

Structural Model for Adoption and Usage of E-Banking in Vietnam

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ABSTRACT

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E-banking is an inevitable trend of the banking industry in the future. E-banking benefits not only banks but also customers, so the study of models of adoption and usage of E-banking is essential. Nguyễn & Cao (2011) propose the adoption and usage of E-banking model in Vietnam - E-BAM (E-Banking Adoption Model), and their findings showed that eight following factors - performance expectancy, compatibility, perceived ease of use, perceived behavioral control, subjective norm, perceived risk in transaction, bank image, and macro impact of law - affect the E-banking adoption and E-banking adoption affects E-banking usage. However, according to some relevant theoretical models, this model does not show relationships among independent variables and the effects of independent variables on the E-banking usage. In this paper, authors re-propose a new model of E-BAM to overcome the limitations of the 2011 research, the relationships in the model were analyzed by linear structural model - SEM (Structural Equation Modeling). Factors including perceived behavioral control, compatibility, performance expectancy, bank image and perceived risk in transaction are mutually influenced and affect the E-banking adoption intention; while perceived ease of use and E-banking adoption affect the E-banking usage.

1. INTRODUCTION

a. E-banking:

Several main channels for E-banking studied by Daniel (1999); and Karjaluoto et al. (2003) are presented in Table 1. In addition, there are other channels for E-banking such as ATM (Auto Teller Machine), POS system (Point of Sale), digital wallet, and payment gateway, etc. As a new channel, E-banking is replacing other traditional banking channels for the benefits of both financial institutions and customers (Andreas, 2006).

Table 1: Some Main E-Banking Channels

Types	Descriptions
PC Banking	Proprietary software, distributed by the bank, is installed by the customer on their PC. Access to bank via a modem linked directly to the bank.
Managed network	The bank makes online services provided by other parties.
Internet Banking	Customers can access the banks via Internet (using their PC, web browsers).
TV Banking	Use of satellite or cable to provide customers with account information displayed on their TV screens.
Phone Banking	Customers access the banking account via their phones.
Mobile Banking	Customers access the banking account with text message (SMS), Internet connection (WAP), high-speed connection provided by the 3 rd party.

b. E-banking in Vietnam:

According to reports by the National Internet Center, Vietnam was ranked 18th among the world 20 top Internet countries, and compared to countries in Asia and Southeast Asia, the Vietnam's rank was respectively 8th and 3rd with about 36% of its population are Internet users (Ministry of Information and Telecommunication, 2013). The Vietnamese government plans to increase the ratio of Internet users to population to 55% - 60% by 2020 (Vietnamese Government, 2012).

According to Cao et al. (2011), the growth rate of IT industry increased by 20% - 25% on average in the past 10 years and is expected to rise to 30% by 2020. However, per statistics gathered until Q3/2012 from Vietnam Banks Association, only 40 out of 62 local banks apply Internet banking and 18 banks offer mobile banking services. Other noteworthy figures are: roughly 20% of the Vietnamese populations are bank account holders, and E-banking accounts for only 15% of banking services they employ

(Vietnam Banks Association, 2013). E-banking is considered a new and fastest-growing field in the world while it has just started to be used in Vietnam.

There are many researches on adoption of E-banking in the world but such researches in Vietnam, a potential market for banking services, are scarce. In their research on adoption and usage of E-banking model (E-BAM) in Vietnam, Nguyễn & Cao (2011) propose a model integrating previous ones and the results show that the factors: performance expectancy, compatibility, perceived ease of use, perceived behavioral control, subjective norm, risk relating transaction, bank image and macro impact of law affect E-banking adoption that, in its turn, affects E-banking usage.

However, according to some relevant theoretical models, the model does not show relationships among independent variables and effects of independent variables on the E-banking usage. In this paper, authors re-propose a new model of E-BAM based on relevant theoretical model and findings by Nguyễn & Cao (2011). The relationships in the model were analyzed by linear structural model - SEM (Structural Equation Modeling).

