


Impact of perceived safety on customers' use of digital banking services at commercial banks: A case study in Vietnam



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ABSTRACT

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This study elaborates on the impact of perceived safety on customers' use of digital banking services at commercial banks in Vietnam. Digital banking services emerged as a significant milestone, exemplifying the transformative growth and integration of commercial banks. By using exploratory factor analysis (EFA) and linear structural equation modeling (SEM), the study examines the impact of perceived safety on customers' use of banking services in Vietnam. Data includes a sample of 558 customers of commercial banks. The research results show the relationship between perceived safety and service usage behavior through a mediating variable: intention to use. At the same time, the study also shows the mediating role of factors such as favorable conditions, expected efficiency, and trust in the relationship between perceived safety and customer intention to use digital banking services. This research contributes theoretically and practically by empirically showing the mediating role of the variable "intention to use" in the relationship between perceived safety and the use of banking services. The findings have practical implications for commercial banks in developing countries, especially those similar to Vietnam, providing them with insights to improve their digital banking services. Additionally, this study opens up avenues for future research. Based on these results, the study proposes several recommendations to encourage customer adoption of digital banking services at commercial banks in Vietnam.

Contribution/ Originality: The study highlights the significance of perceived safety in digital banking adoption and demonstrates the mediating role of intention in the relationship between perceived safety and customer behavior of using digital banking services at commercial banks.

1. INTRODUCTION

Digital transformation encompasses the actions taken by organizations to implement new technologies, resulting in increased benefits and significant improvements in business efficiency and operations across all areas (Naimi-Sadigh, Asgari, & Rabiei, 2022). The advancement of modern technology, along with the increasing adoption of technical and digital platforms by organizations, has been establishing new directions in the work and lives of many workers (Fernández-Fernández, Martínez-Navalón, & Gelashvili, 2021). Digital banking services emerged as a significant milestone, exemplifying the transformative growth and integration of commercial banks into Vietnam's global economy.

Digital banking digitizes all activities and services typically performed in traditional banking branches. Digital banking services include different platforms, such as websites, applications, etc., provided to customers to create unique and valuable experiences. This is vital in customer retention and builds customer loyalty to that bank's brand (Levy, 2022).

Customers digitize and integrate all traditional counter operations into a digital banking application. Mobile devices, particularly smartphones and handheld digital devices, stand out as the most promising means to engage customers, offering the capacity to provide services at any location and time. They boast impressive penetration rates and significant potential for further expansion (Ondiege, 2010).

Numerous scholars have explored and addressed the challenges inherent in digital banking services while also delving into the benefits these services offer to customers. The findings of several studies, including those by Luarn and Lin (2005), Amin, Hamid, Lada, and Anis (2008) and Lee, Kim, Ko, and Sagas (2011) highlight the crucial role of factors such as the perception of transaction costs, ease of use, reliability, and compatibility in influencing customers' intention to adopt digital banking services offered by commercial banks. During this era of scientific and technological advancement, information technology has emerged as a potent catalyst for economic growth. Its utilization and application are bestowing numerous advantages and remarkable value upon customers, facilitating the discovery and utilization of products that cater to their daily requirements. Nonetheless, within this progression, persistent risk factors arise from gaps in the operational mechanisms and the security of customer information at commercial banks. In his study, Zhou (2012) has shown that safety awareness has a significant impact on customers' banking behavior.

In fact, digital banking offers new opportunities for commercial banks but also poses challenges to be overcome for regulators. Future retail banking will see digital banking services as a new trend. Currently, this service is no stranger to consumers in Vietnam. In contrast to conventional banks, digital banking offers consumers the advantage of saving time, reducing costs, and minimizing effort while engaging in online shopping and payments. Moreover, digital banking facilitates the development of distinctive, high-value products tailored to a diverse range of customers.

Nevertheless, the absence of established legal pathways is currently impeding the robust advancement of digital banking services. Furthermore, a key challenge in facilitating transactions within the digital landscape is ensuring robust user authentication. Given that digital banking reduces face-to-face interactions between customers and bank staff, the authentication process necessitates dedicated technological solutions. These solutions encompass biometric authentication systems, electronic ID cards, digital signatures, and the associated legal frameworks, all working harmoniously to fulfill the requisite security and regulatory prerequisites.

As demonstrated in existing literature, many factors could impact the use of commercial digital banking services. However, the lack of research on the relationship between perceived safety and the use of digital banking services. Interestingly, the domestic literature of Vietnam, a developing country that shares many similarities with other developing Asian economies, rarely mentions this relationship. Therefore, this study was conducted to clarify whether perceived safety impacts customers' use of digital banking services at commercial banks in Vietnam and how this impact is expressed.

The primary objective of this research is to examine how perceived safety influences customers' usage behavior concerning digital banking services within the context of commercial banks in Vietnam. The outcomes of this study offer both theoretical and practical significance by elucidating the connection between perceived safety and service utilization behaviors.

The intention to use digital banking services establishes this connection. In particular, the study also demonstrates the mediating role of favorable conditions, expected efficiency, and trust in the impact of perceived safety on customers' intention to use digital banking services.

