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Empirical Study About Behavioral Intention to use Internet Banking Service

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Abstract—*This paper aimed to identify the factors that influenced the behavioral intention to use internet banking service. Survey data were collected from 344customers living inHo Chi Minh City, Vietnam. The research model was proposed from the studies of behavioral intention to use internet banking service. The reliability and validity of the scale were evaluated by Cronbach's Alpha, Average Variance Extracted (Pvc), and Composite Reliability (Pc). The model selection of AIC showed that the behavioral intention to use internet banking service was impacted by six components of the behavioral intention to use internet banking service such as Performance Expectancy, Effort Expectancy, Facilitating Conditions, Social Influence, Safety/Security, and Convenience.*

Keywords—*Vietnam, the behavioral intention to use internet banking service, Pc, Pvc, AIC*

I. INTRODUCTION

Internet banking has performed an essential task in the e-payment field, which gives online principles to support various e-commerce applications such as online stock exchanging, online shopping, and online disposal [1]. Internet banking has appeared as one of the most successful e-commerce applications[2]. Despite the potential benefits such as faster transactions, lower handling fees, the adoption of internet banking has been limited and in many cases, fallen short of expectations in Pakistan [3]. A survey by market research of Kantar TNS company showed that only 4% of Vietnamese respondents had used Internet Banking. Meanwhile, this rate in emerging countries in Asia is 12%, three times higher. On average in the world, this figure reaches 39%, which is nearly ten times higher than in Vietnam [4]. Consequently, knowing the reasons for people willing to choose internet banking would be critical[1]. Vietnam needs to push Internet Banking Service.

Behavioral intention (BI) is described as a broad engagement of a client with a contemporary product or service somebody remains to purchase it in the future [5, 6]. Jani and Han [7] and Kaur and Soch [8] also expressed BI as the encouragement of clients, which includes their families and friends, to utilize their goods or services. The intention of consumers to continue to utilize the products or services for a long time; the willingness of clients to pay a higher price for their loyal label goods or services than others [5]. The study of consumer behavior is intended to explain the process of buying or not buying a commodity. The study of intention to accept and use the products and services is a research field on consumer behavior, and the researchers proved that the

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intention of shopping significantly affects the form of customers' shopping behavior. According to the studies in the past, the intention to accept and use a service is meant to be a motivation to take action and make the decision about whether to use or not a service in the future [9-13].

Purchaser behavior has grown an important field of scientific research in retailing and researching consumer behavior performed through various fields. In particular, the intention to accept and use the product/service of customers is always an essential research category in consumer behavior researching. Intention to accept and use product/service when it is attached to a specific context and situation has a lot of issues that need to be further studied and exposed. In this paper, besides approaching directly to previous studies about intention to accept and use a product/services, this research not only aims to study categories in a single, discrete and independent way but also integrates various contents to build a more completed study about the impact of factors intention to accept and use a product/service.

There are several local and foreign studies on internet banking in various aspects. In Vietnam, the researches are mainly in the form of articles, scientific papers, university and master essays, with the narrow scope of research within the bank branch, and a study area and the simple application model, the review has not been fully the theory of behavior of accepting to use internet banking from clients. In different countries, the studies are more performed, mainly in developed countries. In Vietnam, culture, conventional habits of non-cash payments, and use of internet banking has other particular points in comparison to a foreign country, especially is the most developed countries, so influential determinants, the degree of impact on use the internet banking clients in Vietnam also differ. So, it is required to have a study on this issue which is adequate, comprehensive on the banking system in Vietnam, apply new empirical research and suitable for the internet banking in Vietnam and establish to identify determinants, the influence of the factors perceived by customers to the use of the internet banking. To create success in supplying products the internet banking is a matter of urgency posed to Vietnam banks today. With those analyses above, this paper indicates the determinants affecting the intention to accept and use internet banking services in Vietnam.

II. LITERATURE REVIEW

The Concept of Internet banking

Nowadays, internet banking has been considered in the technology or services context [1]. In technology setting, internet banking is seen as user-friendly online platform that delivers banking services through an open access the internet and offers a wider range of potential benefits to customer's and financial institutions [1, 14], whereas in the context of services, internet banking is a banking channel that allows customers to obtain a wide range of financial and nonfinancial services through a bank's website[15]. The objective of both perspectives is to provide banking services through user-friendly technology[2, 15]. This study defines internet banking as a worldwide web-based banking service where users can get access to their bank accounts with technology and could perform financial transactions, for instance, payment of electricity bills, review of e-statement, directly from their bank accounts round the clock [16].

