Online banking adoption: an empirical analysis

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Abstract
Purpose – This paper aims to empirically examine the factors that affect the adoption of online banking in Vietnam. Perceived usefulness, perceived ease of use, trust and government support were examined to determine if these factors are affecting online banking adoption.

Design/methodology/approach – A survey was distributed to 156 respondents in Vietnam with 103 usable samples giving a response rate of 66 percent. Data were analyzed by employing correlation and multiple regression analysis.

Findings – The results showed that perceived usefulness, trust and government support all positively associated with the intention to use online banking in Vietnam. Contrary to the technology acceptance model, perceived ease of use was found to be not significant in this study.

Research limitations/implications – This study was conducted in Vietnam and future research can use this model to study the adoption of online banking in other countries.

Practical implications – The results allow banks’ decision makers to develop strategies that can increase the adoption of online banking. Banks should improve the security and privacy of the web sites, which will increase the trust of users. Banks should also create features which are useful to users and make sure users are aware of these features. Lastly, government should also play a role to support banks in their efforts to increase online banking adoption.

Originality/value – The findings allow the factors that can influence the adoption of online banking in Vietnam to be understood. Unlike existing studies based on Technology Acceptance Model (TAM), this study includes both security and government support on top of the existing variables used in TAM. Most studies on adoption of online banking are focused on developed countries. By focusing on Vietnam, this model can also be applied to other countries which are relatively new to e-commerce and online banking.

Keywords Virtual banking, Trust, Electronic commerce, Vietnam

Paper type Research paper

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Introduction

The application of internet technologies to businesses for improvements in their performances is not something new. As stated by Saffu et al. (2008), there is an increase in applications of e-commerce in businesses in the past ten years. The benefits of e-commerce include reduction in cost, increasing business opportunities, reducing lead time and providing a more personalized service to the consumers (Turban et al., 2008).

One e-commerce tool that is being adopted by the banking industry is online banking or e-banking. IT tools such as online banking have provided an improvement in services among the banking industry (Dawes and Rowley, 1998). There are currently more than thousands of e-banking web sites all over the world (Gurau, 2002). Although online banking has been implemented in many developed countries such as the United States and those in Europe (Pikkarainen et al., 2004), there is a growing trend in the adoption of online banking by banks in developing countries too (Gurau, 2002). One developing country, which has been growing rapidly in recent years is Vietnam (PhanCuNhan, 2005).

E-commerce is still very much at the beginning stage in Vietnam (Huy and Filiatrault, 2006). Although Vietnam is currently attracting foreign investors due to its low cost advantage when compared to other countries, a low cost strategy will not guarantee businesses to compete effectively in the long run (Chong and Ooi, 2008). In order for the companies to stay competitive, they can implement e-commerce to enable them to be more productive and efficient. The importance of e-commerce in Vietnam is highlighted by the fact that the Vietnamese government is aiming to have more firms conducting e-commerce by 2010 under their Overall Plan on Developing E-commerce (People’s Daily, 2006). Given the importance of online banking, it has become part of the overall e-commerce strategic plan in Vietnam.

However, in order for online banking to be successful in Vietnam, users should be willing to adopt the technology (PhanCuNhan, 2005). Although the Vietnamese government is willing to spend money to invest on e-commerce infrastructure, the ultimate success of e-commerce such as online banking is still depending on consumers’ perceptions and whether they are willing to use online banking.

Although there are past literatures studied on the adoption of online banking, many of these studies have tended to focus on European countries or the United States (Pikkarainen et al., 2004). However, Vietnam is different from these countries given that the economy is still expanding in recent years and its e-commerce infrastructure is still less developed compared to Malaysia. Thus the adoption of online banking is still at its infancy when compared to other developed nations. Therefore, the primary objective of this research is to understand the consumers’ perception towards the acceptance of internet banking in Vietnam and identifies the factors that can predict their intention to use in internet banking context. Given that there are many factors that can influence the usage of online banking, the result from this study will allow decision makers in banks to focus on the factors which will increase the adoption of online banking in Vietnam.

Literature review

Internet banking

Many organizations today have responded to the competitive business environment by implementing e-business as part of their business strategies. With the growth of the
Internet, it is inevitable for banks to move towards providing online banking for their customers. Although the current branch based retail banking remains the most common method for conducting banking transactions, internet technologies have changed the way personal financial services are designed and delivered to customers (Wang et al., 2003). Shih and Fang (2004) describe internet banking as a new type of information system that uses the innovative resources of the internet and WWW (world wide web) to enable customers to effect financial activities in virtual space. For example, it allows customers to perform a wide range of banking transactions electronically via the bank's web site (Tan and Teo, 2000).

