

The role of perceived security and social influence on the usage behavior of digital banking services: An extension of the technology acceptance model

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Abstract: The goal of this research is to identify the variables influencing individual commercial bank customers' intentions to use digital banking services. Digital banking is a relatively emerging research context that helps to complement and clarify marketing structures more clearly when combined with different factors to reflect convenience, usefulness, and distinct digital experiences for customers, thereby enhancing brand value for banks. Collecting data from 400 customers of banks in Vietnam is done through an online survey to ensure safety during the epidemic season. Data are analyzed according to the procedure from Cronbach's Alpha test, EFA to CFA, and tested by the SEM model. The results show that the perceived security factor has the most substantial influence on customers' behavioral intentions, thereby driving their actual behavior. Additionally, the usefulness, simplicity, and social influence of behavioral intentions for digital banking services all stimulate customer behavior. In the digital environment, this study suggests that following social phenomena and ensuring customer information security and transactions are extremely important. The results lead to shaping a culture-technology acceptance model based on TAM. That provides important insights and implications for the theoretical underpinnings of security perception, social influence, and usage behavior, such as how they are formed, roles, and relationships interrelationships between them in the digital environment.

Keywords: Digital banking, Perceived security, Social influence, Usage behavior, Usage intention, Usefulness.

1. Introduction

Digital technology has been and is becoming a hot topic not only in business and life but also in academic research by famous researchers such as [1, 2]. The fourth industrial revolution (Industry 4.0) with the combination of digital technology has had a great impact on the banking sector [3] hotels [4] and tourism [5]. In particular, in the banking sector, technology has been developed and applied, and in the banking sector in various forms, it is gradually replacing the traditional form. According to a portal and communication report of December 2022, up to 47% of users choose to use modern payment methods. Digital banking services bring convenience to customers because they can perform financial transactions and activities anywhere or at home [6]. According to a survey by McKinsey in Vietnam, 50% of respondents said they are ready to use new financial technologies, especially digital payments. The development of IT will help banks to serve customers more effectively and is an important component of the bank's services and competitiveness [7]. Moreover, the convenience brought by digital banking is making it popular, thus encouraging banks to provide a safe and efficient banking system to their loyal customers [8].

This study aims to investigate the factors affecting the behavior of customers using digital banking services. In this field, many studies in foreign countries have identified the relationship between the factors affecting the intention and behavior of using digital banking services, such as the studies of Solarz and Swacha-Lech [9]; Baber [10]; Suryanto and Dai [11] and Kou, et al. [12]. However,

according to Hanel, et al. [13] despite cultural globalization, cultural differences between countries can lead to marked differences in behavior. Therefore, the causal relationship between the proposed variables needs to be further studied in different cultural contexts (e.g., Vietnam). In Vietnam, a number of studies have investigated the factors affecting the intention to use online banking services, such as the study of Phuc and Nguyen [14] and Okorie, et al. [1]. In general, the studies in Vietnam mainly set standards in digital banking, focusing on developing the number of users and analyzing the intention to use the service. The behavioral aspect of using digital banking services is still limited in the ability to reach customers; the studies mainly focus on big cities in Vietnam. This study is aimed at individuals who are using and have real experience with digital banking services in order to find out the main factors affecting behavior through the intention to use digital banking services.

The State Bank's payment department reported that as of the conclusion of the third quarter in 2022, there were approximately 110,920 individual accounts, holding an accumulated balance of roughly 915.1 billion VND (The Vietnamese Dong). Moreover, the count of domestic cards issued stood at 112.69 million, alongside 32.49 million international cards. The advancement of Internet banking and mobile banking was notable, with Internet banking transactions totaling 8,44,405 billion VND and mobile banking transactions reaching 4,993,449 billion VND. This indicates a rise in the usage of digital banking services by customers. Based on the previously discussed research gap, this study aims to explore two key inquiries: (1) What are the factors that impact the adoption of digital banking services in commercial banks? (2) To what extent do these factors shape the adoption of digital banking services in commercial banks? Conducted in Vietnam, this study aims to uncover how variations in research contexts can impact outcomes.

2. Literature Review

2.1. Theory of Planned Behavior TPB

Ajzen and Fishbein proposed the Theory of Reasoned Action (TRA), upon which Ajzen later developed and honed the Theory of Planned Behavior (TPB) [15]. TPB holds considerable recognition within psychosocial research as a pivotal theory for predicting human behavior [16]. This theory delineates three primary factors that impact the intention to engage in a behavior:

Attitude: This is an individual's positive or negative evaluation of a behavior's performance. Attitudes reflect an individual's beliefs and judgments about the consequences of behavior and its values. **Subjective norms (social influence)** can be understood as the pressure that individuals perceive from others in performing or not performing a behavior. Subjective norms include social expectations and evaluations regarding whether an individual should or should not engage in that behavior. For instance, parents who have had negative experiences with digital banking services might create pressure and obstacles for their friends and family members who intend to use the service. **Perceived behavioral control** refers to an individual's perception of the ease or difficulty of performing a behavior. It involves their confidence in controlling and executing a behavior, considering the availability of resources and opportunities to engage in it. These concepts are central to TAM (Technology Acceptance Model) and UTAUT (Unified Technology Use and Acceptance Model).

In Venkatesh and Davis [17] developed TAM, which is widely known as TAM2 [17]. This model explains and predicts the behavior of information technology users based on two important factors: perceived usefulness and perceived ease of use. **Perceived Usefulness:** This is an important factor in TAM2. It refers to users' assessments of the extent to which information technology can provide benefits and help improve work performance. **Perceived ease of use:** This factor relates to users' assessment of the ease of use of information technology. **Perceived ease of use** measures the extent to which users feel using information technology is easy, convenient, and hassle-free.