This paper shows that the internet banking is electronic banking services, the remote distribution ways of banking

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services, and with only a tool having an Internet connection, clients can do current banking services anytime, anywhere except money withdrawal. There are two levels of internet banking as providing information level, exchanging information level, and transaction level. The advantages of Internet banking are advantages for banks and consumers. They will save time, cost, convenient to do businesses anytime, anywhere, quickly and efficiently for consumers and save costs, increase profitability, operational efficiency, create market segments, and improve the competitiveness of the bank.

III. THE BEHAVIORAL INTENTION(BI)

Intention

Individually considered, the intention is based on an individual's attitude toward the behavior, perceived norms, and PBC, with each predictor, weighted for its importance concerning the behavior and population under assessment [11]. The stronger an individual's intention to perform a behavior, the more likely it will be performed.

Behavior

Described behavior as the observable response in a given situation to a specific target. More specifically, behavior is a function of compatible intentions and perceptions of behavioral control. When behaviors pose no serious problems of control, they can be predicted from intentions with considerable accuracy [13].
Behavioral intention to use tends behavior of a person in doing technology. Interest in behavior can be viewed from the level of technology use so it can be divined from the attitude and attention — the motivation to keep utilizing such technology and the request to motivate other users [17].

Perceived ease of use of a product/services/bank's new technology is said to be one of the fundamental determinants that impact attitudes and behavior to accept and use banking products and services. Many studies are using the Technology Acceptance Model, Theory of Reasoned Action, and combined with other models that proved this idea[9, 17-19].

Besides, the influence of social factors on the intention to accept and use banking service has been tested in many models. The influence of social impacts hows the impact of the community on the intention to perform a specific behavior of people. The behavior of a consumer is also subject to the impact of social factors such as family, the role and social status, reference group.
Belief is a very important element in many business relationships to decide the development of many enterprises and the social order. The study of Jaruwachirathanakul and Fink [20] showed that besides concerns about losing money, customers are also very concerned about information security, and privacy is being invasive.

Through decades with the scientists' researches demonstrated that with the innovative preferred, creative preferred, the customer will very actively reach out to the new products of the supplier. The researchers extended and integrated models and conducted to learn more about the innovation factor of customers in accessing and accepting to use a new product, especially in the field of applying information technology.

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In the development process of the research about the intention to accept and use services of customers, researchers interested in communication and information factors as an independent variable, intermediate, or even as dependent variables that impact the intention to accept and use services of customers. Extensive studies in the past decades provided evidence of the considerable impact of communication factors affecting customers' intention to use services.

Although there are a few studies on factors affecting intention to use internet banking services in Vietnam above theories along with empirical evidence in different fields will have a contribution to building the research model and assumptions in the context of Vietnam.

Effort Expectancy (EE)

Effort expectancy (EE) is determined as the level of ease associated with the use of internet banking. Effort expectancy is related to recognized ease of use and complexity [3]. Zhou et al. [21]expressed that when the user perceives that internet banking is easy to use and does not need much force, they would have high opportunities to adopt internet banking. The connection of effort expectancy on behavioral intention has found important[22]. Effort expectancy is positively influenced performance expectancy, for example, when users perceive that Internet banking is easy to use, and not many efforts are wanted. They will have a high expectation of getting the expected performance [21].Thus, as an individual level/organization to easily login and use Internet Banking.

Facilitating Conditions (FC)

Facilitating conditions (FC) is described as the impact of organizational and technical foundation to support the use of Internet banking, such as user's awareness, capacity, and devices [10]. The facilitation condition was similar to perceived behavioral administration and adaptability. Authors like Venkatesh et al. [23]affirmed that facilitating conditions relates to customer's perception of the resources and assistance ready to implement a behavior. To do internet banking users requires to have some skills such as configuring and operating computers and correlating to the internet[24]. Thus, facilitating the condition is individual/organization considers that the assistance of banks for internet banking services, both material conditions, technical and services, will support them easier to use.

Security (SE)

Security in the circumstances of Internet banking described as "a potential loss due to fraud or a hacker compromising the security of an online bank user" [25]. Internet banking concerns financial performance as fundamental activities [26]. Financial deals using IT devices tend to the plentiful threat to clients as illegal acts can be done quickly without any physical communication [27]. In conclusion, most of the clients are hesitant to adopt Internet banking services due to their security matters [26, 28]. The banking industry is correlated with a high level of trust correlated to security issues than traditional banking [29]. The security concern is the major root of dissatisfaction in internet banking[30]. Today, several banking services are offered through the Internet and smart tools. Thus clients are highly concerned about security issues more grievously. Security issues have proven difficulties hence, clients keep on eye what kind of data is gathered, for what purpose, how long these data is stored,

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and for what aim their data is treated [31]. Drawing on the different studies in literature, the issue of security was found to be the most important determinant factor which prevents client adoption of Internet banking[31-33]. Furthermore, information security issues were recognized as serious, limiting factors on the adoption and use of e-banking applications [34]. Accordingly, security widely considered as the most important determinant which controls the acceptance of Internet banking among banking clients. As the extent that clients trust transactions through Internet Banking, Personal information is kept confidential and secure finance.