Early online banking web sites contained mainly product and service information for their customers. However, with the development of asynchronous and secured electronic transaction technologies, more banks are now using online banking both as a transactional as well as an informational medium. As a result, registered internet banking users can now perform common banking transactions such as writing cheques, paying bills, transferring funds, printing statements, setting up fixed deposits, purchasing investment related funds and enquiring about account balances. Internet banking has evolved into a “one stop service and information unit” that promises great benefits to both banks and consumers (Tan and Teo, 2000).

Internet banking works the same way as the traditional banking services. The main difference is that customers are accessing their account and information, making payments and reconciling statements by using their computer rather than paper to complete the transactions. Internet banking services are crucial elements for the long-term survival of banks in the world of electronic commerce (Tan and Teo, 2000). The market for internet banking is forecasted to grow sharply in the next few years, affecting the competitive advantage enjoyed by traditional banks with physical branches (Duclaux, 1996; Liao et al., 1999).

Although online banking is common in many developed countries, for many developing countries, online banking is still very much at its infancy. This is especially true for countries, such as Vietnam, which are still building up their IT infrastructure. One of the Vietnamese's government economic plans is to shift its focuses from agricultural production to the service industry. As banking is an important part of the service industry, it is important for the banks to operate efficiently through the use of online banking. Although online banking is still unfamiliar to many Vietnamese users and is still at an early stage of development, but with an internet population of 15 million users, there is a huge market potential for banks to explore (VietnamNet, 2009). However, for any technologies to be successfully introduced and used, the users have to accept and adopt the technology. Although online banking adoption studies have been conducted in many developed and Western countries, studies for a developing and fast growing country such as Vietnam remain very few. Therefore this study attempts to investigates the factors that can influence users' acceptance of online banking in Vietnam.

Technology adoption models
To assess the adoption scenario of IT application in the market, such as internet banking, a lot of previous studies and research have carried out and various frameworks were proposed to identify the factors or determinants influencing the acceptance of technology in the consumer context. Since online banking is a type of
technological innovation (Lin and Lee, 2005), existing studies on innovation adoption could be used in the study of online banking. One of the most common models used by researchers in the study of individual’s adoption of technology is Technology Acceptance Model (TAM) (Davis, 1989). TAM proposed that both the perceived usefulness and perceived ease of use can be used to predict the attitude towards using new technology, which in turn affects the behavioral intention to use the actual system directly (Davis, 1989; Venkatesh et al., 2003).

Perceived usefulness is defined by Davis as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989). Thus for users of online banking, they will adopt the system if they believe the system will bring benefits such as reducing time spent on going to bank and improving efficiency (Rao et al., 2003).

According to TAM, perceived ease of use is “the degree to which the prospective adopter expects the new technology adopted to be a free effort regarding its transfer and utilization” (Davis, 1989). Therefore if users feel that online banking is easy to use and free of hustle, then the chances of them to use the system will be greater.

Jeyaraj et al. (2006) conducted a comprehensive review of predictors of technology adoptions by organizations and individuals that were published between 1992 and 2003 and found that TAM is one of the most widely used technology adoption model. Although TAM was first introduced in 1989, it is still being widely used as shown in Jeyaraj et al. (2006). However, many research state that TAM itself is insufficient to explain users’ decisions to adopt technologies, therefore they use TAM as a base model and extended the model by adding additional variables to the model depending on the types of technologies they studied. For example, Kamarulzaman (2007) on his study of internet shopping adoption drew upon TAM and included personal and cognitive influence. Amin (2007) also modified the original TAM by including perceived credibility and the amount of information on mobile credit card were added to his study of mobile credit card usage intentions. Various extensions to the TAM were also conducted in the study of online banking such as those conducted by Pikkarainen et al. (2004) also used TAM as a base and included various factors such as security and privacy, enjoyment and amount of information.

Other researchers have also tried to combine TAM with other technology adoption models. Hernandez and Mazzon (2007) applied TAM with other technology adoption models such as Innovation Diffusion Model and TAM2, which is an extension of TAM in their study on online banking implementation in Brazil. Gounaris and Koritos (2008) applied Perceived Characteristics of the Innovation (PCI) model in their online baking adoption study. However, the model is a combination of TAM with another model known as Innovation Diffusion Model which looks at a technology’s characteristics in the study of technology adoption.

Based on existing studies, our research will also use TAM as the base model and will extend the model by including other variables which we believe are important for the studies of online banking adoption in Vietnam. Our model aims to focus on factors which are specific to Vietnam, i.e. the Vietnamese’s government support and Vietnamese consumers’ trust on security and privacy due to the unclear internet laws and regulations in Vietnam.

