive sampling to gather data. Online questionnaires were distributed to active mobile banking app users all over Indonesia from March until May 2023. A total of 258 responses were collected at the end of the data collection period. This study did not exclude any potential outliers in the dataset. A detailed description of the respondents' demographics is shown in Table 1.

Table 1. Respondents' Demographics

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	124	48.1
	Female	134	51.9
Age (Years)	17-26	112	43.4
	27-42	96	37.2
	43-58	44	17.1
	> 58	6	2.3
Educational Background	High School Diploma	71	27.5
	Associate's Degree	47	18.2
	Bachelor's Degree	106	41.1
	Postgraduate Degree	34	13.2
Occupation	Student	78	30.2
	Employee	72	27.9
	Self-Employed	66	25.6
	Housewife	42	16.3

Note: N = 258

4.3. Common Method Bias

Common method bias is a bias caused by common method variance, which may lead to the artificial inflation or deflation of the relationship between constructs (Rodríguez-Ardura and Meseguer-Artola, 2020). Common method bias is likely to occur when the data for the dependent and independent variables are gathered from a single source (Chang et al., 2020). This study implemented the recommendations from Mackenzie and Podsakoff (2012) to counter common method bias. The respondents were told beforehand in the questionnaire that they were guaranteed anonymity and that there were no incorrect answers. Furthermore, this study also changed the order of the questions and separated the scale items used to measure the dependent and independent variables. This study used Harman's single-factor test through exploratory factor analysis using IBM SPSS software. This study also assessed the full collinearity variance inflation factor (VIF) of each latent construct using SmartPLS to detect common method bias. The Harman's single-factor test showed an explained variance of 27.9%, which is lower than the cut-off value of 50% as recommended by Mackenzie and Podsakoff (2012). In addition, all of the inner VIF values for each construct proposed in the research model are below the threshold value of 3.3, as recommended by Kock (2015). Thus, it can be concluded that there is no issue of common method bias in this study.

4.4. Data Analysis Approach

This study used partial least squares structural equation modeling (PLS-SEM) with the SmartPLS software to test the proposed hypothesis. PLS-SEM combines principal component analysis with OLS-regression to estimate the structural model (Mateos-Aparicio, 2011). PLS-SEM was selected as the main data analysis approach because of the complexity of the proposed model and the exploratory nature of the current study, as recommended by Hair et al. (2018).

5. Results

5.1. Assessment of Measurement Model

The measurement model was evaluated by inspecting its validity and reliability. The validity of the proposed model can be assessed mainly by its convergent and discriminant validity. There are three requirements that must be fulfilled to demonstrate that the proposed model has acceptable convergent validity. The first requirement asserts that the factor loadings of the items measuring each construct must exceed 0.6, and items below 0.6 should only be dropped if doing so may improve the composite reliability and AVE of the constructs (Chin, 1998). The second and third requirements state that the composite reliability (CR) and the average variance extracted (AVE) of each construct must be higher than 0.7 and 0.5, respectively (Foroughi et al., 2023). Four items were dropped to improve the CR and AVE of the constructs. After dropping the items with low factor loadings, all items now possess factor loadings, CR, and AVE above the recommended value. This indicates the model has sufficient convergent validity. A detailed description of the factor loadings, CR, and AVE of the constructs is depicted in **Table 2**.