2.2. Customer Behavior

Customer behavior reflects the totality of customer decisions regarding the acquisition, consumption, and disposal of goods, including products, services, activities, and ideas [18]. Besides, the concept of customer behavior can be considered as (1) human actions before, during, and after shopping and consuming; (2) customer behavior is influenced by environmental factors and (3) consumption behavior also has an adverse effect on the environment [19] or is an observable response of an individual in a given situation to a certain situation [20]. In this study, usage behavior is the specific behavior of customers when using digital banking services and can be formed by service usage frequency after considering security and usefulness factors of digital services.

2.3. Hypotheses and Research Models

2.3.1. Perceived Usefulness (PU)

Following the original TAM model, perceived usefulness has been applied to various IT domains used to measure work, life, and learning performance [21]. Perceived usefulness is defined as the degree of confidence that using a particular topic can benefit those using it in services [22]. In the context of digital banking, perceived usefulness should be defined as the service's ability to meet customer needs and wants, provide value and benefit to customers, and solve financial-related issues. It is an important factor in increasing the sales of a business [23].

Research has shown that perceived usefulness significantly impacts the intention to use digital banking services in various contexts. For example, Rauniar, et al. [24] found that students' perceptions of Facebook's usefulness influenced their intention to use the platform. Similarly, a study conducted in Danang in a tourism context revealed that perceived usefulness positively impacted the intention to use the service [25]. The studies reveal that customers are more likely to use digital services if they perceive the benefits and efficiency of using them, regardless of the context. In other words, the usefulness of a system is directly proportional to the intention to use it. Therefore, it is crucial to assess the relationship between perceived usefulness and behavioral intention to use digital banking services to ensure customers feel effective when using them. Based on the consulted theory and related studies, the author proposes the following hypothesis as the first step:

H₁: Perceived usefulness has a positive impact on the usage intention of digital banking services.

2.3.2. Perceived Ease of Use (PE)

Perceived ease of use is the ability of a product or service to be used easily and effectively by users without having to invest too much time, effort, or resources in learning how to use it." [26]. Besides, perceived ease of use is understood as the simplicity and ease of a product or service in using, providing information, and solving needs [27]. In this study, perceived ease of use is the degree to which users rate a digital banking system as having ease of use and flexibility without encountering problems in use.

Perceived ease of use of the system helps to reduce the customer's effort in using the application [28] and helps businesses enhance customer experience and satisfaction with their products or services [29].

Previous studies have shown that perceived ease of use has a positive impact on the usage intention of digital services. In the education landscape, digital banking is becoming an important part of students' learning experiences and financial management. When students find that the mobile banking application is easy to use, has a friendly interface, and has clear features, they tend to be more willing to use mobile banking to manage their finances [30]. Types of e-banking services have applications that are easily compatible with devices, easy to register, and simple user interfaces that are easy to attract customers to use [31]. Research in Malaysia shows a positive relationship between these two factors; perceived system ease of use is the most important predictor and independent variable that increases service usability [32]. Mobile banking applications are easy to use, have a friendly interface, and have clear features, they tend to be willing to use mobile banking services for financial management [33]. This shows that perceived ease of use plays an important role in motivating the intention to use digital

banking services. Based on the theory that the author has consulted and related studies, the author makes the first hypothesis as follows:

H₁: Perceived ease of use has a positive impact on usage intention of digital banking services.

2.3.3. Perceived Security (PS)

Perceived Security is defined as the subjective ability of users to believe that their personal information will not be illegally accessed, stored, or manipulated by others [34]. It also encompasses the degree of trust in a technology or system to transmit sensitive information without any breach or leakage [35]. Security concerns remain at the forefront of customer worries when using online banking and e-commerce platforms [36]. As information technology continues to develop, users perceive digital payment systems as not being secure enough because they can be hacked [37, 38]. Besides, awareness helps improve the corporate image [39].

Several studies have shown that Perceived Security has a positive relationship with willingness to use services. For instance, research by Liébana-Cabanillas, et al. and Alalwan, et al. indicates that customers who trust the security of their data are more likely to use mobile banking services [40, 41]. In a similar vein, Nguyen and Le's study reveals that users who place a high value on information security are more likely to accept and use these services [42]. In this study context, where digital banking is rapidly developing, perceived security is defined as the subjective ability of users to trust that their personal information and financial transactions will not be leaked. Based on the above discussion, the following hypothesis is suggested:

H₂: Perceived Security has a positive impact on the usage intention of digital banking services.

2.3.4. Social Influence (SI)

Social influence is defined as the degree to which individuals believe that important and influential people should use new technology [43]. Is the power of those around us to influence or change our behavior, thoughts, and feelings [44]. Social influence in this study is understood as the influence of important and influential people in promoting the use of digital banking services. Social influence plays an important role in building brand reputation and enhancing customer trust in the business [45]. Research by Berenguer-Contrí, et al. [46] indicates that building good relationships with customers through social influence can play an important role in improving business performance and enhancing competition and the enterprise picture. In addition, Imran, et al. [47] mentioned that social influence can play an important role in creating a positive working environment and enhancing employees' contribution to the business.