2. THEORETICAL BASES AND RESEARCH MODEL

a. Theoretical Bases:

According to Ajzen & Fishbein (1975; 1980), theory of reasoned action (TRA) is a research model based on the social psychology to identify factors of behavioral intention. Derived from TRA, Ajzen (1985; 1991; 2002) proposes a theory of planned behavior (TPB) including perceived behavioral control. Based on the TRA, Davis et al. (1989; 1993) establish the technology acceptance model (TAM) to explain users' behaviors toward adoption and usage of information system.

Moreover, diffusion of innovations theory (IDT), developed by Rogers (1995), tries to explain user's adoption of technological innovations. Meanwhile, Venkatesh et al. (2003) describe a unified model, called unified theory of acceptance and use of technology (UTAUT) to explain behavioral intention and usage behavior toward information system.

Thus, the UTAUT is developed through eight models: the theory of reasoned action, the theory of planned behavior, the technology acceptance model, a model combining the theory of planned behavior and the technology acceptance model (Taylor & Todd, 1995), the extension of diffusion of innovations theory (Moore & Benbsat, 1991), the

motivational model (Davis et al., 1992), the model of PC utilization (Thompson et al., 1991), and the social cognitive theory (Compeau and Higgins, 1995).

In the research by Nguyễn & Cao (2011), E-BAM shows that the independent variables affect adoption of E-banking and adoption of E-banking affects usage of E-banking, but the correlation between the independent variables and their impact on usage of E-banking are not indicated.

b. E-banking Adoption Model:

By examining actual conditions of E-banking in Vietnam and models TRA, TPB, TAM, TAM 2 (a theoretical extension of TAM, developed by Venkatesh & Davis, 2000), IDT, UTAUT and relevant researches, authors repropose adoption and usage of E-banking model in Vietnam – E-BAM. The model can overcome the limitations concerning relationships among independent variables and their effects on E-banking usage. In the E-BAM model presented by Nguyễn & Cao (2011), moreover, subjective norm has the least effect on E-banking adoption (EBA) with coefficient β equaling only 0.087 ($p = 0.018$). They also find that about 25% of surveyed people do not care about macro impact of law (MIL) because they think they could not do anything to macro factors, which implies that local users pay almost no attention to the legal aspect of E-banking in particular and electronic transactions in general. Thus, subjective norm and macro impact of law are not included in this model.

Perceived ease of use (PEU) is defined as the degree to which customers believe that using E-banking system does not require much effort (Davis, 1989) (with five observed variables), referring to TAM by Davis et al. (1991; 1993), TAM 2 by Venkatech & Davis (2000), research on e-commerce adoption by Lee et al. (2001), researches on adoption and usage of Internet Banking by Podder (2005); Sattabusaya et al. (2007); Hernandez & Mazzon (2007); Surapong (2009); Yaghoubi & Bahmani (2010); Hosein (2010); Safeena et al. (2011); Nabil (2012); Abeka et al. (2012); Njuguna et al. (2012); and Ali et al.(2013), and researches on adoption and usage of E-banking by Bander (2008); Gibson & Gibson (2009); Clegg et al. (2010); Sadeghi & Farokhian (2011); Aliyu (2012); Mohammad (2012); Pham et al. (2013); Fonchamnyo et al. (2013).

Perceived behavioral control (PBC) is defined as customers' perception of E-banking system (with four observed variables) referring to the TBP model by Ajzen et al. (1986; 1991; 2002), the research on technology adoption by Li (2010), researches on adoption and usage of Internet Banking by Jaruwachirathanakul & Fink (2005); Hernandez &

Mazzon (2007); and Majali & Mat (2010), and researches on E-banking adoption by Yaghoubi & Bahmani (2010); Sadeghi & Farokhian (2011); Mohammad (2012); and Pham et al. (2013).