Table 2. Assessment of Convergent Validity

Items	Loadings	CR	AVE	Source
Perceived Usefulness (PU)				
PU1: Mobile banking app is efficient for managing my personal finances.	0.761	0.878	0.643	Yuan <i>et al.</i> (2016)
PU2: Mobile banking app is convenient for managing my personal finances.	0.826			
PU3: Mobile banking app enables me to quickly manage my personal finances.	0.797			
PU4: Overall, mobile banking app is useful for managing my personal finances.	0.822			
Perceived Ease of Use (PEOU)				
PEOU1: It does not require a lot of effort to use mobile banking app.	0.779	0.809	0.585	Rahi <i>et al.</i> (2021)
PEOU2: The interface of the mobile banking app is clear and understandable.	0.730			Rahi <i>et al.</i> (2021)
PEOU3: It is easy for me to get the mobile banking app to do what I want it to do.	Dropped			
PEOU4: I find the mobile banking app easy to use.	0.785			
System Quality (SQ)				
SQ1: The interface of mobile banking app is well structured.	0.617	0.710	0.557	Tam and Oliveira (2017)
SQ2: Mobile banking app is easy to access.	0.856			
SQ3: Mobile banking app offers convenient access whenever I need it.	Dropped			
Information Quality (IQ)				
IQ1: The information provided by mobile banking app is useful for me.	Dropped	0.812	0.520	Tam and Oliveira (2017)
IQ2: The information provided by mobile banking app is understandable.	0.727			
IQ3: The information provided by mobile banking app is interesting.	0.638			
IQ4: The information provided by mobile banking app is reliable.	0.775			
IQ5: The information provided by mobile banking app is up-to-date.	0.738			
Service Quality (SERV)				
SERV1: The customer service personnel are always willing to help whenever I need support with mobile banking usage.	0.698	0.827	0.546	Tam and Oliveira (2017)
SERV2: The customer service personnel provide personal attention when I experience problems using mobile banking app.	0.764			
SERV3: The customer service personnel provide	0.771			

services related to the mobile banking app on time.
SERV4: The customer service personnel are knowledgeable to answer my questions regarding mobile banking app. 0.719

Perceived Security (PS)

PS1: I think mobile banking app ensures the safe transmission of its users' information. 0.729 0.839 0.546 Susanto *et al.* (2016)

PS2: I feel secure to perform transactions using mobile banking app. 0.828

PS3: Overall, mobile banking app is a safe channel to transmit sensitive information. 0.828

Satisfaction (SAT)

SAT1: I think that I made the correct decision to use mobile banking app. 0.641 0.782 0.547 Lee and Chung (2009)

SAT2: I am satisfied with the way mobile banking app carried out transactions. Dropped

SAT3: I am satisfied with the service I have received from mobile banking app. 0.781

SAT4: Overall, I am satisfied with mobile banking app. 0.788

Continuance Intention (CI)

CI1: I want to continue using mobile banking app in the future. 0.660 0.775 0.535 Poromatikul *et al.* (2019)

CI2: My intention is to continue using mobile banking app rather than any alternative means. 0.775

CI3: I am willing to recommend mobile banking app to friends, neighbors, and relatives. 0.755

Notes: CR = Composite Reliability; AVE = Average Variance Extracted

This study used the Fornell-Larcker criterion to measure discriminant validity. The Fornell-Larcker criterion suggests that the square root of the AVE of each construct must be higher than the correlation coefficient with other constructs for a model to have satisfactory discriminant validity (Fornell and Larcker, 1981). Table 3 shows that this study fulfilled the requirement for discriminant validity.

Table 3. Assessment of Discriminant Validity

	CI	IQ	PEOU	PU	SAT	PS	SERV	SQ
CI	0.732							
IQ	0.572	0.721						
PEOU	0.460	0.580	0.765					
PU	0.543	0.635	0.474	0.802				
SAT	0.485	0.584	0.478	0.612	0.740			
PS	0.417	0.621	0.327	0.598	0.511	0.797		
SERV	0.470	0.599	0.474	0.554	0.527	0.490	0.739	
SQ	0.309	0.296	0.279	0.348	0.418	0.264	0.271	0.746

Notes: Continuance Intention (CI), Information Quality (IQ), Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Satisfaction (SAT), Perceived Security (PS), Service Quality (SERV), System Quality (SQ)

5.2. Assessment of Structural Model

5.2.1. Hypothesis Testing

This study used the bootstrapping method with 5,000 subsamples to test the proposed hypotheses using the SmartPLS software. The assessment of the structural model included various measures such as the path coefficient (β), t-value, p-value, coefficient of determination (R^2), and predictive relevance (Q^2). This study assumes a confidence level of 95%. Thus, a hypothesis is accepted only if the p-value is lower than 0.05 and the t-value is larger than 1.96. The full results of the structural model assessment are presented in Table 4.