Based on the literature review, this research builds a model and constructs hypotheses. Utilizing the SPSS (Statistical Package for the Social Sciences) and AMOS (Analysis of Moment Structures) tools for the data processing, this research adheres to the following steps: (1) Testing the reliability of the scale used in the study; (2) Carrying on EFA (Exploratory Factor Analysis); (3) Conducting CFA (Confirmatory Factor Analysis) (4) Running SEM (Structural Equation Modeling).

Subsequently, the findings obtained will be analyzed and compared with previous studies to demonstrate the contribution of this research. Based on this, the study puts forth several recommendations aimed at enhancing customers' utilization of digital banking services within Vietnam's commercial banking sector.

2. LITERATURE REVIEW AND HYPOTHESES

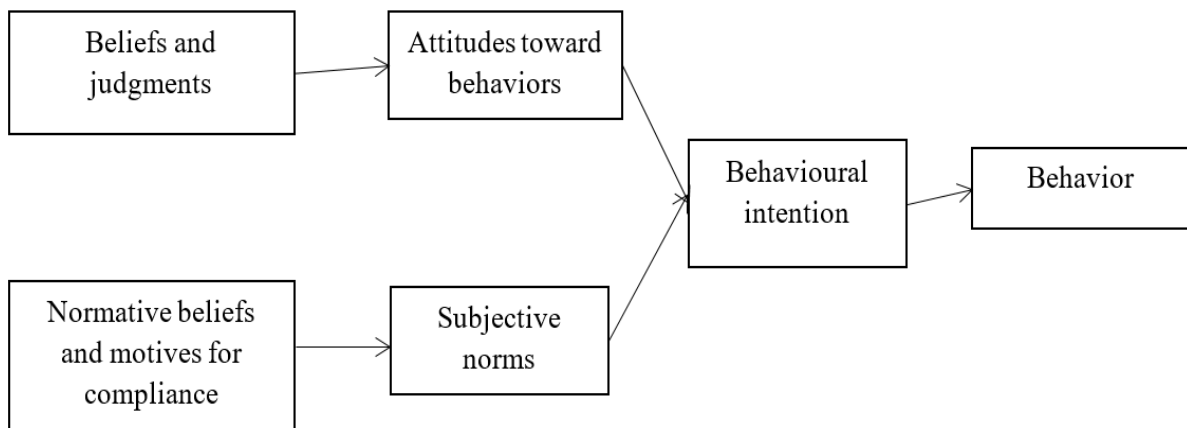
2.1. Literature Review

2.1.1. Theory of Reasonable Action (Ajzen & Fishbein, 1980)

In 1967, psychologists Ajzen and Fishbein formulated the Theory of Rational Action (TRA), building upon prior research in social psychology, persuasive models, and attitude theories. Fishbein's theory intricately explores the connection between attitude and behavior, offering insights derived from various related fields. The theory of rational action underwent subsequent revisions and expansions by the two authors in the ensuing decades. These efforts aimed to rectify inconsistencies within the A-B relationship. The introduction of two key concept, the theory of planned behavior (TPB) and the method of rational action (MRA), achieved this.

The theory of rational action (Ajzen & Fishbein, 1980) explains the relationship between attitudes and behaviors in human actions. This is a theory that aims to analyze and predict individuals' behavior based on their attitudes and behavioral intentions observed previously. Individuals will take action based on the discernible benefits that they expect to gain. Ajzen and Fishbein posit that individuals frequently exhibit rational and scientific tendencies in their decision-making processes when considering the information at hand. Individuals contemplate the consequences of their real-world actions prior to determining their participation in a specific behavior. TRA proposes that an individual's subjective norm is shaped by a multiplier of normative beliefs, encompassing both personal expectations and the drive to uphold these anticipated behaviors.

Figure 1: The model presents the theory of rational action.



Note: Ajzen and Fishbein (1980).

Figure 1. Theory of rational action.

2.1.2. Perceived Safety and Behaviour of Using Digital Banking Services of Customers at Commercial Banks

Perceived safety refers to the extent of confidence in an organization's ability to handle all transactions with a strong emphasis on safety and security (Turban, King, Lee, Warkentin, & Chung, 2002). Customers' safety, including security, is required to ensure that users have their confidence in e-banking services. The risk of exploiting and illicitly acquiring personal and financial information is a prevalent concern in the realm of

transactions. As a result, users must prioritize their sense of security when engaging in financial transactions. This persistent issue stands as a significant impediment to the widespread adoption of e-banking in the present day, as noted by various researchers (Gefen, 2000; Jarvenpaa, Tractinsky, & Vitale, 2000; Wang, Law, Guillet, Hung, & Fong, 2015).

Intention to use is the willingness of a person to accept service (Deb & David, 2014). According to Ajzen (1991) intention is a factor that reflects the individual's ability to perform a behavior or conduct an action. Intention expresses an individual's willingness to perform a particular behavior. In the context of digital technology, intention reflects the degree to which users show their interest and frequency of use of electronic devices in the future (Venkatesh & Davis, 2000; Webster, Trevino, & Ryan, 1993).

The customer's use of digital banking services is the frequent use of customer services for a period of time (Al-Queisi & Al-Abdallah, 2013) which is considered the number of transactional banks and the utilities of digital banking services used by customers (Cheng, Lam, & Yeung, 2006). Behavioral theoretical models universally suggest that individual behavior is inherently predictable and profoundly influenced by individual intentions. Given that the primary objective of banks is to entice customers into utilizing their services rather than merely intending to do so, numerous studies have meticulously explored the intricate connection between behavioral intentions and tangible usage (Susanto, Chang, & Ha, 2016; Yoon & Occena, 2014).