Compatibility (C) is the dissemination of changes in the E-banking technology in individual life and work (with six observed variables), referring to the IDT model by Rogers (1995), research on technology adoption by Li (2010), researches on adoption and usage of Internet banking by Podder (2005); Majali & Mat (2011); Ali et al. (2013), and researches on adoption and usage of E-banking by Alagheband (2006); Gibson & Gibson (2009); Mansumittrchai & Malkawi (2011); and Abukhzam & Lee (2012).

Performance expectancy (PE) is defined as the degree to which customers believe that E-banking system will help them to achieve better performance in bank-related jobs (with four observed variables) referring to the UTAUT model by Venkatesh et al. (2003), the research on technology adoption developed by Li (2010), and the research on adoption and usage of Internet banking by Kholoud (2009).

Bank image (BI) is defined as the effect of bank's typical images on customers' E-banking adoption (with six observed variables) referring to the extension of IDT model by Moore & Bembasat (1991), the research on consumer loyalty (Barbara & Magdalini, 2006), the research on technology adoption by Li (2010), the research on adoption and usage of Internet banking by Hernandez & Mazzon (2007), and the researches on E-banking adoption by Sadeghi & Farokhian (2011); and Pham et al. (2013).

Perceived risk in transaction (PRT) is defined as degree of risks of perceived by consumers when using an E-banking system (with four observed variables) referring to the E-CAM model by Lee et al. (2001), the research on perceived risk in online transaction by Li & Huang (2009), researches on adoption and usage of Internet banking by Podder (2005); Sattabusaya et al. (2007); Narsi (2011); Mansumittrchai & Malkawi (2011); Safeena et al. (2011); Nabil (2012); Njuguna et al. (2012); and Muzividzi et al. (2013), and researches on E-banking adoption by Alagheband (2006); Kurnia et al. (2009); Sadeghi & Farokhian (2011); Shafei & Mirani (2011); Aliyu (2012); Mohammad (2012); Abukhzam & Lee (2012); and Pham et al. (2013).

E-banking adoption (EBA) is customers' adoption of E-banking (with the three observed variables), referring to the TAM by Davis et al. (1991; 1993), the TAM 2 by Venkatesh & Davis (2000), the IDT model by Rogers (1995), researches on adoption and usage of Internet banking by Podder (2005); Sattabusaya et al. (2007); Hernandez

& Mazzon (2007); Surapong (2009); Wang & Pho (2009); Yaghoubi & Bahmani (2010); Hosein (2010); Majali & Mat (2011); Njuguna et al. (2012); and Ali et al. (2013), and researches on E-banking adoption and usage by Jaruwachirathanakul & Fink (2005); Bander (2008); Gibson & Gibson (2009); Clegg et al. (2010); Shafei & Mirani (2011); Mohammad (2012); Pham et al. (2013); and Fonchamnyo et al. (2013).

E-banking usage (EBU) is defined as the frequency by which customers use E-banking products and services after adoption (with the two observed variables), referring to the TAM by Davis et al. (1991; 1993), the TAM 2 by Venkatesh & Davis (2000), the UTAUT model by Venkatesh et al. (2003), researches on adoption and usage of Internet banking by Podder (2005); Sattabusaya et al. (2007); Hernandez & Mazzon (2007); Bander (2008); Surapong (2009); Yaghoubi & Bahmani (2010); Hosein (2010); Njuguna et al. (2012); and Ali et al. (2013), and researches on adoption and usage of E-banking by Clegg et al. (2010); Mohammad (2012); Fonchamnyo et al. (2013); and Pham et al. (2013).

The research establishes the following hypotheses:

- Relationships of the independent variables

H1a⁺: Perceived ease of use has a positive reciprocal relationship to behavioral control.

H1b⁺: Perceived behavioral control has a positive reciprocal relationship to compatibility.

H1c⁺: Compatibility has a positive reciprocal relationship to perceived ease of use.

H1d⁺: Compatibility has a positive reciprocal relationship to performance expectancy.

H1e⁺: Performance expectancy has a positive reciprocal relationship to bank image.