Like many developing countries, government plays an extremely important role in the planning of the country’s economy. The Vietnamese government believes that
e-Commerce plays an important role in their country development. However, the overall internet usage in Vietnam remains very low when compared to other ASEAN countries such as Malaysia and Singapore (Hoang, 2003). Many information and business transactions over the internet are still ruled by the Vietnamese government policies (Hoang, 2003). Moreover, laws related to security and privacy issues remained unclear to many users, which will affect whether internet banking is trustworthy to the users. The factors related to Government support as well as consumers’ trust on the security and privacy of the online banking are slightly different from existing studies conducted in many developed or Western countries. For example, Vietnamese government plays a more important role in planning the economy when compared to many developed or Western nations. There are still many parts of Vietnam whereby the technological infrastructure still does not supports good internet connections. Unlike many developed nations whereby transactions online have clear law and policies, such issues remained unclear in Vietnam. Therefore we feel that it is important to study if the Vietnamese government’s support can influence the adoption of online banking as several countries have shown that government policies can influence the adoption and growth of IT (Chong and Ooi, 2008). As with many internet technologies, it is also important to investigate if users’ trust on security and privacy will influence the adoption of online banking. Given that there is a lack of clear laws and regulations on the security and privacy of online transactions in Vietnam, we would like to see if this will have an influence on the adoption of online banking. Therefore our research maintains the original variables derived from TAM which are perceived usefulness and perceived ease of use, and extend TAM by incorporating trust and government support which we believe will play a major role in influencing Vietnamese users’ decision to adopt online banking.

Perceived usefulness

Perceived usefulness in this study is the extent to which the individual believes that internet banking is more advantageous when compared to traditional way of conducting banking transactions. These benefits include allowing them to conduct banking activities anytime, anywhere.

Past studies on technology adoptions have consistently showed that perceived usefulness has a strong influence on users’ intentions to adopt the technology. Jeyaraj et al. (2006) in their review of technology adoption studies from 1992-2003, found that of the 29 studies on technology adoptions, perceived usefulness was found to be significant in 26 of the studies.

Perceived usefulness is also one of the common factors applied in existing online banking literatures. Pikkarainen et al. (2004) in their study of online banking in Finland, found that perceived usefulness is one of the most significant influence on the intention to use online banking among the consumers. Gounaris and Koritos (2008) compared various models in their study of the drivers of internet banking adoption decision. Similar to Pikkarainen et al’s study, perceived usefulness was found to be one of the important adoption factors for online banking implementation. Celik (2008) conducted a web based survey to find out the adoption of online banking among Turkish users and his finding was consistent with prior studies i.e. perceived usefulness plays a significant role in determining Turkish users’ intentions to adopt online banking. At the same time, Amin (2007) also found that perceived ease of use is
an important determining factor as to whether users would be likely to adopt mobile credit card transactions.

Jaruwachirathanakul and Fink (2005) conducted a study on Thailand, which like Vietnam, is a country in Southeast Asia as well as being a fast growing developing nation, also found that perceived usefulness is able to encourage the adoption of online banking among Thai consumers. Therefore, based on the literatures, we hypothesize that:

H1. Perceived usefulness has a positive effect on Vietnamese intention to adopt internet banking.

Perceived ease of use
Like perceived usefulness, perceived ease of use is derived from TAM. Even though the customers may believe the given application is useful, but at the same time they might think that the system is difficult to use (Davis, 1989). Besides perceived usefulness, perceived ease of use has also been validated as important determinant in adoption of a lot information technologies, such as intranet (Chang, 2004), WWW (Lederer et al., 2000), online banking (Wang et al., 2003) and wireless internet (Lu et al., 2003; Shih and Fang, 2004). According to Rogers (1995), complexity of one particular system will become the inhibitor that discourages the adoption of an innovation.

Given that users do not have face-to-face interaction in an internet environment, user friendliness and the ease of use of the web sites will lessen the threat to use internet banking by the customers. An application perceived to be easier to learn and easier to use than another is more likely to be accepted by users (Pikkarainen et al., 2004). Gounaris and Koritos (2008) applied the PCI model in their study of online banking and their model consists of variables derived from TAM. Their study concluded that perceived ease of use was able to improve the prediction of consumers’ adoption of online banking. However, not all studies found that perceived ease of use has an influence on the adoption of online banking. Studies from Pikkarainen et al. (2004) and Eriksson et al. (2005) found that perceived ease of use do not influence the adoption of online banking. However, their studies were conducted in different environment than Vietnam. In Vietnam, as Hoang (2003) pointed out, Vietnamese users have little experience in using the internet and therefore the ease of use of the online banking web site might influence their adoption decision. As different studies show various results in the influence of perceived ease of use, our study will include the variable and hypothesize that:

H2. Perceived ease of use has a positive effect on Vietnamese intention to adopt internet banking.