Favorable conditions refer to the degree to which an individual holds the belief that the essential resources required to facilitate the utilization of the system are available (Venkatesh, Thong, & Xu, 2012). The framework of favorable conditions comprises the components of the organizational and technical environment that eliminate use obstacles. According to Gupta, Seetharaman, and Raj (2013) the adoption of information technology systems is positively impacted by social influence, expected efficiency and effort, and favorable conditions.

Expected efficiency is defined as the degree to which an individual believes that using the system will help them achieve their goals at work (Davis, Bagozzi, & Warshaw, 1992). Examples of expected efficiency that stems from usefulness include job fit, relevant advantage, and external motivation. There are three factors that impact expected efficiency, including perceived usefulness, inbuilt motivation, and job fit (Venkatesh, Morris, Davis, & Davis, 2003).

Trust plays a pivotal role in fostering effective relationships. According to Mayer, Davis, and Schoorman (1995) trust can be defined as the reliance one entity places in another. Trust constitutes a pivotal factor in all business relationships (Wang et al., 2015) assuming a particularly significant role within the realm of digital banking services by mitigating uncertainty (Gu, Lee, & Suh, 2009; Wang et al., 2015). According to Wang et al. (2015) trust is a critical component of the relationship between consumers and sellers in the technology sector.

2.2. Research Hypothesis

2.2.1. Perceived Safety and Favorable Conditions

According to Ghali (2021) the risk of leaking private and secured personal information is one of the main weaknesses of digital banking services. In the milieu of the introduction of digital banking services, discernible patterns indicate heightened customer circumspection regarding the domain of information security, operational integrity, and the cultivation of trust in relation to the accruing advantages of said services. In their study exploring customer attitudes towards the adoption of digital banking services, Laforet and Li (2005) focused on the concepts of confidentiality and security as indicators of potential risks. Their findings emphasized that the perceived level of risk and the sense of safety associated with information security emerged as the paramount factors influencing the utilization of these services. According to Wang et al. (2015) service users gain credibility from perceived safety and trust. The investigation formulates a hypothesis to examine the correlation between perceived safety and favorable conditions that banks offer to customers within the framework of commercial banks in Vietnam.

H₁: Perceived safety has a positive impact on favorable conditions in the process of using digital banking services of customers at commercial banks in Vietnam.

2.2.2. Favourable Conditions and Intention to use

Perceived safety, convenience, and ease of use are factors that customers will consider when deciding to use digital banking services (Hasandoust & Saravi, 2017). Research by Venkatesh et al. (2012) suggests that favorable conditions positively affect customers' intention and behavior to use services at the bank. However, there are also many studies showing that favorable conditions have no impact on the intention to use digital banking services, such as the studies of Aboelmaged and Gebba (2013) and Baptista and Oliveira (2015). Therefore, to demonstrate the connection between favorable conditions and the intention to use digital banking services at commercial banks in Vietnam, we posit the following hypothesis:

H₂: Favorable conditions have a positive impact on customers' intention to use digital banking services at commercial banks in Vietnam.

2.2.3. Perceived Safety and Expected Efficiency

Research by Davis et al. (1992) demonstrates that if an app is easily used, it is likely to be accepted. The study also shows that the effort factor is driven by expectations and will be driven by behavioral factors. Customers now perceive greater safety and security when using the service. As a result, customers experience a heightened sense of confidence when engaging with service and products. Moreover, this improvement in perceived safety contributes to an enhanced expectation of efficiency (Nguyen, Tran, Ho, & Duong, 2021). Therefore, within the context of commercial banks in Vietnam, this study aims to explore the correlation between perceived safety and anticipated efficiency concerning the utilization of digital banking services. To address this, the following hypothesis has been formulated:

H₃: Perceived safety has a positive impact on expected efficiency in the process of using digital banking services of customers at commercial banks in Vietnam.

2.2.4. Expected Efficiency and Intention to use

When they first use a service, most customers don't understand how banks operate or care for them (Li, Guo, Qu, & Hao, 2022). Therefore, creating a favorable impression with customers through sharing information and increasing efficiency expectations in the use process is essential to promoting customers' intention to use digital banking services. The research results of Ananda, Devesh, and Al Lawati (2020) indicate that the customers' perceived usefulness of the service positively influences the intention and behavior of using digital banking services. So far, in their studies, the authors show that the conflicting opinions revolve around the relationship between expected efficiency and intention to use digital banking services. While many studies show the positive impact of expected efficiency on intention to use services (Alalwan, 2020; Deb & David, 2014) some studies show that there is no impact of expected efficiency on intention to use services, such as Al-Jabri (2015) and Baptista and Oliveira (2015). Compared to traditional banks, customers' satisfaction with convenience and usefulness when using digital banking services is higher (Shin, Cho, & Lee, 2020). In the context of commercial banks in Vietnam, whether or not the impact of expected efficiency on the intention to use digital banking services, the authors develop a hypothesis:

H₄: The expected effect has a favorable impact on customers' intention to use digital banking services at commercial banks in Vietnam.