H1f⁺: Bank image has a positive reciprocal relationship to compatibility.

H1g⁻: Bank image has a negative reciprocal relationship to perceived risk in online transaction.

- Effects on E-banking adoption (EBA)

H2a⁺: Perceived behavioral control has a positive impact on EBA.

H2b⁺: Compatibility has a positive impact on EBA.

H2c⁺: Performance expectancy has a positive impact on EBA.

H2d⁺: Bank image has a positive impact on EBA.

H2e⁻: Perceived risk in online transaction has a negative impact on EBA.

- *Effects on E-banking usage (EBU)*

H3a⁺: Perceived ease of use has a positive impact on EBU.

H3b⁺: E-banking adoption has a positive impact on EBU.

3. RESULTS AND DISCUSSION

Observed variables are measured by the 7-point Likert scale and questionnaires are sent by post and email to surveyed people who have used or have intention to use E-banking services in Vietnam. Gathered data are analyzed using SPSS and AMOS softwares. The preliminary research with a trial scale is conducted with 50 samples. Of 32 tentative variables, three are removed from the scale: PBC₁ of perceived behavioral control, C₁ of compatibility with Cronbach alpha < 0.06 (as suggested by Nunnally, 1993), and RPT₄ of perceived risk in transaction with factor loading in EFA < 0.50 (as suggested by Hair et al., 2006). Thus, the official research is conducted with 369 samples and 29 observed variables.

a. Statistical Description of Samples:

Gender: there is no significant difference between male (51.50%) and female (48.50%). *Age*: the 20-29 and 30-39 age groups represent 43.90% and 40.90% of respondents respectively; the remaining respondents are of other age groups. *Education*: higher education accounts for 53.70%; postgraduate education 33.10%; while respondents who have not finished secondary education represent 1.10%. *Job*: office workers account for 37.10%; lower manager 25.20%; middle manager 16.50%; and university and high school students 8.90%. *Income*: VND5 - 9 million income bracket accounts for 38.80%; 10 - 19.9 million bracket 27.10%; and other brackets represent smaller proportions. *Home region*: 31.40%, 14.10% and 54.50% are proportions of surveyed people from the North, Central Vietnam and the South respectively. *Bank account*: accounts with joint-stock commercial banks represent 57.90%; with state-owned ones 28.60%; and foreign banks 10.90%.

b. Model and Hypotheses Testing:

- *Exploratory Factor Analysis (EFA)*:

From 27 observed variables, EFA extracts 7 factors that are divided into groups of components in rotated component matrix as required by the research model. The EFA

results are presented in Table 2. The coefficient KMO is 0.896 at statistical significance of 0.000 implying that EFA of the independent components is appropriate. Total variance extracted of variables is 73.309 %, which implies that they can explain 73.309 % of variation in data.

With an extracted variance of 79.431%, EBU can explain variation in data rather well. Factor loading of variables included in EBU is also high (> 0.80).

Table 2: Structure of Components and Scale for E-BAM

Observed variables		Factor Loading		Cronbach α	Eigenvalues	AVE
		EFA	CFA			
<i>Bank Image (BI)</i>				0.888	9.199	0.573
1	BI ₆ Banks improve the quality of products and E-banking service.	0.787	0.836			
	BI ₄ Commitments to high quality for E-banking services are well implemented.	0.762	0.818			
	BI ₅ Banks provide full instructions and online supports for E-banking.	0.757	0.790			
	BI ₁ Banks gain good prestige and fame.	0.755	0.741			
	BI ₃ Big investments in E-banking systems are made.	0.741	0.701			
	BI ₂ Bank image is better than competitor's.	0.705	0.632			
<i>Perceived Ease of Use (PEU)</i>				0.897	3.022	0.639
2	PEU ₁ E-banking usage is easy to learn.	0.806	0.872			
	PEU ₂ E-banking transaction is simple and understandable.	0.786	0.788			