There have been many studies related to the relationship between social influence and the intention to use digital banking services in different contexts. Research by Tran, et al. [48] in Vietnam shows that the recommendations and reviews posted on the internet by people who have used online banking are considered. More importantly, people who are passionate about social networking are more likely to use online banking. At the same time, Dinh, et al. [49] indicate this positive relationship in the context of tourism. This study has shown that travel customers are more likely to use digital banking services if they feel the support of their loved ones, friends, or community. However, in the educational context, research by Nguyen, et al. [26] and Nguyen and Le [42] in Vietnam has shown that the influence of society on the intention to use digital banking services is very small. It can be seen that in different contexts, the influencing factors of society on the intention to use digital banking services are very diverse and depend on each specific case, so this article will evaluate the influence of society on the intention to use digital banking services in the context of commercial banking.

H₃: Social influence has a positive effect on the usage intention of digital banking services.

2.3.5. Brand Image (BI)

Brand image refers to the series of activities associated with a brand that are stored in the mind of the customer [50] and how they interpret its characteristics [51]. A well-communicated image can

protect a brand from competition and establish its position in the market [52]. This research specifically employs the term "brand image" to signify the customer's perception and trust in a bank's identity rooted in its service offerings.

In a harshly competitive environment, brand image is very important. A positive and strong brand image can help increase credibility, increase customer acquisition, and differentiate it from competitors [53]. Besides, a positive brand will help increase customer loyalty to the business [54].

The relationship between brand image and intention to use banking services has been the subject of a few recent studies, all of which have demonstrated that, depending on the situation, brand image positively influences intention to use digital banking services. Research by Amin and Khairil [55] in Malaysia has shown this positive relationship in the context of tourism. When a brand's image is appreciated, customers tend to use that service. This is consistent with the studies of Alalwan, et al. [41] and Nguyen and Le [42]. Research by Hsieh, et al. [56] in Taiwan showed that brand image has a positive relationship with the intention to use digital banking services in education. As educational institutions build a trustworthy and professional image and provide convenient and secure digital banking, students and parents tend to use that service for financial management and transactions.

Building a strong brand image requires banks to be innovative and responsive to customers' needs and preferences. A well-established brand image associated with reliability, high-quality service, and excellent customer support tends to increase the likelihood of customers choosing digital banking services. Drawing from the preceding discussion, this research proposes the following hypothesis:

H₂: Brand image has a positive influence on usage intention of digital banking services.

2.3.6. Usage Intention (IU)

In the theory of technology adoption and use (UTAUT), intention to use is a strong and positive predictor of technology use behavior [23]. Usage intention is defined as an individual's desired power to perform a behavior [57]. Is the degree to which a person forms conscious plans to do or not perform some particular task in the future [58]. In this study, usage intention is an individual's willingness to use and continue to use a technology system, where individuals are technology users and the context is digital banking.

Customer intention research provides an important foundation for forecasting the actual behavior of a particular action [59, 60]. Therefore, the study and consideration of customer behavior and choices in choosing products and services is an important issue in marketing strategies. Intention turns into behavior if the individual has a positive evaluation of the performance of the behavior. The stronger the intention towards a given behavior, the stronger an individual's decision to accept that behavior [61].

Moreover, in previous studies on mobile banking, intention to use was identified as a direct agent and a strong influence on usage behavior Huy and Maduku [62]. Liang and Xue [63] study in the context of online transactions explored the factors affecting the intention to reuse online services and analyzed the relationship between intention and actual behavior. Research by Alalwan, et al. [41] examined the relationship between intention to use mobile banking services and usage behavior. Both studies show that higher service intentions tend to lead to increased and more frequent use of online banking.

The intention is seen as an important factor in predicting and explaining digital banking usage behavior and in developing strategies and policies to encourage effective use. Usage intention represents the level of trust and loyalty of customers in the business. If customers have long-term intentions, businesses can build trust and loyalty, increase customer retention, and generate sustainable profits. Therefore, the following hypothesis is proposed:

H₃: Usage intention has a positive impact on the usage behavior of digital banking services.

Therefore, based on the preceding discussion, the integrated conceptual framework was formulated and is depicted in Figure 1.

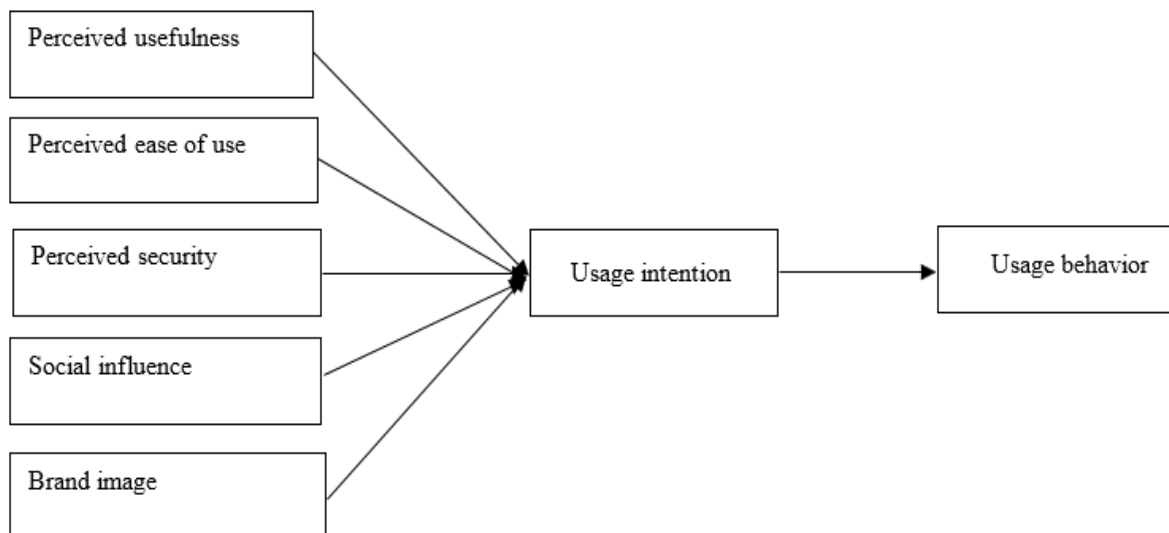


Figure 1.
Proposed research model.