2.2.5. Perceived Safety and Trust

Research by Martínez-Navalón, Fernández-Fernández, and Alberto (2023) indicates that perceived safety is significant and that the confidentiality of information needs to be ensured to build consumers' trust. At the same time, the higher the ease of using digital banking services, the greater the trust. Along with the increase in the number of products and services offered online, consumers are increasingly concerned about security and privacy. Research by Roboff and Charles (1998) suggests that customers often have little understanding of the risks of using

digital banking services, even though they are aware of them. Moreover, they also note that while consumer confidence in their banks remains robust, their trust in technology is notably lacking (Howcroft, Hamilton, & Hewer, 2002). Regarding this content, the following hypothesis is formulated:

H₅: Perceived safety has a favorable impact on customers' trust in digital banking products and services of commercial banks in Vietnam.

2.2.6. Trust and Intention to Use

Findings in Almaiah et al. (2023) show that perceived security, trust, and service quality play important roles in the behavior of using digital banking services. At the same time, risk factors should be minimized to increase customers' positive perceptions, thereby positively impacting their attitudes, trust, and intentions to use digital banking services. Customers only decide to use digital banking services if they feel fully confident in banking transaction security. Therefore, security measures will play an important role in instilling customer confidence in using e-banking services, not just the convenience it can bring (Choudhuri, Singh, Ravi, & Badhusha, 2024). Trust plays a vital role and wields significant influence across a multitude of business and management endeavors. Building trust will foster partnerships. The research results of Asante and Baafi (2022) and Aljaafreh, Al-Hujran, Al-Ani, Al-Debei, and Al-Dmour (2021) show that initial trust positively impacts the intention to use digital banking services. Until now, numerous studies have consistently indicated that customers who place their trust in digital banking services tend to exhibit more favorable attitudes and a greater propensity to embrace and utilize these services (Kim, Park, & Jeong, 2004; Susanto et al., 2016; Yoon & Occena, 2014; Zhou, 2012). Research by Singh and Srivastava (2020) shows that factors such as customer satisfaction and acceptance significantly impact the intention to use digital services. In order to understand and determine the relationship of the impact of trust on the intention to use digital banking services at commercial banks in Vietnam, the following hypothesis is formulated:

H₆: Trust has a favorable impact on customers' intention to use digital banking services at commercial banks in Vietnam.

2.2.7. Intention and Usage Behaviour

The studies conducted by Venkatesh et al. (2003) and Venkatesh and Zhang (2010) have convincingly shown that behavioral intention plays a crucial role in influencing the adoption and utilization of technology. The perceived usefulness and perceived ease of use significantly influence attitudes, which in turn shape the intention to utilize. This intention, in a reciprocal manner, impacts the behavior of adopting information technology systems or services (Wu & Wang, 2005). Therefore, the following hypothesis is formulated:

H₇: The intention to use positively affect customers' use of digital banking services at commercial banks in Vietnam.

2.2.8. Favourable Conditions and Expected Efficiency

Efficiency in using digital banking services plays an intermediary role in the impact of convenience on customer satisfaction. Using digital banking services reinforces the positive effects of convenience on customer satisfaction (Shin et al., 2020). Research by Shankar and Jebarajakirthy (2019) shows that the advancement of technology and the proliferation of e-services entail a greater demand for digital banking services. A comprehensive analysis of various individual factors, including the customer's unique attributes and values, formulates customer efficiency expectations. These are intertwined with the advantageous usage conditions that the bank commits to providing during the customer's engagement with its services (Moudud-Ul-Huq, 2021; Tran, Nguyen, Ho, & Duong, 2021). Alawadhi and Morris (2008) conducted a study on the adoption of digital banking services, which found that certain favorable conditions significantly influence customers' anticipated effort and intention to utilize the service. Therefore, within the framework of Vietnamese commercial banks, the study formulates the following hypothesis

regarding the influence of favorable conditions on expected efficiency in customer utilization of digital banking services.

H₈: Favorable conditions have a favorable impact on expected efficiency in the process of using digital banking services of customers at commercial banks in Vietnam.

2.2.9. Trust and Expected Efficiency

The emergence of digital banking services has not only brought about a transformative shift in the banking industry but has also introduced new elements of risk. Hence, placing trust in the utilization of digital banking services becomes even more imperative than in the case of traditional services. The level of usefulness and reliability in using digital banking services significantly impacts customers' expectations toward these services' performance (Ghani, Ali, Musa, & Omonov, 2022). Trust in the service thereby impacts their expectations and efforts in the process of accessing and using the service; without trust, there is no acceptance and use of this service (Zhou, 2012). In order to test the impact of the trust factor on the expected efficiency of customers in using digital banking services at commercial banks in Vietnam, the following hypothesis is formulated:

H₉: Belief has a positive impact on expected efficiency in the process of using digital banking services of customers at commercial banks in Vietnam.

Figure 2 illustrates the proposed research model.