	PEU ₄	It is easy to use E-banking system skillfully.	0.766	0.797	
	PEU ₃	E-banking system seems flexible.	0.714	0.770	
	PEU ₅	Using E-banking helps implement transactions at will.	0.706	0.768	
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	<i>Performance Expectancy (PE)</i>			0.882	2.100 0.654
	PE ₁	E-banking service seems to be useful and convenient.	0.799	0.877	
3	PE ₂	EBU helps save time better.	0.797	0.851	
	PE ₃	EBU helps improve productivity and performance.	0.773	0.762	
	PE ₄	E-banking helps complete bank-related activities quickly.	0.764	0.737	
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	<i>Perceived Behavioral Control (PBC)</i>			0.854	1.569 0.667
	PBC ₃	Necessary resources for EBU.	0.821	0.865	
4	PBC ₄	Necessary knowledge for EBU.	0.803	0.789	
	PBC ₂	EBU is well under control.	0.752	0.794	
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	<i>Perceived Risk in Transaction (PRT)</i>			0.835	1.146 0.637
	PRT ₂	Confidentiality of transactions through E-banking system is not secured.	0.886	0.896	
5	PRT ₃	Frauds and loss of money may happen when using E-banking services.	0.851	0.759	
	PRT ₁	E-banking can fail to ensure privacy.	0.807	0.730	
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<i>Compatibility (C)</i>		0.807	1.034	0.591
C ₃	Using E-banking is appropriate with the present financial situation.	0.756	0.815	
6 C ₂	Using E-banking is suitable for financial management.	0.734	0.777	
C ₄	Transaction through E-banking system is as easy as transaction by cash.	0.702	0.710	
<i>E-banking Adoption (EBA)</i>		0.864	1.723	0.632
EBA ₃	E-banking is strongly recommended.	0.919	0.896	
7 EBA ₂	E-banking can be used frequently in future.	0.881	0.747	
EBA ₁	I have intention to use E-banking in the next 3 months.	0.866	0.731	

Source: Results of analysis of Cronbach alpha, EFA and CFA.

- Confirmatory Factor Analysis:

Confirmatory Factor Analysis (CFA) demonstrates that the model is compatible with data. Table 3 shows that Chi-square (χ^2)/DF = 2.012; GFI = 0.890; TLI = 0.949; CFI = 0.941; and RMSEA = 0.055. Table 2 indicates that standardized CFA factor loadings of all observed variables are high, varying between 0.701 and 0.896. According to Fornell & Larcker (1981), the average variance extracted (AVE) varying from 0.573 to 0.667 (larger than 0.50) reflects a high convergent validity for the measures. In addition, the measures gain discriminant validity because all AVEs are larger than the corresponding squared correlation coefficients (r^2). Moreover, the Cronbach alpha values of all variables of components included in official measures are satisfactory, implying that they are good measures (>0.80). The results of theoretical model test are shown in Table 3 with χ^2 /DF = 1.806; GFI = 0.905; TLI = 0.949; CFI = 0.956; and RMSEA = 0.047, which shows that the model is compatible with the data.

Table 3: CFA Indicator

Indicator	Reference value	Measurement model	Theoretical model
CMIN/DF (χ^2/DF)	≤ 2.00 *	2.012	1.806
GFI	≥ 0.90 **	0.890	0.905
TLI	≥ 0.90 **	0.949	0.949
CFI	≥ 0.90 **	0.941	0.956
RMSEA	≤ 0.05 ***	0.052	0.047

Source: * Carmines & McIver (1981), ** Bentler & Bonett (1980), *** Steiger (1990) and data of CFA in this research.

- SEM Analysis:

The results of SEM analysis presented in Table 4 show a correlation among PBC, PEU, and C, with $\beta = 0.659$ (level of statistical significance of $p = 0.000$) and $\beta = 0.397$ ($p = 0.000$) respectively, while PBC impacts on EBA with $\beta = 0.475$ ($p = 0.000$), so H1a, H1b and H2a are accepted.