3. Methodology

3.1. Objectives of the Research

Digital banking is a relatively emerging research context that complements and demystifies marketing structures more clearly when combined with different factors to reflect convenience, usefulness, and differentiated experiences for customers [64], thereby enhancing brand value for banks. The danger of online theft organizations requires banks to pay more and more attention to the security of information and transactions for customers. The globalization of the economy, politics, technology, and culture presents many opportunities as well as challenges for banks. The shift in consumer opinion brought about by social influence is a significant problem that banks have to adjust to. However, understanding how social influence is defined and how it affects user behavior seems unclear in the context of the banking industry and even ignored in the context of digital banking in Vietnam. It is therefore essential to conduct a study that can achieve the following purposes:

1. Provide a specific definition of Perceived Security and social influence in the digital banking context.
2. Exploring the influence of Perceived Security and social influence on behavior in the context of digital banking in Vietnam.
3. What solutions are proposed for effective digital banking services?

3.2. Model

This study was conducted mainly at commercial banks in Vietnam. The survey subjects are customers who are using digital banking services provided by banks, with a total of 400 participants. The information collection tool is a complete questionnaire containing 28 questions built on previous studies. Using a five-point Likert scale, customers were asked to answer all questions by indicating their degree of agreement (from completely disagreeing to completely agreeing). The data was collected at the end of 2022.

3.3. Methods

Data collected for the study will undergo processing through various statistical software programs like SPSS, AMOS, and Excel. To begin with, Cronbach's Alpha scale was employed to test the data's reliability. EFA analysis was then used to reduce the data. CFA was performed to confirm the accuracy

of the measurement model against actual data, and SEM was utilized to evaluate the multidimensional relationship between the variables in the model [65].

3.4. Measures

Previous studies support the development of a scale of factors influencing the behavior of using digital banking services: perceived usefulness [66-68] perceived ease of use [66] Perceived Security [66], social influence [69], brand image [64], intention to use [70], use behavior [71].

4. Results

4.1. Profile of Respondents

There are 168 customers who are male (42%) and 232 customers who are female (equivalent to 58%). The customer group from 16 to 25 years old has 62 customers (equivalent to 15.5%). The customer group from 25 to 45 years old has 285 people (accounting for 71.3%), young enough to update new trends and be financially independent. The remaining group of customers over 45 years old has the highest ability to be financially independent, and they are also likely to be up to date with technology and trends, although not as much as the previous groups. Regarding occupation, there are 278 survey participants (accounting for 69.5%) who are working; the remaining 122 people are mainly students (30.5%). In terms of monthly income, the group of individual customers under 5 million has 63 people, accounting for 15.8%; there are 256 customers with incomes from 5 to under 15 million, accounting for 64%; and the group of customers over 15 million accounts for 20.7%.

4.2. Reliability and Validity of Measurement

To ensure scale reliability, Cronbach's Alpha coefficient was used for 5 independent variable scales, 1 intermediate scale, and 1 dependent variable scale [72]. All scales had a Cronbach's Alpha coefficient greater than 0.6, and no scale had a Cronbach's Alpha if Item Deleted greater than the coefficient of Cronbach's Alpha [73]. Therefore, all observed variables are accepted and will be used for exploratory factor analysis (EFA).

According to the analysis results, the Bartlett test yielded a sig. value of 0.000, which is less than the threshold of 0.05. This suggests that there is a significant correlation between the observed variables in the factor analysis. Additionally, the KMO (Kaiser-Meyer-Olkin) coefficient measure was 0.933, indicating that the factor analysis is consistent with the research data [74]. The EFA analysis resulted in seven components with a cumulative coefficient of 67.062%, indicating that the seven factors explain 67.062% of the data variation. To qualify, all factor eigenvalues were greater than 1 [74]. In the factor rotation matrix table, all variables had a factor loading greater than 0.5. This means that the factor analysis grouped the 28 variables into seven factors, as per the original theoretical model. Additionally, all variables only loaded a single factor, which is indicative of satisfactory factor analysis. Therefore, all scales used for the variables in the model meet the requirements and can be used in the subsequent analysis.

Besides, convergent and discriminant validity helps examine the validity of measures. Factor loading and the average variance extracted (AVE) values served to estimate convergent validity. As shown in Table 1, all the construct's factor loadings and AVE values were higher than the suggested value (0.50) by Hair, et al. [73]. Additionally, based on criteria proposed by Hu and Bentler [75], the CFA results revealed that all fit indices of the measurement model were within the recommended level. Specifically, Chi-square/df = 2.029, CFI (comparative fit index) = 0.938, TLI (Tucker-Lewis index) = 0.929, and RMSEA (root mean square error of approximation) = 0.051. This outcome implies that an adequate fit between the measurement model and its observed data has been proven.

To establish the meaning of a measure, it is important to establish discriminant validation, as suggested by Heeler and Ray [76]. Campbell [77] proposed that discriminant validity can be achieved by ensuring that a measure is not highly correlated with another or by comparing the AVE values for each construct and the r^2 value, which represents the squared correlation between two constructs.