Social Influence (SI)

Social influence (SI) is defined as the effect of environmental factors, for instance, the opinions of user's friends, relatives [10]. Like other constructs of UTAUT, social influence was derived from the subjective norm, social factors, and image. The comparison of eight models revealed that the relationship of social influence will be an insignificant involuntary context and becomes significant in mandatory context. According to Martins et al. [24], social influence will affect the user's intention to adopt internet banking services. Similar to this, Chaouali et al. [35]postulated that an individual who believes that important others believe his usage of new products or services will be more inclined to use these products or technology services. Summarily, Social influence as a personal level/organizations to easily login and use Internet Banking.

Convenience (CO)

Previous researches [36] supported the idea that clients consider convenience as critical in adopting or conducting online shopping. Widely accepted literature suggests that the likelihood of consumers to accept or use new technology will improve when the technology is estimated easy to use, useful, and convenient [37, 38]. Finally, customers can do banking activities any time (24/7), regardless of where the utilities (minus withdrawals).

Performance Expectancy (PE)

Performance expectancy (PE), where users perception of accomplishment excel by use of Internet banking on jobs, i.e., individual understands that using Internet banking will assist in attaining benefits in conducting banking controls [3, 10]. Zhou et al. [21]refined that performance expectancy displays user's perception towards development by using internet banking like the convenience of payment, fast reply, and service effectiveness. Performance expectancy in other models was represented as perceived value, relative advantage, result expectancy, and external motivation. To internet banking, Alalwan et al. [39]proposed that performance expectancy is considered as a term of utility that encounters during the use of mobile food ordering apps. Performance expectancy has been widely used to know the behavioral intention of users to select internet banking [3, 24]. Generally, individuals/organizations believe that using internet banking will increase the effectiveness of their work.

IV. METHODOLOGY

The research approach

An overview of the research methods used to collect and analyze the data was briefly discussed. In this research, a survey with a questionnaire was used to collect data. The questionnaire was made in English and then translated into

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Vietnamese because all of the respondents were Vietnamese. The research methodology was implemented through two steps: qualitative research and quantitative research. Qualitative research was conducted with a sample of 30 people. Quantitative research was carried out as soon as the question was edited from the test results with a sample of 344 people. According to Hair et al. [42, 43], the sample size must be at least ≥ m x 5, in which m is the number of observed variables. So, with 26 items observed in this study, the sample size should be at least ≥ 150. Therefore, 300 people are surveyed by the face-to-face method in Ho Chi Minh City, Vietnam. The questionnaire answered by respondents is the main tool to collect data. The survey was conducted in 2019. The questionnaire contained questions about the position of the factors that influenced the behavioral intention in Vietnam. A Likert-scale type questionnaire was used to detect those factors measured from (1) "strongly disagree" to (5) "strongly agree".

In this paper, we designed an empirical study in the context of intention to use the internet banking in Vietnam to examine factors as function 1:

$$BI = \beta_0 + \beta_1 EE + \beta_2 FC + \beta_3 SE + \beta_4 SI + \beta_5 CO + \beta_6 PE + e$$

Code

Performance Expectancy (PE),Convenience (CO),Social Influence (SI), Security (SE), Facilitating Conditions (FC), Effort Expectancy (EE), Behavioral intention (BI). Function 1.The Empirical model

BI is measured by sum of four sentences (1) I will use the Internet Banking when I am in need of banking transactions, (2) I will use Internet Banking when I need to do banking, (3) Use Internet Banking to handle banking transactions is that I will do, and (4) I think, for myself, the use of the service Internet Banking has fulfilled all my banking needs. Dependent variable (BI) measures a sum of four answers with the value from 1 to 5.

Blinding

All study personnel and participants were blinded to treatment for the duration of the study. No people had any contact with study participants.

Datasets

We validate our model on three standard datasets for the behavioral intention to use internet banking service in Vietnam: Smartpls, Stata, and R. Dataset has nine variables: eight independent variables and one variable. There are 344 observations in the dataset. Smartpls was used for advanced analysis, Stata for Lasso regression, and R for model choice.