C is correlated to PEU, PE and BI with respectively $\beta = 0.554$ ($p = 0.000$), $\beta = 0.364$ ($p = 0.000$) and $\beta = 0.224$ ($p = 0.000$); and it also has an influence on EBA with $\beta = 0.364$ ($p = 0.000$), hence all four hypotheses H1c, H1d, H1f and H2b are accepted.

There exists a correlation between PE and BI with $\beta = 0.565$ ($p = 0.000$) and PE has an impact on EBA with $\beta = 0.300$ ($p = 0.000$), thus H1e and H2c are accepted.

BI is negatively correlated to RPT with $\beta = -0.169$ ($p = 0.002$) and impacts on EBA with $\beta = 0.347$ ($p = 0.000$), which allows hypotheses H1g and H2d to be accepted.

PRT impacts negatively on EBA with $\beta = -0.138$ ($p = 0.033$), so H2e is accepted.

The impact of PEU on EBU has a coefficient β equaling 0.599 ($p = 0.003$), therefore hypothesis H3a is accepted.

EBA has an impact on EBU with $\beta = 0.550$ ($p = 0.006$), leading to acceptance of H3b.

In sum, test results show all hypotheses are accepted. Hypotheses H1a, H1b, H1c, H1d, H1e, H1f, H2a, H2b and H2c show that PEU, PBC, C, PE and BI have reciprocal relationships and impact positively on E-banking adoption; H1g and H2d imply that PRT

has a reciprocal relationship to BI and impact negatively on EBA; while hypotheses H3a and H3b show that PEU and EBA have a positive effect on E-banking usage.

Table 4: Relationships in E-BAM – SEM

	Hypothesis (H)	Relationship	Estimate - β	Standard deviation	Critical value (CR)	Significance (p-value)	Result
1	H1a ⁺	PEU ↔ PBC	0.659	0.071	8.388	***	Accepted
2	H1b ⁺	PBC ↔ C	0.397	0.054	5.704	***	Accepted
3	H1c ⁺	C ↔ PEU	0.554	0.063	6.932	***	Accepted
4	H1d ⁺	C ↔ PE	0.364	0.048	5.735	***	Accepted
5	H1e ⁺	PE ↔ BI	0.565	0.062	7.333	***	Accepted
6	H1f ⁺	BI ↔ C	0.244	0.041	4.206	***	Accepted
7	H1g ⁻	BI ↔ RPT	-0.169	0.039	-3.175	0.002	Accepted
8	H2a ⁺	PBC → EBA	0.475	0.057	6.027	***	Accepted
9	H2b ⁺	C → EBA	0.364	0.072	4.166	***	Accepted
10	H2c ⁺	PE → EBA	0.300	0.064	3.420	***	Accepted
11	H2d ⁺	BI → EBA	0.347	0.066	4.085	***	Accepted
12	H2e ⁻	RPT → EBA	-0.138	0.051	-2.129	0.033	Accepted
13	H3a ⁺	PEU → EBU	0.599	0.075	2.936	0.003	Accepted
14	H3b ⁺	EBA → EBU	0.550	0.105	2.730	0.006	Accepted

*** p < 0,001

Source: Results of SEM analysis.

c. Discussion:

There are several relevant researches in Vietnam: Trương & Lê (2008) apply the model of technological adoption to E-banking adoption based only on TAM, while Pham et. (2013) propose a model of E-Banking adoption in Vietnam without offering

specific research results. In this research, authors develop the E-BAM by integrating different theoretical models such as TRA, TPB, TAM, TAM 2, IDT and UTAUT, and the research results are based on analyses of samples gathered nationwide.

The results of SEM analysis in E-BAM as presented in Figure 1 show that factors PEU (perceived ease of use), PBC (perceived behavioral control), C (compatibility), PE (performance expectancy), and BI (bank image) are correlated with at least two other factors. Specifically, the strongest inverse correlation is found between PEU and PBC with β equaling 0.659 ($p = 0.000$); while PRT has the weakest inverse correlation to BI with β equaling -0.169 ($p = 0.002$).