Fornell and Larcker [72] also suggest that discriminant validity is accepted when the r^2 value is lower than the AVE value of each construct. Table 2 shows support for the discriminant validity of the model constructs.

Table 1.
CFAs' results within the five latent factors.

Component	Estimate	S.E.	C.R.	P	CR	AVE
UB2 <--- UB	0.797				0.853	0.594
UB3 <--- UB	0.810	0.069	16.713	***		
UB4 <--- UB	0.794	0.064	16.372	***		
UB1 <--- UB	0.674	0.063	13.579	***		
SI3 <--- SI	0.787				0.836	0.561
SI2 <--- SI	0.816	0.063	16.109	***		
SI1 <--- SI	0.715	0.063	14.108	***		
SI4 <--- SI	0.670	0.065	13.140	***		
PE2 <--- PE	0.740				0.851	0.589
PE3 <--- PE	0.796	0.069	15.294	***		
PE4 <--- PE	0.767	0.070	14.724	***		
PE1 <--- PE	0.766	0.071	14.709	***		
PU3 <--- PU	0.807				0.839	0.567
PU1 <--- PU	0.772	0.055	16.086	***		
PU2 <--- PU	0.728	0.056	15.014	***		
PU4 <--- PU	0.701	0.051	14.353	***		
PS1 <--- PS	0.756				0.812	0.519
PS2 <--- PS	0.710	0.064	13.799	***		
PS4 <--- PS	0.751	0.071	14.644	***		
PS3 <--- PS	0.817	0.075	15.942	***		
BI3 <--- BI	0.769				0.845	0.577
BI2 <--- BI	0.691	0.061	13.177	***		
BI4 <--- BI	0.729	0.064	13.900	***		
BI1 <--- BI	0.690	0.063	13.154	***		
IB4 <--- IU	0.580				0.717	0.520
IB1 <--- IU	0.652	0.107	9.555	***		
IB3 <--- IU	0.684	0.114	9.842	***		
IB2 <--- IU	0.574	0.111	8.773	***		

Note: *** Statistically significant at $p < 0.001$; S.E. Standard errors; C.R.: Critical ratio.

4.3. Testing the Structural Model

A statistical analysis tool called structural equation modeling (SEM) with AMOS 20 software was used to test the proposed hypotheses about how PS, SI, PE, PU, BI, IU, and UB are connected. The results are illustrated in Figure 2. In addition to this, Table 3 presents the estimated results of the parameters in the theoretical model and their significance. The statistical values, including the p-value, GFI value, TLI, CFI, Chi-squared/df, and RMSEA, fall within acceptable ranges.

Specifically, this model has a p-value = of 0.000 and GFI values = of 0.892 (if the GFI value is below 0.9 but from 0.8 or higher, it is still acceptable according to 2 studies by Homburg and Baumgartner [78] and Torkzadeh and Doll [79]). TLI = 0.928 > 0.9 and CFI = 0.936 > 0.8; Chi-squared/df = 2.045

< 3 and RMSEA = 0.051 < 0.08 are both satisfactory. In summary, both the sample size and fit indices demonstrate that the proposed research model effectively supports its hypotheses.

Table 2.
Discriminant validity of constructs.

Constructs	MSV (Maximum shared variance)	MaxR(H)	PS	SI	PE	PU	BI	IU	UB
PS	0.452	0.815	0.720						
SI	0.440	0.846	0.663	0.749					
PE	0.566	0.853	0.651	0.502	0.768				
PU	0.527	0.845	0.591	0.537	0.726	0.753			
BI	0.566	0.850	0.598	0.468	0.752	0.708	0.759		
IU	0.507	0.721	0.672	0.602	0.699	0.712	0.642	0.724	
UB	0.425	0.861	0.590	0.464	0.563	0.576	0.570	0.652	0.771