Table 4. Hypothesis Testing

Hypothesis	Relationship	Path Coefficient (β)	t-statistics	p-values	Decision
H1	PEOU \rightarrow SAT	0.118	1.775	0.079	Rejected
H2	PEOU \rightarrow PU	0.121	1.980	0.048	Accepted
H3	PS \rightarrow SAT	0.112	1.881	0.060	Rejected
H4	PS \rightarrow PU	0.288	3.933	0.000	Accepted
H5	SQ \rightarrow SAT	0.186	3.638	0.000	Accepted
H6	SQ \rightarrow PU	0.118	2.223	0.026	Accepted
H7	IQ \rightarrow SAT	0.148	1.949	0.051	Rejected
H8	IQ \rightarrow PU	0.245	3.265	0.001	Accepted
H9	SERV \rightarrow SAT	0.135	2.237	0.025	Accepted
H10	SERV \rightarrow PU	0.176	2.303	0.021	Accepted
H11	PU \rightarrow SAT	0.256	4.127	0.000	Accepted
H12	PU \rightarrow CI	0.394	4.572	0.000	Accepted
H13	SAT \rightarrow CI	0.244	2.980	0.003	Accepted

A total of three hypotheses were rejected. The results of the hypothesis testing showed that the effects of perceived ease of use on satisfaction ($\beta = 0.118$, t-value = 1.775, p-value = 0.079) were

not significant, thus hypothesis H1 was rejected. However, the effect of perceived ease of use on perceived usefulness was confirmed, hence H2 was accepted ($\beta = 0.121$, $t\text{-value} = 1.980$, $p\text{-value} = 0.048$). The relationship between perceived security and satisfaction was insignificant ($\beta = 0.112$, $t\text{-value} = 1.881$, $p\text{-value} = 0.060$), thus rejecting the hypothesis H3. However, the effect of perceived security on perceived usefulness was shown to be significant ($\beta = 0.288$, $t\text{-value} = 3.933$, $p\text{-value} = 0.000$), hence hypothesis H4 was confirmed. System quality was confirmed to have a significant influence on both satisfaction ($\beta = 0.186$, $t\text{-value} = 3.638$, $p\text{-value} = 0.000$) and perceived usefulness ($\beta = 0.118$, $t\text{-value} = 2.223$, $p\text{-value} = 0.026$), thus hypotheses H5 and H6 were accepted.

Information quality was demonstrated to have a significant influence on perceived usefulness ($\beta = 0.245$, $t\text{-value} = 3.265$, $p\text{-value} = 0.001$) but not on satisfaction ($\beta = 0.148$, $t\text{-value} = 1.949$, $p\text{-value} = 0.051$); hence, hypothesis H7 was rejected and hypothesis H8 was accepted. Service quality was shown to be a significant predictor of satisfaction and perceived usefulness ($\beta = 0.135$, $t\text{-value} = 2.237$, $p\text{-value} = 0.025$, and $\beta = 0.176$, $t\text{-value} = 2.303$, $p\text{-value} = 0.021$), which confirmed Hypotheses H9 and H10. As hypothesized, perceived usefulness had a significant effect on satisfaction ($\beta = 0.256$, $t\text{-value} = 4.127$, $p\text{-value} = 0.000$) and continuance intention ($\beta = 0.394$, $t\text{-value} = 4.572$, $p\text{-value} = 0.000$), thus hypotheses H11 and H12 were accepted. Lastly, hypothesis H13, which postulated a significant effect of satisfaction on continuance intention, was confirmed ($\beta = 0.244$, $t\text{-value} = 2.980$, $p\text{-value} = 0.003$).