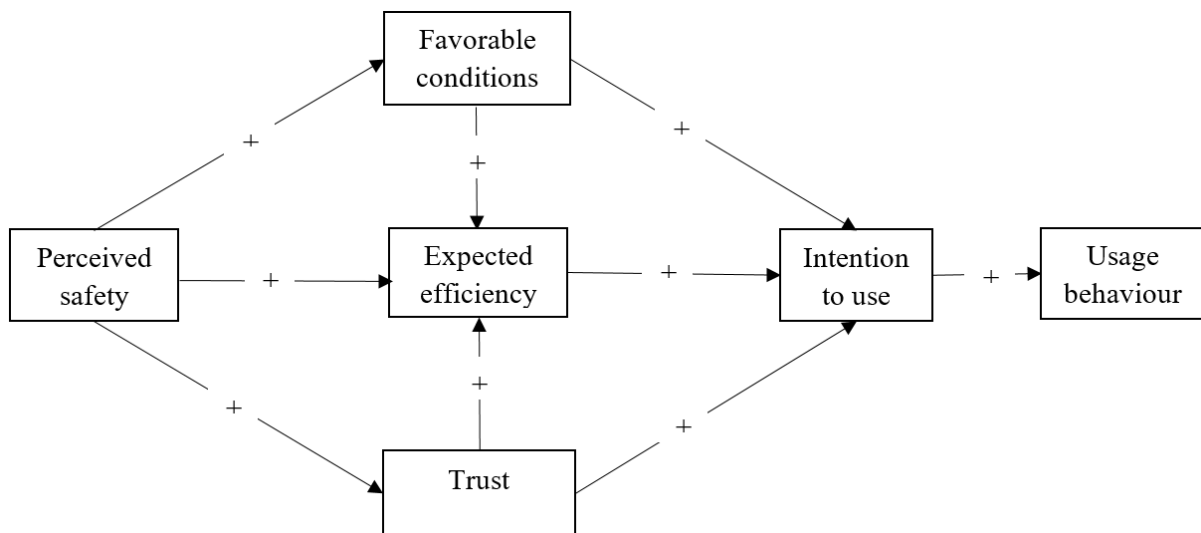


Figure 2. Proposed research model.

3. RESEARCH METHODOLOGY

3.1. Study Scale

Based on the theoretical overview and related research works, the article proposes a research model with the independent variable perceived safety (PES), and the dependent variable is the customer's use of digital banking services (USB). The intermediate variables include: Favorable conditions (FAC); Expected efficiency (EXE); Trust (TRU); Intent to use (INU). The scale used in the study is the likert scale with 5 scores: (1) Strongly disagree; (2) Disagree; (3) Normal; (4) Agree; (5) Strongly agree. The study adjusts indicators measuring applied variables based on sample characteristics from prior studies. The study uses a behavioral variable that measures the frequency of service performance, categorized into the following tiers: Never; Less than an average of 1 time per month; Averaging between 1 to 5 times per month; Averaging between 6 to 10 times per month; More than 10 times per month.

Table 1 presents origin of variable's scale.

Table 1. Origin of the scale of variables.

No.	Variable	Code	Number of observations	Origin of scale
1	Perceived safety	PES	4	Deb and David (2014)
2	Favorable conditions	FAC	4	Venkatesh et al. (2012)
3	Expected efficiency	EXE	5	Kim et al. (2004) and Venkatesh et al. (2012)
4	Trust	TRU	5	Kim et al. (2004)
5	Intention to use	INU	4	Venkatesh et al. (2012)
6	Usage behaviour	USB	1	Venkatesh et al. (2012)

3.2. Research Samples

Data is collected through stratified sampling at Vietnamese commercial banks and branches distributed in the North, Central, and South, such as Joint Stock Commercial Bank for Investment and Development; Joint Stock Commercial Bank for Foreign Trade; Joint Stock Commercial Bank for Industry and Trade; Ho Chi Minh City Development Joint Stock Commercial Bank. In the northern region, there are banks and branches located in Hanoi. The central region concentrates bank branches in Nghe An, Ha Tinh, and Thanh Hoa. In the southern region, there are bank branches situated in Ho Chi Minh City. The survey unit in the study was identified as customers of commercial banks with an average age of 21 to 50 years old, the sample size in the collection was 558 samples. The data collection process is conducted in two ways: direct distribution and online survey through the Google Form tool. Initially, 500 questionnaires were distributed, out of which 316 were collected, and ultimately, 277 questionnaires were deemed valid and usable. Regarding the online survey method, a total of 294 online questionnaires were gathered, out of which 281 were deemed usable. A total of 558 valid questionnaires were utilized for analysis. Based on the study conducted by Hair, Anderson, Tatham, and Black (1998) which provides guidance on determining the appropriate sample size, it is recommended that the minimum sample size should be at least five times the total number of observed variables. Given that the article's dataset consists of 23 observations, the research incorporates a sample size of 558 to meet the analytical prerequisites. The time to complete the data collection is 05/2022 to 10/2022.

3.3. Data Processing

The method used in the study is the quantitative method, the data after being collected, cleaned, and processed through SPSS and AMOS software version 22.0.

Firstly, the study assessed the reliability of the scale with the Cronbach's Alpha coefficient requirement > 0.7 and the total variable correlation coefficient > 0.3 . Simultaneously, discard this type of observed variable if the Cronbach's Alpha value of the deleted item surpasses the Cronbach's Alpha coefficient of the variable.

Second, the EFA exploratory factor analysis study aims to evaluate the convergent validity and discriminant validity of the scale of variables and indicators. The requirements in EFA exploratory factor analysis are factor loading > 0.5 ; KMO (Kaiser-Meyer-Olkin) coefficient ≥ 0.5 and ≤ 1 ; Sig value. < 0.05 ; at the same time, the percentage of variance extracted $> 50\%$. The factor extraction method used is the Varimax factor rotation method.