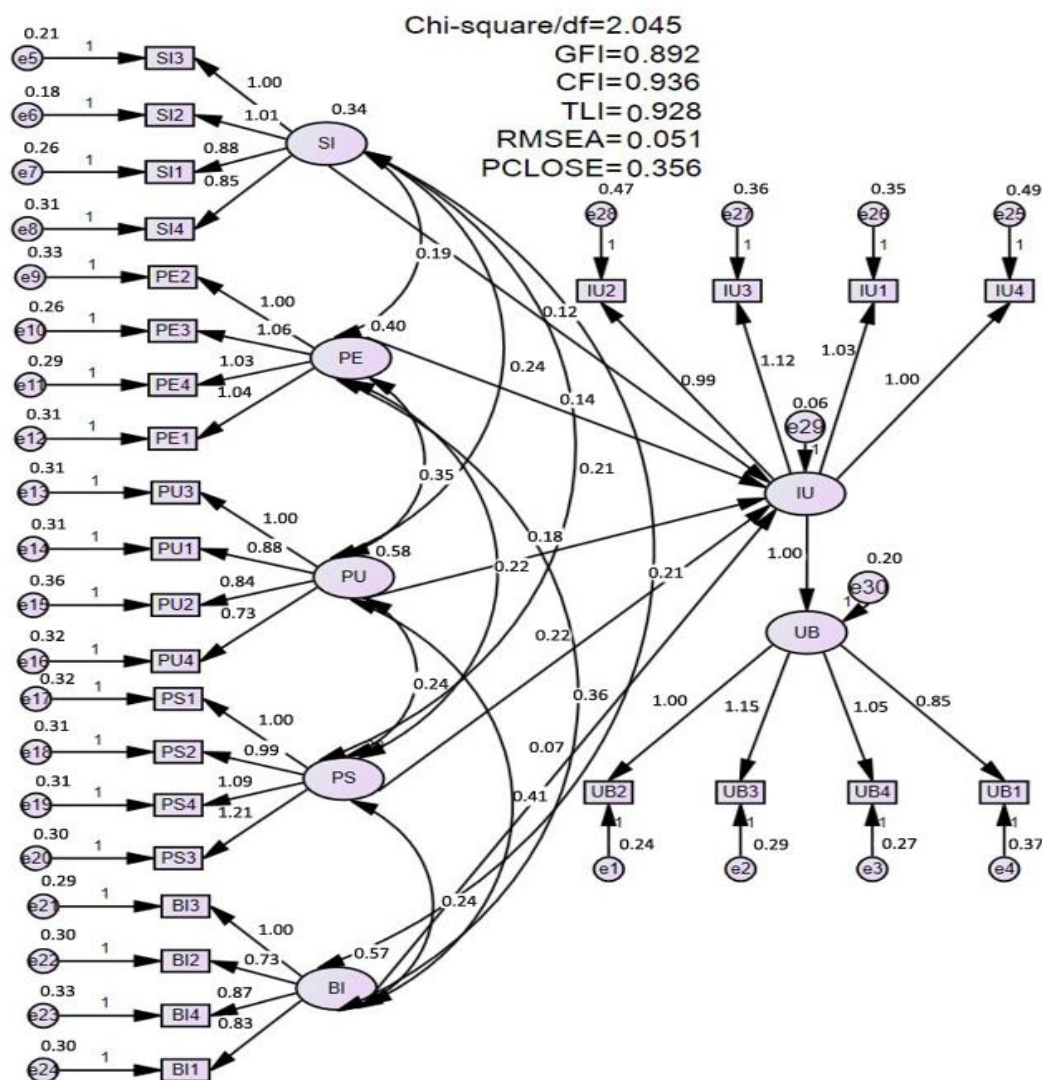


Figure 2.
SEM results of the research model.

Table 3 The study shows that the intention to use has a very positive influence on the behavior of using digital banking services ($\beta = 0.996$, $p = 0.000$). This research result is consistent with many previous studies, such as research by [Liang and Xue \[63\]](#) or by [Alalwan, et al. \[41\]](#). At the same time, this result also confirms the effectiveness of the TPB model in studying user intention.

Research results show that Perceived Security has the strongest impact on intention to use digital banking services ($\beta = 0.225$, $p = 0.002$), which is consistent with the results of [Juwaheer, et al. \[80\]](#); [Merhi, et al. \[35\]](#) and [Anouze and Alamro \[6\]](#).

Similar to the research results of [Dinh, et al. \[49\]](#) and [Tran, et al. \[48\]](#), another significant factor that strongly encourages customers' intention to adopt digital banking services is social influence. This finding extends the scope of the technology acceptance model by shedding light on the impact of social globalization across various facets of human life.

The research findings further fortify the TAM model's efficacy in elucidating the influence of perceived ease of use and perceived usefulness on user attitudes across diverse contexts, as evidenced in studies conducted in Malaysia by [Tiong \[32\]](#) and [Salehan, et al. \[30\]](#).

Finally, digital brand image has no significant influence on behavioral intentions to use online banking. This finding is inconsistent with the results obtained by [Amin and Khairil \[55\]](#); [Alalwan, et al. \[41\]](#); [Nguyen and Le \[42\]](#) and [Hsieh, et al. \[56\]](#), who found a significant positive effect of Perceived Security on behavioral intention. The reason may be that the subjects in this study are people who are using digital banking services, so they will be mainly interested in the experience of using the service, such as whether digital applications are easy to use, useful, or not, and in accordance with social trends or not. While a bank's image can make a good first impression, if the service doesn't meet the needs and expectations of users, they may not use the service, no matter how good the image is. In short, bank image may be one of the factors that make the first impression, but to influence the intention to use digital banking services, it is necessary to have the right response of the service to the needs and expectations of the user.

Table 3.
Hypothesis verification result.

Path	Estimate	S.E.	C.R.	P	Results
IU <--- SI	0.216	0.065	3.121	0.034	Accepted
IU <--- PE	0.141	0.069	2.045	0.041	Accepted
IU <--- PU	0.183	0.053	3.486	***	Accepted
IU <--- PS	0.225	0.073	3.08	0.002	Accepted
IU <--- BI	0.074	0.052	1.424	0.154	Not accepted
UB <--- IU	0.996	0.109	9.162	***	Accepted

Note: *** Statistically significant at $p < 0.001$.

5. Conclusion and Suggestion

5.1. Conclusion

Many interesting implications in recent studies show the importance of exploring social influence and Perceived Security in enhancing the intention to use and promoting the behavior of using digital banking services. Globalization promotes world economic development but also has many consequences. It helps many businesses diversify their services, but it also makes more technology criminals appear and requires a more difficult customer experience. Therefore, customers increasingly appreciate the role of security factors and the prevailing service trend. However, previous studies seem to ignore this factor.

After synthesizing theories from existing theoretical models, the researchers have proposed a research model suitable for the research problem. The model includes 4 factors that directly affect the intention, thereby affecting the behavior of individual customers using digital banking services at Vietnamese commercial banks. After conducting data collection, 450 questionnaires were issued, and the

obtained results were presented in 400 tables as appropriate. The collected data was put into SPSS and AMOS software for processing.