5.2.2. Coefficient of Determination and Predictive Relevance

There were three main endogenous variables in the proposed model: perceived usefulness, satisfaction, and continuation intention. The explained variances of perceived usefulness, satisfaction, and continuance intention were 52.4%, 50.6%, and 33.2%, respectively. Additionally, the Q2 values of all dependent variables were greater than 0, which means that the model has satisfactory predictive relevance, as shown in Table 5.

Table 5. Coefficient of Determination and Predictive Relevance of the Model

Constructs	R ²	Adjusted R ²	Q ²
Perceived Usefulness	0.524	0.515	0.324
Satisfaction	0.506	0.494	0.262
Continuance Intention	0.332	0.327	0.165

6. Discussion

This study tries to integrate two models, mainly the technology acceptance model and the IS success model, to explain the user's continued intention to use mobile banking applications in Indonesia. An integrative model can produce a more complete view of the causal mechanisms behind the observed phenomenon, which cannot be achieved by a single theory (Rahi et al., 2021). This study reveals that perceived ease of use is an important indicator of perceived usefulness toward mobile banking apps, which is consistent with the findings from Rahi et al. (2021) and Raza et al. (2017). Nevertheless, this study also shows that the effect of perceived use toward satisfaction is not significant, which is in contrast to the findings by Yin and Lin (2022)

and Albashrawi and Motiwalla (2019). These findings might be caused by several reasons. Firstly, the study collected data from users that are already using mobile banking applications, which means that they are already familiar with the interface of the applications. Previous studies have found that pre-usage variables such as perceived ease of use might not be as relevant in post-usage scenarios (Foroughi et al., 2019; Gilani et al., 2017; Lin, 2011). Subsequently, users who are already familiar with the mobile banking application's interface might perceive the ease of use of the app as useful, but this does not directly contribute to their satisfaction with the app.

This study reveals that perceived security is not a significant antecedent of satisfaction. This result is in contrast with the findings from past studies, which found that perceived security is an important predictor of user satisfaction with various information systems (Susanto et al., 2016; Wilson et al., 2021; Tran, 2020; Nan et al., 2020). However, this study also displays that perceived security has a significant influence on the perceived usefulness of mobile banking apps, which supports the findings of Lim et al. (2018), Farooq et al. (2020), and Hassan et al. (2022). These results imply that mobile banking users perceive the security of the mobile banking app as useful for them, but it is not the factor that makes them feel satisfied.

This study attempts to explore the effect of the IS success model, which comprises system quality, information quality, and service quality, on the perceived usefulness and user satisfaction of mobile banking apps. The system quality of the mobile banking app has a significant influence on user satisfaction, in line with the results of the studies by Bouhlel et al. (2023) and Delone and Mclean (2003). Moreover, the result shows that system quality is also an important driver of the perceived usefulness of mobile banking apps, confirming the results of Trang and Tuan (2019) and Al-Okaily et al. (2021). The findings suggest that system quality dimensions, such as ease of access and system responsiveness, may make users feel that the mobile banking app is useful for daily use. Also, if the mobile banking app has good system quality, the user will be more satisfied with the use of mobile banking. In accordance with previous findings, the study presented that service quality has a significant effect on satisfaction (Bouhlel et al., 2023; Al-Hattami et al., 2021) and perceived usefulness (Song et al., 2021; Chen et al., 2022). This means that although mobile banking can be categorized as a self-service application, mobile banking users in Indonesia still prefer the presence of a customer service staff in case of trouble or when they are interested in finding out about certain financial products that the banks offer. The involvement of the customer service staff in the context of mobile banking is still relevant, as the mobile banking application is limited in its features and not all problems can be solved through the application alone. The last IS success model construct, information quality, is confirmed to have a significant effect on perception, as suggested by Song et al. (2021) and Kim et al. (2019). Nevertheless, the effect of information quality on satisfaction is not significant based on the result of this study, which is not consistent with the findings of Minh et al. (2023) and Tam and Oliveira (2017). The result can be inferred that although information quality is regarded as useful in the usage of mobile banking apps, good information quality does not necessarily make users feel satisfied with the app. This might mean that information quality is an expected feature that all mobile banking apps in Indonesia already offer and thus may not be as relevant in improving user satisfaction.