Data analysis

Data processing and statistical analysis software are used by Smartpls and R software. The scale's reliability and validity were checked by Cronbach's alpha (α), average variance extracted (ρ_{vc}), and composite reliability (ρ_v). AIC was utilized to choose the best model. Cronbach's alpha coefficient higher than 0.6 would guarantee the scale's reliability[40]. Pc is better than 0.6 and ρ_{vc} must be greater than 0.5. AIC was utilized to choose the best model by R software. AIC (Akaike's Information Criteria) was used for model selection in the theoretical framework. AIC method can handle many independent variables, even when multicollinearity exists. AIC can be implemented as a regression model, predicting one or more dependent variables from a set of one or more independent.

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V. EMPIRICAL RESULTS

Reliability and validity

In the studious model, convergent validity was examined through ρ_c or Cronbach's alpha. ρ_v and ρ_{vc} were the measures of reliability since Cronbach's alpha often undervalues the scale reliability [41]. The heterotrait-monotrait ratio of correlations (HTMT) was contracted to confirm data validity. Nevertheless, according to Hair et al. [42, 43], Cronbach's alpha and Pc values should be higher than 0.60, and ρ_{vc} the index should be higher than 0.50 for the validation of construct reliability. Alternatively, in terms of construct validity, follow to Hair et al. [42, 43], HTMT values should be less than 1.0 in table 2. The authors discovered that all construct values were less than the threshold values in Table 3. The result of the construct's reliability and validity are shown in Table 1.

Table 1. Cronbach's alpha, composite reliability (Pc), rho_A, and AVE values (Pvc).

Factor	Cronbach's Alpha	rho_A	Pc	Pvc	Decision
BI	0.783	0.785	0.861	0.608	Accepted
CO	0.804	0.943	0.848	0.588	Accepted
EE	0.494	0.520	0.704	0.332	Accepted
FC	0.821	0.823	0.881	0.650	Accepted
PE	0.714	0.775	0.819	0.497	Accepted
SE	0.819	0.831	0.879	0.646	Accepted
SI	0.610	0.592	0.760	0.447	Accepted

This demonstrated that this model was internally logical. To investigate if these indicators for factors demonstrate converging validity, Cronbach's alpha was calculated. From 2, it could be recognized that some factors are reliable (Cronbach's alpha > 0.60), Pc, rho_A, and Pvc > 0.5 [44]. The factor EE has Cronbach's alpha < 0.60, Pvc <0.5, and PE, SI had Pvc < 0.5, but other standards are accepted.

Table 2. Constructs Validity Results (HTMT: Fornell-Larcker Criterion).

Constructs	BI	CO	EE	FC	PE	SE	SI
BI	0.780						
CO	0.163	0.767					
EE	0.560	0.088	0.576				
FC	0.364	0.067	0.309	0.806			
PE	0.189	0.028	0.199	0.161	0.705		
SE	0.390	0.307	0.328	0.645	0.078	0.804	
SI	0.354	0.191	0.424	0.108	0.057	0.283	0.668

The results in figure 1explicated that the model fits with the analyze data [44]. The behavioral intention was modified by six factors, about 38.9%.

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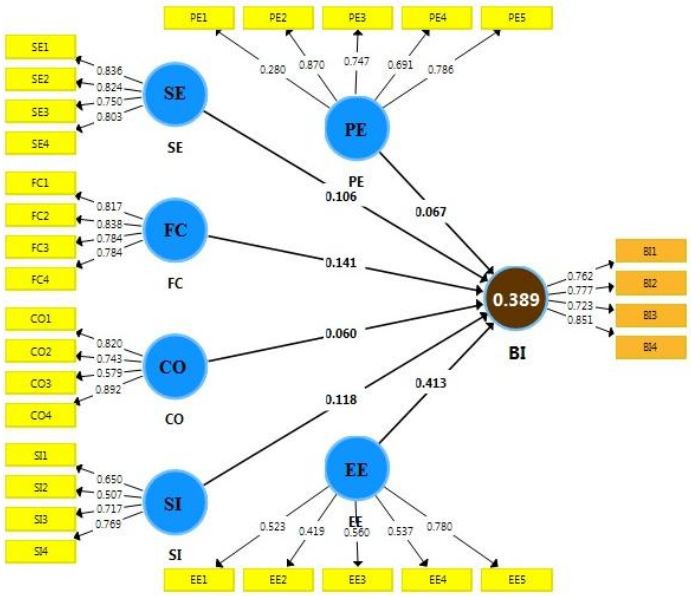

Figure 1. Empiricalmodel

Model choice

The lasso finds the solution to the optimization problem [45], so it could be useful for designing algorithms for finding its solutions [45, 46]. We conducted two steps for Lasso regression in table 3 and AIC for model choice in table 4.