According to the research that was conducted, both the reliability and validity of the model's scales were found to be present. Additionally, the study identified four factors that positively influenced the intention to adopt digital banking services, namely perceived security, social influence, perceived usefulness, and perceived ease of use. In descending order, intention in turn had a direct positive impact on user behavior. It was also noted that providing highly secure services during the process was a crucial determinant that affected both intention and behavior in digital banking service usage. These findings are consistent with earlier studies conducted in the digital banking context [6, 35, 80]. Meanwhile, the brand image hypothesis for the intention to use this service is not supported. This shows that customers who have used digital banking services are not too concerned about brand image as long as the application ensures security, usefulness, and ease of use, and the organization always accompanies them to support them during their use. Furthermore, this result also sheds light on the validity of the TAM 2 model and the UTAUT model when conducting research on technology usage intentions and behavior in the Vietnamese market.

5.2. Implications for Theory

This study makes a major theoretical contribution by applying the TAM2 technology acceptance model from the context of technology adoption and uses to the more specific context of digital banking. This expands the application of the TAM2 model to the field of digital banking services and further clarifies how factors affect the intention and behavior of customers to use digital banking services.

In addition to the two main factors in the model, perceived usefulness and perceived ease of use, the study also added two new factors to the model, including perceived security and social influence. These factors are considered to have a positive impact on the intention and behavior of using digital services. Among them, perceived security was identified as the most important factor for the intention and behavior of using digital services. This is particularly crucial in a digital world when utilizing digital services depends heavily on client trust and information security. The results also determined that social influence predicts the extent to which customers are willing to change their minds to engage with a particular service. It is recommended that the globalization of society is increasingly strongly influencing customer attitudes and behaviors. Therefore, it is necessary to add social influence and perceived security to models measuring customer attitudes and behaviors in digital service contexts, as shown in Figure 3.

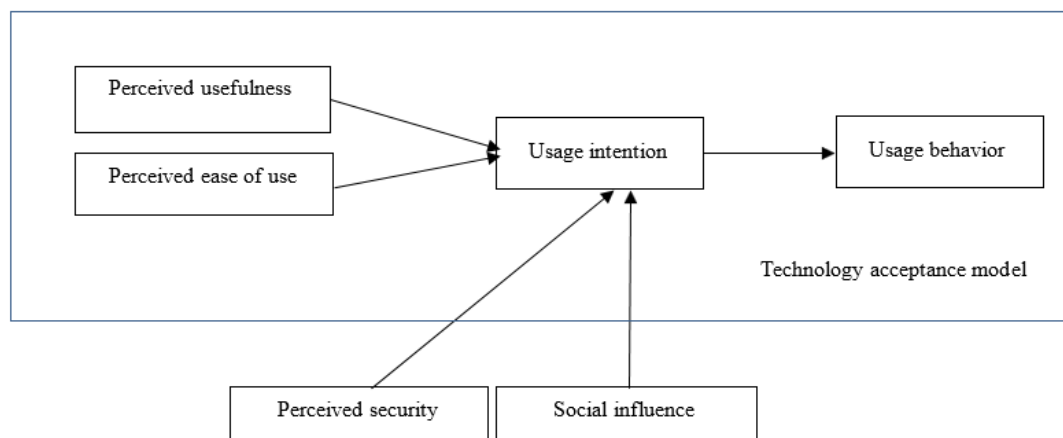


Figure 3.
Culture-technology acceptance model.

5.3. Implication for Practice

From the results of the study on factors affecting the behavior of individual customers using digital banking services at Vietnamese commercial banks, a number of governance implications are given to improve the usage intention and behavior of digital banking services.

Perceived Security and social influence are the two most influential factors in shaping customers' intentions and behaviors to use digital banking services. To enhance the security of customer information, a combination of biometrics and other data, such as passwords and PINs, can be used to increase the number of steps required for authentication [81]. By combining these factors, one can create a stronger and more secure authentication system while enhancing the integrity and security of customer information [82]. In addition to the application of biometric measures, the application of SSL/TLS (Secure Sockets Layer/Transport Layer Security) data encryption is a way to prevent attackers from stealing personal and account information [83]. In addition, customer referral programs in the banking industry explore how promotions can generate growth in service customers [84]. With the current security functions in the banking system and the continuous development of AI (Artificial Intelligence) technology and the prediction of OI (Organoid Intelligence) technology, the security function will be increasingly improved to meet the increasing requirements of customers. In the future, when OI technology develops, banks will also need to apply it to increase the security of information and transactions for their customers. This is also an opportunity for digital businesses to attract and retain customers. However, now, to increase the security of digital banks where the services do not require the presence of tellers, a combination of biometric technology, including biometrics like eye and fingerprint authentication, is needed. Therefore, banks can now take advantage of their security functions to confidently introduce their services to schools (pay tuition fees and other services) and pay on commercial platforms and e-commerce to increase the number of customers. This is also a way that banks can apply to increase the number of customers since customers are not eligible to use digital banking services. Thus, in order to improve the intention and behavior of customers to use digital banking services, banks need to enhance security and create value and preferential benefits for customers who are using them. It is very important to increase the number of customers.

Confidentiality is not only important for digital banking services but also for all other services related to the application of information technology to business and life. From simple things like providing personal information on social networking sites or performing financial-related transactions. Enterprises providing services on digital platforms need to apply the most appropriate security techniques to their platforms to ensure the safety of their customers, thereby retaining existing customers and attracting new customers.