Thirdly, the study used AMOS software to assess the conformity of the model with the research data through CFA assertion factor testing.

Fourth, conducted research hypotheses by SEM linear structure model analysis with the requirement of chi-square/df indicators < 3 (Hair et al., 1998); $P < 0.05$; GFI (Goodness of Fix Index), TLI (Tucker-Lewis Index), CFI (Comparative Fit Index) > 0.9 (Segars & Grover, 1993); RMSEA (Root Mean Square Error of Approximation) < 0.08 (Taylor, Sharland, Cronin, & Bullard, 1993).

4. RESEARCH RESULTS AND DISCUSSION

4.1. Testing the Reliability of the Scale

The results of Cronbach's Alpha test analysis show that the reliability of the scale and the data values included in the analysis when the Cronbach's Alpha coefficient of all variables is > 0.7 ; the total variable correlation coefficient of all variables is greater than 0.3. At the same time, the value of Cronbach's Alpha If Item Deleted is smaller than the coefficient of Cronbach's Alpha total variable.

Table 2 describes Cronbach's Alpha coefficients, which are used to assess the scale's reliability.

Table 2. Assessing the reliability of the scale through Cronbach's Alpha coefficient.

No.	Variable	Code	Cronbach's alpha
1	Perceived safety	PES	0.905
2	Favorable conditions	FAC	0.869
3	Expected efficiency	EXE	0.874
4	Trust	TRU	0.912
5	Intention to use	INU	0.847

4.2. EFA Analysis

After testing the suitability of the scale, the study conducted an EFA exploratory factor analysis. The analysis process was performed only once for groups of variables, and the results of the analysis showed that the data met the requirements with factor load factors > 0.5 ; KMO coefficients were 0.931 (≥ 0.5 and ≤ 1); P-value values were 0.000 (< 0.05); the percentage of variance extracted was 72.262 ($> 50\%$); and the two conditions were satisfied: "convergent validity" (the observed variables converge to the same factor) and "discriminant validity" (the observed variables belong to this factor and differentiate from other factors).

4.3. CFA Analysis

In order to provide convincing evidence of convergent validity and discriminant validity requirements of the theoretical structure, the convergent validity is used to show that the indicators in the same scale of the theoretical structure have a strong relationship with each other, and the discriminant validity is used to show that different concepts in a theoretical structure are not strongly related. The study conducted a confirmatory factor analysis (CFA), the analysis results showed the suitability of the measurement model, all indicators met the requirements with Chi-square = 499.110; df = 199; Chi-square/df = 2.508 (< 3); P = 0.000; GFI = 0.925 (> 0.9); TLI = 0.956 (> 0.9); CFI = 0.962 (> 0.9); RMSEA = 0.052 (< 0.08).

Figure 3 illustrates confirmatory factor analysis.

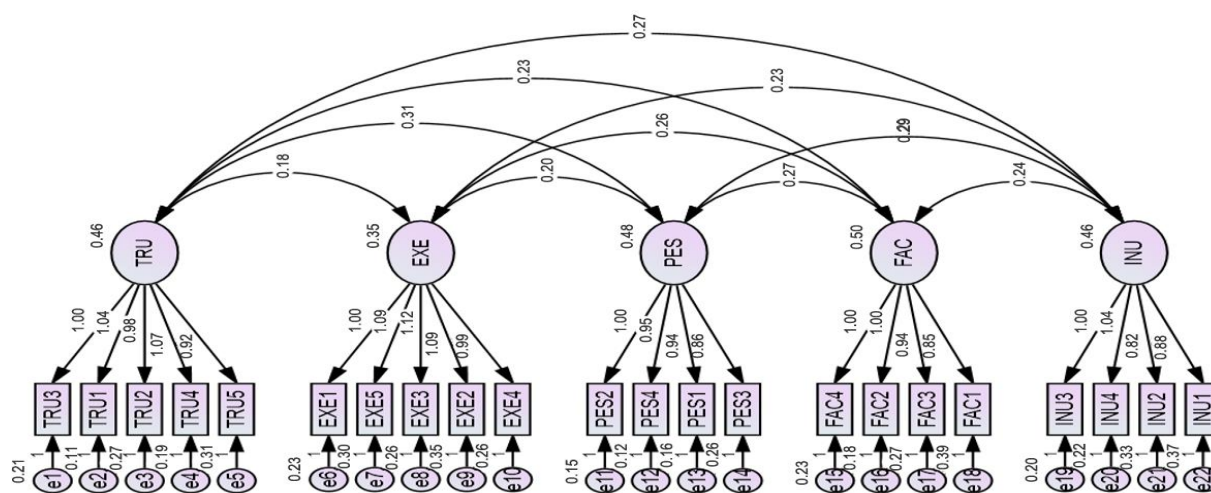


Figure 3. CFA analysis.

4.4. SEM Linear Structure Model Analysis

In order to test the hypotheses, the study conducted a linear structural model (SEM) analysis. The results of the analysis show that the aggregate indicators are satisfactory. Specifically, the chi-square index = 588.051; df = 222; Chi-square/df = 2.649 (<5), P= 0.000; GFI = 0.916 (>0.9); TLI = 0.950 (>0.9); CFI = 0.956 (>0.9); RMSEA = 0.054 (<0.08).