Moreover, PBC, C, PE, BI and PRT have impacts on E-banking adoption, and the strongest impact is from PBC with $\beta = 0.475$ ($p = 0.000$) and the weakest one is from PRT with $\beta = -0.138$ ($p = 0.033$). Due to a negative regression coefficient β of PRT ($\beta < 0$), there exists an impact in which the higher the level of risk, the lower the level of E-Banking adoption, and vice versa.

PEU has a direct impact on E-banking usage with coefficient $\beta = 0.599$ ($p = 0.003$), showing that people will be ready to use E-banking service when it is easy. Additionally, there is a correlation between EBA and EBU with a coefficient β of 0.550 ($p = 0.006$), which implies that the higher the adoption of E-banking, the broader the usage of E-banking.

Generally, the research results reflect correlations between independent components, and confirm that EBU is directly affected by EBA and PEU.

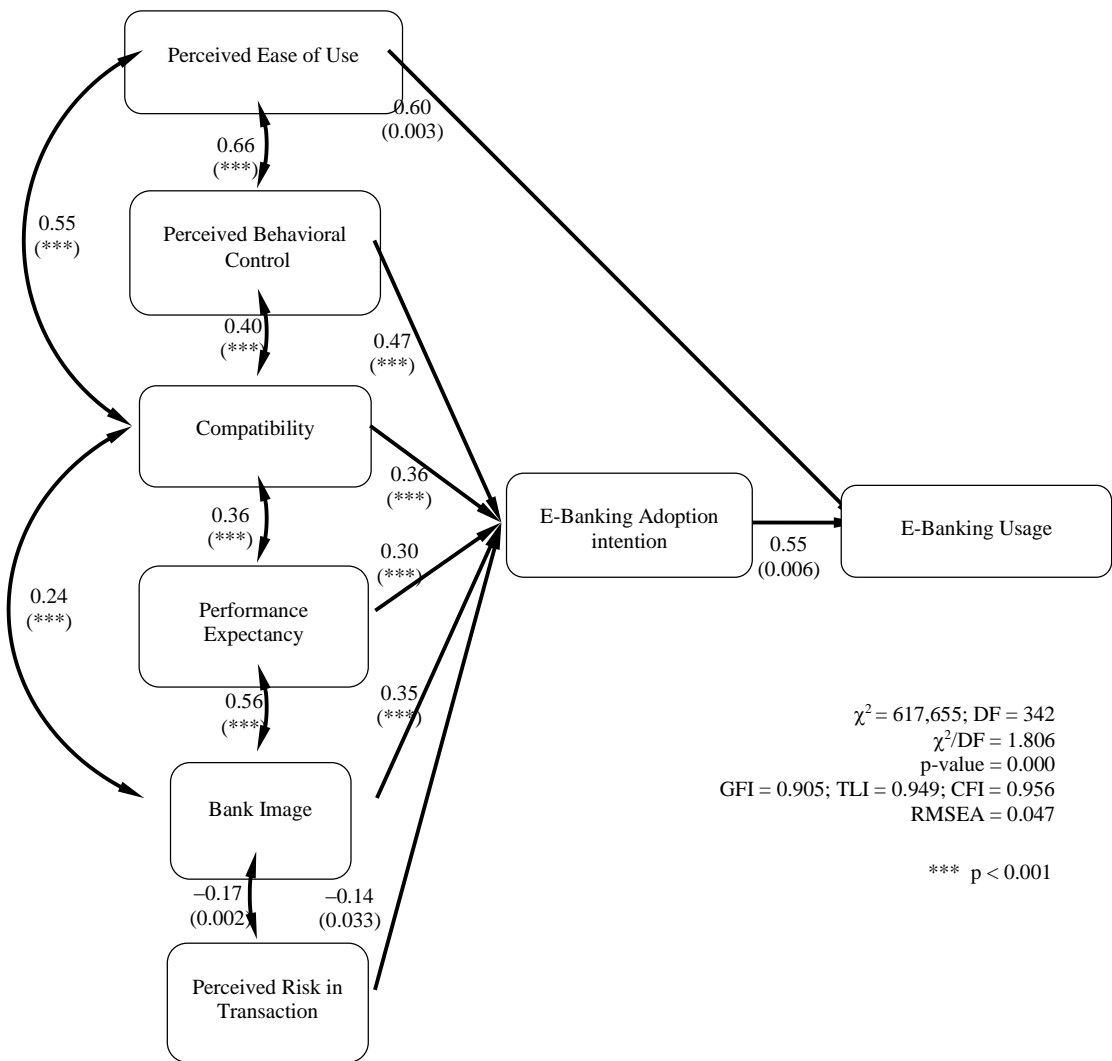


Figure 1: Model of E-Banking Adoption and SEM

Source: Proposed research model and research results

4. RESULTS AND RECOMMENDATIONS

a. Results:

The results from E-BAM show that measures for variables (adoption and usage of E-banking) ensure the reliability. Both EFA and CFA for the variables produce high factor loadings, and their measures obtain the discriminant validity. Moreover, the SEM

analysis shows the factors as perceived behavioral control, compatibility, performance expectancy, bank image and transaction-related risk have mutual influence and affect the E-banking adoption; meanwhile, both perceived ease of use and adoption of E-banking have an impact on E-banking usage.

All of 14 hypotheses proposed by the research model are accepted. Moreover, the E-BAM indicates the correlations between the independent factors and the impact of PEU on EBU which is not demonstrated in the previous study by Nguyễn & Cao (2011). Adoption and usage of E-banking in Vietnam is well explained by high model testing weights.

b. Recommendations:

E-BAM identifies the factors that impact on adoption and usage of E-banking in Vietnam, thereby evaluating different impacts of these factors on EBU and EBA. The research results can serve as a basis for relevant studies in Vietnam. However, the results still have several limitations. Future researches need to acquire a larger sample and extend the scope of the study, adjust the measures according to development of E-banking service in Vietnam and the world, include demographic factors in the SEM, and add several measures for such factors as service quality and socio- cultural effects.