Research has shown that relatives, friends, learning, and the working environment have a positive influence on increasing the intention to use digital banking services. Therefore, it is required that administrators have policies affecting users so that these objects can influence the behavior of their friends and relatives. Research by Zhang and Wedel [84] has shown customer referral programs in the banking industry and explored how promotions can generate customer growth and service usage. Besides, to increase the number of customers, banks can cooperate with schools and businesses in paying tuition fees or salaries. Chen, et al. [85] studied the impact of a workplace banking program on employee behavior and the use of banking products. The results show that providing digital banking services through employee programs and promotions can enhance the intention to use digital banking services and create benefits for both banks and employees. For example, in this case, in order to increase the number of customers and increase the intention to use digital banking services, the bank can cooperate with schools or businesses in paying salaries and tuition fees.

In addition, Lawrence and Bola [86] also showed that by investigating the impact of school banking programs on children's financial literacy and financial behavior, the results showed that cooperation with schools Learning about digital banking service delivery and financial education can help increase awareness and use of digital banking services in the future. This is also a way that banks can apply to increase the number of customers right from the time customers are children. In summary, the results

also determined that social influence predicts the extent to which customers are willing to change their minds to engage with a particular service. It is advisable for business services to be updated of global trends, particularly those that are currently popular. When businesses do that, customers will share their interesting experiences with relatives and friends and post positive comments on social networking sites. This will help businesses attract potential customers.

The research results show that applying for digital banking services can pay for most products and services, and the quick, flexible, and easy payment process and easy financial management will help increase the intention to use the service. Research by [Suri and Jack \[87\]](#) shows that expanding the payment coverage in digital banking has significantly contributed to increasing the perception of the efficiency of banking services. Specifically, the expansion of payment coverage has provided customers with obvious benefits, including time savings, convenience, easier access, and greater safety. The solution posed for administrators in this study is that commercial banks can expand the payment range through linking points of sale and e-commerce exchanges like Amazon. This allows customers to make payments directly from their bank account when making purchases on Amazon without using a credit card or having to enter payment information each time. Besides, campaigns such as pasting QR (quick response) codes at retail and grocery stores will help expand payment possibilities and make the payment process easier [\[88\]](#). In addition, in order to help customers manage their finances effectively, administrators can apply blockchain. Many studies have shown that the application of Blockchain in the banking system will help customers manage their personal accounts, track transactions, and make smart financial decisions [\[89, 90\]](#). At the same time, these studies also show that the application of Blockchain can create a reliable, secure, and transparent financial environment, helping customers manage their finances more effectively.

Research has shown that perceived ease of use is the most important factor in driving customer intention and behavior to use digital banking services. The implication of this result is that customers will use the service if the application operation is simple, the service package is easy and clear, and they will increase their intention and behavior to use it. Numerous studies have also shown that simplifying user interfaces, reducing complicated procedures, and increasing visibility can enhance customer interaction and service usage [\[91-93\]](#). This ensures that customers can find functions and features easily, with no difficulty in manipulating and executing transactions. Concurrently, simplifying procedures and duties for clients utilizing online banking services. Reduce complicated steps, require necessary information, and limit repetition. This helps to reduce the time and effort that customers need to spend to make transactions. Specifically, banks can eliminate the requirement to log in with long and complex passwords. Instead, banks can adopt fingerprint or facial recognition authentication methods that both enhance security and simplify application usage. Take, for example, today's mobile banking app - Apple Pay. Apple Pay uses Touch ID (identification) or Face ID to authenticate payments instead of requiring users to enter a password or PIN (Personal Identification Number) each time they make a transaction. This simplifies the checkout process and enhances convenience, leading to higher usage and increased user satisfaction.

In summary, the results of this study expand and clarify the technology acceptance model and the factors affecting the intention and behavior of using digital banking services. This provides important information for bank managers to better understand how customers evaluate and use digital banking services, thereby providing reasonable solutions and improvements to enhance customer satisfaction and experience and increase engagement in digital banking.

5.4. Limitations and Future Research

Firstly, the current study had a limited sample size of only 400 participants. Additionally, the technology landscape is constantly evolving, leading to the creation of new products and services, which in turn require rapid behavioral changes for integration. Therefore, to obtain a more accurate assessment of the impact of different factors on the intention and behavior of using digital banking services, it is advisable to expand the sample size and broaden the research scope to include other fields.

For instance, conducting research in diverse contexts, such as schools, agriculture, and rural or mountainous areas, would yield a more comprehensive understanding of the topic.

Second, as the availability of digital banking options increases, customers exhibit different preferences and concerns. Traditional banking customers, for example, place value on the ability to access physical branches and conduct transactions in person for confirmation and risk reduction. In contrast, digital banking customers rely solely on the application and its security features to ensure safety. Examining the perceived security differences between these two customer types can offer valuable insights into how customers view the security of digital banking applications. Future research could investigate customer perceptions and understandings of security aspects such as personal information management, secure transactions, and fraud prevention. By addressing this limitation, a more comprehensive understanding of user-perceived security in digital banking applications can be achieved.

Thirdly, factors not explicitly taken into account in the current research model might have an impact on the intention to use digital banking services. For example, demographic characteristics such as gender, age, income, education level, and geographic location can significantly impact how customers access and utilize digital banking services [94]. Exploring the social role of gender and demographic characteristics in future studies could provide valuable insights into their interplay with user behavior. Understanding these factors could inform the development of effective marketing strategies and enhance user experiences within the digital banking sector.

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Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Competing Interests:

The authors declare that they have no competing interests.

Authors' Contributions:

Both authors contributed equally to the conception and design of the study. Both authors have read and agreed to the published version of the manuscript.

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