Figure 4 illustrates structural equation modeling analysis.

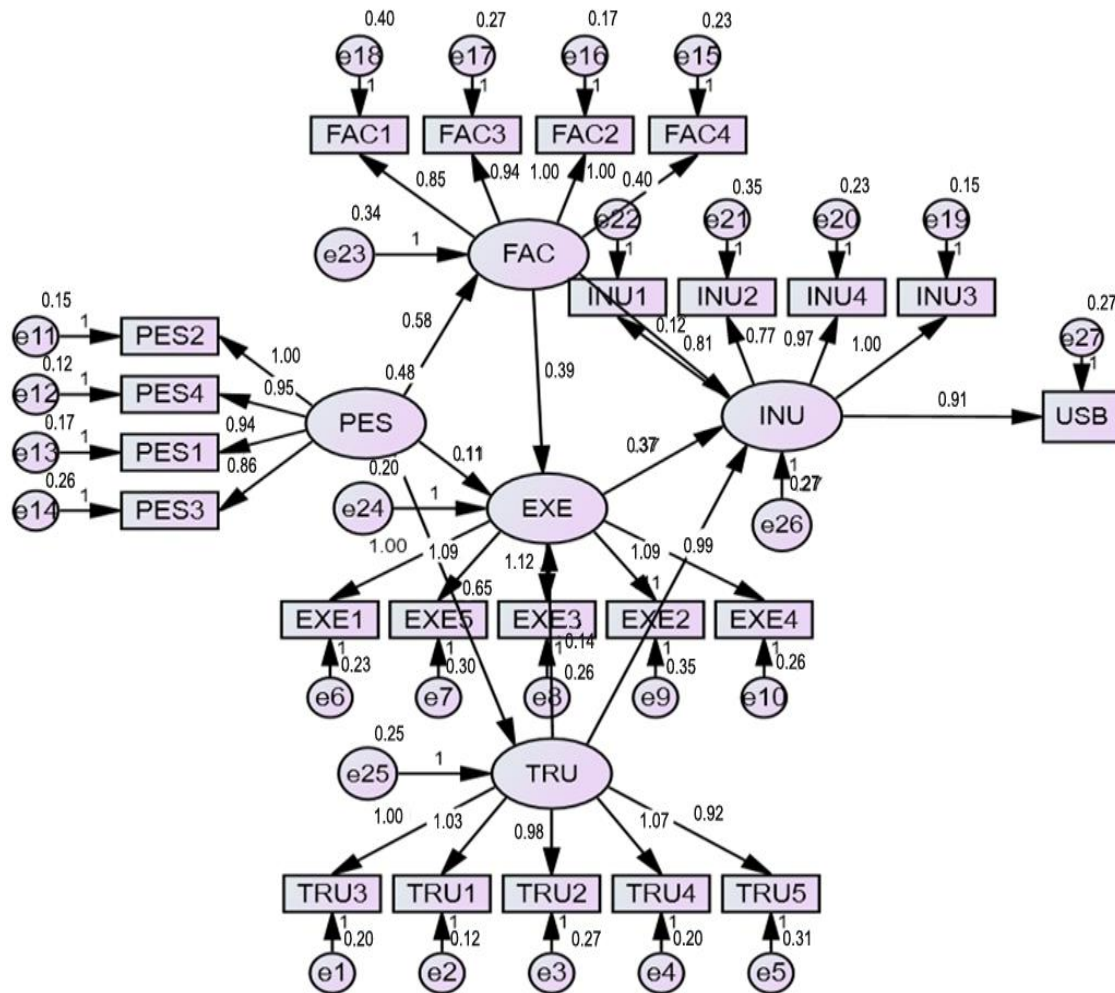


Figure 4. SEM analysis.

The results of estimating the relationships in the model show that the research model is suitable, all research hypotheses are accepted with a significance level of $P < 0.05$.

Specifically, with the significance level in the P test < 0.05 and a positive regression weight (0.582 and 0.123), the study accepts the hypotheses H1 and H2. Therefore, it is possible to draw conclusions on the perceived safety of favorable conditions in the process of using digital banking services, and at the same time, favorable conditions have a positive impact on customers' intention to use digital banking services at commercial banks in Vietnam. These findings align with the research conducted by Laforet and Li (2005); Venkatesh et al. (2012); Aboelmaged and Gebba (2013); Wang et al. (2015) and Baptista and Oliveira (2015).

Hypotheses H3 and H4 are accepted with significance levels in the P test < 0.05 and regression weights of 0.110 and 0.372, respectively. This shows that the perception of safety has a positive impact on expected efficiency in the process of using digital banking services, thereby positively affecting the intention to use digital banking services of customers at commercial banks in Vietnam. These findings are also consistent with the studies conducted by Davis et al. (1992); Deb and David (2014) and Alalwan (2020).

Similarly, with a significance level in the test < 0.05 and a regression weight > 0 , hypotheses H5 and H6 are also accepted.

Hence, this study arrives at the inference that the perceived safety positively impacts customer trust, subsequently leading to a positive influence on customers' inclination to utilize digital banking services offered by commercial banks in Vietnam. These results also support the studies of Roboff and Charles (1998); Howcroft et al. (2002); Kim et al. (2004); Zhou (2012); Yoon and Occena (2014), and Susanto et al. (2016).