The research results are also basis for Vietnam's banks to strengthen adoption and usage of E-banking services. The research shows that perceived ease of use has the strongest effect on E-banking usage. Although this factor depends much on technology and personal competence, banks should design so comprehensive E-banking products that customers can easily understand and use them. Interfaces of E-banking services should be customer friendly and flexible enough to help customers get access to other banking services. Additionally, risk involved in online transactions is a reason for customers' hesitation in adoption and usage of E-banking, because there exist information crimes worldwide and "criminal activity may even initiated by using the consumer's personal information to create false identities" (Ratnasingham, 1998).

In Vietnam, about 20 electronic banks have serious security gaps that can make hackers easily attack customers' computers, steal personal information, insert malicious codes into banking host server and control total E-banking system. These gaps are caused by banks' failure to pay attention to information security, establish a process of independent evaluation of internet security and invest in system security (Bkis, 2010).

To reduce risk involved in online transactions, banks should build an effective system of information security for customers when they make transactions through E-banking system. The influence of PEU on E-Banking adoption and usage is enhanced by helping customer save their time and expenditures on transactions through banks. There should be a cooperation between banks in applying uniformly new technologies, expanding electronic networks such as Banknet, Smartlink, Inter Banking Payment System (IBPS), and Host2Host, etc., improving efficiency of new technological applications and shortening the time for handling transactions through E-banking channels.

The banks can also promote E-banking adoption and usage by enhancing E-banking service quality, building up customer's loyalty and domino effect of E-banking usage. Last but not least, banks should introduce measures to raise frequency of usage of E-banking products and services and encourage customers to transfer to E-banking channels■

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