Table 3. Lasso regression

Selected Lasso	**Post-est OLS**
PE 0.0796701	0.083024
FC 0.1396465	0.1424616
EE 0.3572656	0.3590157
CO 0.0523157	0.0562549
SI 0.1077822	0.1102707
SE 0.1577853	0.1577564
Partialled-out*	
_cons 1.3747117	1.1829172

Akaike's Information Criteria (AIC) was used on the theoretical framework. AIC method could handle many independent variables, even when multicollinearity exists. AIC could be implemented as a regression model, predicting one or more dependent variables from a set of one or more independent variables, or it could be implemented as a path model.

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Table 4. Akaike's Information Criteria

Unit	Model	AIC
1	BI ~ PE + FC + EE + CO + SI + SE	397.81
2	BI ~ PE + FC + EE + SI + SE	396.87

AIC results in table 4 showed that model 2 was the best. The behavioral intention to use internet banking service was affected by five factors. In the AIC analysis in table 4, the variables associated with the behavioral intention to use internet banking. The most important factor for the behavioral intention to accept and use banking service was Effort Expectancy (EE) with the Beta equals to 0.35397 with the function as follows.

BI = 1.68181 + 0.08511PE + 0.13226FC + 0.35397EE + 0.11555SI + 0.18101SE

Code: Performance Expectancy (PE), Social Influence (SI), Security (SE), Facilitating Conditions (FC), Effort Expectancy (EE), Behavioral intention (BI).

VI. DISCUSSION

All standards, including Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Security about internet banking service after being assessed by alpha Cronbach's, shows excellent results. Because scale shows a focusing of remarks fulfilled with the Cronbach's alpha coefficient> 0.6 levels of acceptance popular and the Pc, rho_A, and Pvc > 0.5, this is the reliability scale. By analyzing lasso regression, study models the intention to use internet banking in Vietnam shows the results of five scales: Performance Expectancy (PE), Social Influence (SI), Security (SE), Facilitating Conditions (FC), Effort Expectancy (EE) about internet banking, explains 38.9% of the variability of the intention to use banking products. The scale was chosen for variables in the model to ensure the components and is used in subsequent analysis. With those analyses above, this paper shows the determinants influencing the intention to use internet banking in Ho Chi Minh City, Vietnam.

VII. CONCLUSION

The research results showed that factors (Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Security) have a positive impact on the intention to use the level of internet banking of use. However, the degree of influence between factors to the usage of internet banking between two groups of customers not/have used differently. For potential clients: the most influential factor is convenience, followed by security, Effort Expectancy, Facilitating Conditions, Social influence, and ultimately Performance Expectancy. For existing customers: the most influential factor is convenience, followed by Effort Expectancy, Facilitating Conditions, Performance Expectancy, Social influence and finally, security. The study outcomes are compatible with previous studies and the real situation in Vietnam.

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VIII. SUGGESTIONS AND RECOMMENDATIONS

Solutions to promote the security of internet banking services

Improving the quality of services internet banking, increase the perceived security of client transactions, Banks have marketing strategies to suit each customer current/ potential market segments under (age, gender, income, education, housing, Internet experience) about information security full/ high security of internet banking services.

Solutions increased recognition of Effort Expectancy

Promoting the quality of services internet banking to develop the perceived ease of use internet banking 's customer service, Banks have marketing strategies to suit each customer current/potential market segments under (age, gender, income, education, housing, Internet experience) about the ease of use a detail, mass.

Solution facility conditions

Development Solutions internet banking service quality to increase client comments, Banks need to have a marketing strategy to suit each client's current/potential client service comments internet banking to facilitate the invention of the bank.

Measures to increase the positive influence of social influence

Improving the quality of services to create trust internet banking existing clients, so that they feel comfortable and share with their potential clients use the service-oriented, Banks have marketing strategies to suit each group of clients (current/potential) market segments according to demographic features.

Measures to increase the impact of the Performance Expectancy factor

Promoting the quality of services to increase Performance Expectancy of clients, Appropriate marketing solution for effective awareness-raising client expectations to each group of clients in each market segment according to demographic features.

Solutions developed other Internet banking services

Development of quality human resources services serving internet banking, Banks must regularly analyze and evaluate the activities internet banking, Also again, banks also need to strengthen the assistance of the governments in the development of services in rural areas internet banking and systems suitable to the features of rural clients.

Future research directions

Expansion model studies with appropriate expansion variables, more broadly, with larger samples and with an interview of business clients.

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