Hypothesis H7 is accepted with significance level $P < 0.05$ and regression weight of 0.915 (> 0). Thus, it can be concluded that the intention to use has a positive impact on the use of digital banking services by customers at commercial banks in Vietnam. This finding aligns with the research conducted by Venkatesh et al. (2003), Wu and Wang (2005), and Venkatesh and Zhang (2010).

In addition, hypotheses H8 and H9 are also accepted with significance level $P < 0.05$ and regression weight in the positive test (0.389 and 0.142). It means that both favorable conditions and trust have a positive impact on customers' intention to use digital banking services at commercial banks in Vietnam. Alawadhi and Morris (2008) and Zhou (2012) conducted research that support this findings.

Thus, accepting all hypotheses from H1 to H9 has shown this study's theoretical and practical contributions. Theoretically, the study has demonstrated the mediating role of favorable conditions, expected efficiency, and trust in the relationship of perceived safety to customers' intention to use digital banking services. Moreover, the intention is also proven to have a positive impact on customers' use of digital banking services at commercial banks.

In practical terms, the results of the study will be useful documents, providing solutions for policymakers and commercial banks in the process of finding and promoting customers' use of digital banking services at banks in Vietnam.

Table 3 presents results of SEM on the relationship between variables in the model.

Table 3. Results of SEM analysis for relationships in the model.

Hypothesis	Relationship	Weight age	S.E.	C.R.	P	Conclusion
H1	FAC \leftarrow PES	0.582	0.046	12.592	0.000	Accepted
H2	INU \leftarrow FAC	0.123	0.051	2.425	0.015	Accepted
H3	EXE \leftarrow PES	0.110	0.054	2.025	0.043	Accepted
H4	INU \leftarrow EXE	0.372	0.065	5.730	0.000	Accepted
H5	TRU \leftarrow PES	0.654	0.042	15.427	0.000	Accepted
H6	INU \leftarrow TRU	0.407	0.046	8.872	0.000	Accepted
H7	USB \leftarrow INU	0.915	0.042	21.823	0.000	Accepted
H8	EXE \leftarrow FAC	0.389	0.045	8.686	0.000	Accepted
H9	EXE \leftarrow TRU	0.142	0.048	2.971	0.003	Accepted

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusion

The study aims to test the impact of safety awareness on customers' use of digital banking services at commercial banks in Vietnam. The study's results offer valuable theoretical and practical insights by illustrating the connection between perceived safety and service usage behavior, mediated by the intermediate factor of intention to use.

At the same time, the study also demonstrates the mediating role of favorable conditions, expected efficiency, and trust in the impact of perceived safety on customers' intention to use digital banking services.

5.2. Recommendations

Numerous commercial banks in Vietnam and globally are focusing on the advancement of digital banking services. However, effectively implementing these services to maximize the benefits for both customers and banking organizations remains a significant challenge. Drawing from research, the authors have put forward several recommendations to encourage customers at commercial banks in Vietnam to utilize digital banking services:

Firstly, prioritizing safety and security throughout the utilization of digital banking services necessitates banks conducting thorough studies on the products intended for customer provision. It is imperative for banks to meticulously assess and guarantee the confidentiality of customer information throughout their service usage journey. Furthermore, it is advisable to prompt customers to thoroughly review the registration forms and service usage agreements. This will enable them to gain a comprehensive understanding of the services they intend to utilize, the specific information encompassed within those services, as well as any pertinent details recorded during their usage. Customers also need to improve their vigilance and sense of learning more about how to operate the service and what to pay attention to when trading.

Second, establishing optimal conditions for customers during their engagement with the bank's services is imperative. Banks should enhance their customer support infrastructure by expanding the availability of hotlines dedicated to addressing emergencies. This proactive approach guarantees seamless accessibility, enabling customers to promptly connect whenever issues or concerns arise. Banks must consistently engage in research and development to craft compelling ancillary products, services, and promotions. These offerings should be enticing enough to captivate customers and enhance the value proposition of their banking services.

Thirdly, for optimal efficiency, banks must establish comprehensive advertising policies, introduce a range of customer-centric services, diversify their service delivery methods, and cultivate professionalism and operational efficiency throughout the service provisioning process. Banks need to collect customer feedback on a regular basis, and by using the right tools, banks can customize services for their customers.

Fourth, create trust for customers in the process of using digital banking services. Banks are required to wholeheartedly adhere to and fulfill their commitments to customers. Engaging in comprehensive research and formulating customer support policies rooted in practicality and designed to effectively meet customer needs is crucial. The bank must also focus on establishing and nurturing sustainable relationships. This approach is essential for fostering trust and cultivating lasting customer loyalty toward both the bank and the services utilized by customers.

5.3. Limitations and Future Research

Apart from the aforementioned contributions, the study does exhibit certain limitations. For instance, the utilization of convenient sampling methods may potentially diminish the overall representativeness of the research sample.

At the same time, the research context is limited to commercial banks in Vietnam. Based on the attained outcomes, this paper introduces a new avenue for the future direction of research in neighboring and global nations, particularly within well-developed countries that may possess distinct institutional frameworks compared to both Vietnam and other developing nations.

Drawing from the findings of the research, the authors put forth several suggestions aimed at enhancing the adoption of digital banking services among customers in Vietnam's commercial banking sector.

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