In line with Yin and Lin (2022) and Bouhlef et al. (2023), this study demonstrates that perceived usefulness is a significant predictor of user satisfaction. In addition, the study suggests that perceived usefulness is a direct antecedent of continuance intention, in line with previous findings (Le et al., 2020; Zhou, 2014). Lastly, the effect of satisfaction toward continuance intention is confirmed as significant in accordance with the findings of Poromatikul et al. (2019) and Foroughi et al. (2019). Surprisingly, based on the path coefficient S , perceived usefulness is the more important predictor of continuation intention than user satisfaction. This result is in contrast with various established information systems adoption theories, such as the expectation-confirmation model (Bhattacharjee, 2001) and the IS success model (Delone and Mclean, 2003). It turns out that user satisfaction is not enough to improve continuance intention. Users are more likely to continue using mobile banking apps because of the perceived benefits of the application itself than because of user satisfaction.

7. Theoretical and Managerial Implications

There are several contributions that this study offers to the literature on information systems research. Firstly, this study integrates the Delone and Mclean IS success model with the Technology Acceptance Model to explain continuance intention in the context of mobile banking, thus enriching the literature on post-adoption behavior of information systems. Secondly, the combined TAM-Delone and Mclean model is able to explain 52.4% of the perceived usefulness variable and 50.6% of the satisfaction variable, which means that the model has considerably good predictive power.

The empirical findings of this study can help the mobile banking industry in a multitude of ways. Based on the results of this study, it can be concluded that the perceived ease of use, information quality, system quality, service quality, and data security are important drivers of the usefulness of mobile banking apps for users. More importantly, albeit the information quality and perceived security of mobile banking apps do not make users feel satisfied, information quality and perceived security are still important antecedents of perceived usefulness, which is an important antecedent of user satisfaction. Interestingly, mobile banking users in Indonesia are more likely to continue to use the application not because they are satisfied with the app but because they are more driven by the usefulness of the application itself for their regular use. Thus, the software development team for the mobile banking app must always ensure that the app is responsive, delivers up-to-date information, provides assistance whenever the user encounters problems, and prioritizes the security of user data to enhance the perceived usefulness of the app.

8. Limitations and Future Research

There are several limitations in this study. The sample size of this study is relatively small, while the model is considerably complex. Thus, future studies can incorporate a larger sample size to explain mobile banking continuance intention using the integrated TAM-Delone and Mclean models. Although this study tries to explain the continuance intention of mobile banking users with the integrated TAM-Delone and Mclean model, the model can only explain 33.2% of the variance of mobile banking user continuance intention. This means that perceived usefulness and satisfaction can only explain 33.2% of mobile banking continuation intentions. This implies that there are other variables that are also relevant in influencing the user's continuation intention.

Future research can explore the effects of variables such as IT identity, perceived value, and trust on the continuance intentions of mobile banking users. Also, future studies can use a qualitative approach to further explore the antecedents of mobile banking user continuance intention because there may be important factors that may motivate users to continue using mobile banking apps that have not yet been tested with a quantitative approach.

9. Conclusion

In short, this study is one of the first attempts to investigate the causal mechanisms underlying the continued intention of mobile banking users using the integrated TAM-Delone and Mclean models. The results of this study showed that a total of three out of 13 hypotheses were rejected. The results revealed that perceived usefulness and user satisfaction are key determinants of continued intention to use mobile banking apps; however, perceived usefulness has a stronger influence on continuance intention than satisfaction. Moreover, both perceived usefulness and user satisfaction are driven by service quality and system quality. Meanwhile, perceived security and information quality only influence perceived usefulness, not user satisfaction. Perceived ease of use is an antecedent of perceived usefulness but not an antecedent of user satisfaction. The findings of this study contribute to the literature on post-adoption information systems. The result of this study is also beneficial for the mobile banking industry to formulate strategies that may improve user satisfaction and encourage continuous usage of mobile banking applications.

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