Government support
Government’s support is one of the major driving forces in internet banking adoption (Tornatzky and Klein, 1982; Jaruwachirathanakul and Fink, 2005). Government can support internet banking adoption by investing in infrastructure such as fiber optic cabling. Government’s heavy investment in IT infrastructure can been seen in countries such as Singapore, Japan and Malaysia (Chong and Ooi, 2008).

Tan and Teo (2000) in their study of online banking adoption in Singapore, found that government’s support significantly influence the users’ intention to adopt online

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banking. During the 1990s, the Singaporean government successfully promote the adoption of electronic data interchange (EDI) through educational programme as well as providing success stories of EDI implementation from other countries (Burn, 1995).

In Malaysia, government has been known to promote using various online services such as the having more e-government web sites that are easily accessible. The government has invested in commercials aired on television as well as radio to promote e-government web sites such as MyEG service, which allows users to renew their road tax online. Besides promotion and supporting with infrastructures, government’s role in defining a clear cyberlaw will also improve users’ confidence in online banking.

Government support is important in the development of e-commerce in Vietnam. Although Vietnam has a fast growing economy like China, their economy is still very much centrally planned and driven by the government. The government has done the first step through continual investments in infrastructures that support e-commerce, they would still need to support and encourage more users to adopt online banking. Vietnamese still primarily carry out their transactions in cash (LookatVietnam.com, 2009). Therefore the government plays a role in encouraging their citizens to conduct transactions online and thus make use of online banking.

As Hoang (2003) pointed out, the government still needs to work on certain areas to improve the e-commerce adoption in Vietnam. For example, there is a lack of supporting laws or regulations to support e-commerce. The financial system of Vietnam also needs to be changed to support internet buying and selling that affects online banking. Many business invoices are traditionally issued and controlled centrally by the Vietnamese government. Hoang (2003) also stated that the government should also set up a body to deal with e-commerce.

Chong and Ooi (2008) in their study of RosettaNet adoption in Malaysia found that the Malaysian government plays an important role in driving RosettaNet standards adoption through incentives such as grants and tax exemptions. Therefore this study hypothesize that:

\[ H3. \] Government support has a positive effect on the Vietnamese to adopt internet banking.

**Trust**

Trust is an important element affecting consumer behavior and it determines the success of technologies adoption such as e-commerce (Chen and Barnes, 2007; Holsapple and Sasidharan, 2005; Goles et al., 2009; Yang et al., 2009). In our study, trust is defined as the extent to which an individual believes that using online banking is secured and has no privacy threats. Therefore our study focuses on the element of security and privacy from the consumers’ perceptions as to whether they believe transactions on internet banking is secured and private. Such definition is similar to Eriksson et al. (2005) in which they define trust from the customers’ perception on security and reliability of the online banking system.

Sathyne (1999) found that security and privacy concerns are identified as the “biggest obstacles” to the adoption of online banking in Australia. Trust is also more crucial and complex in internet banking than traditional banking due to its virtual environment. Thus, to complete the purchase transaction, customers have to trust the online business and online transaction of the bank. Without trust the consumer will avoid making any transaction online. This is particularly important in a Vietnamese culture.
whereby transactions were conducted face to face and most people have little experience on internet transactions.

Grabner-Krauter and Faullant (2008) investigated if technology trust has a role in influencing the usage of internet banking. One factor which influences the technology trust is whether the system is secured or not and they recommended that it is possible for banks to improve the security of the system to increase the level of consumers trust.

Jahangir and Begum (2008) found that consumers' trust on security and privacy are both important factors in influencing the adoption of online banking in Bangladesh (another developing country), which like Vietnam, is at an early stage of online banking implementation.

Hernandez and Mazzon (2007) conducted a comprehensive study on internet banking adoption in Brazil and their results are consistent with other studies, which support the importance of security and privacy in influencing the adoption of online banking.

Amin (2007) indicates that trust is the “heart of the system” for online banking. Thus, we can say that internet banking is susceptible to greater sense of insecurity than older banking services and thereby importance of trust is also relatively higher in adoption of internet banking (Figure 1). Since the impact of trust on intention to adopt is hard to be ignored in this study, we propose the following hypothesis:

\[ H4. \] Trust will have a positive effect on Vietnamese's intention to adopt internet banking.

**Methodology**

**Sampling and data collection**

A survey instrument was developed for testing the hypotheses in this study. In order to ensure the content validity of the scale used, it is advised to largely adapt the items for each construct from prior researches (Luarn and Lin, 2005). Therefore 21 survey items

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**Figure 1.**

The research model
for five constructs in the questionnaire were adapted from prior empirical studies and are modified to fit into the context of online banking. Table I shows the sources of where the questions were adapted from. In order to ensure that the survey is valid, we also distributed our survey forms to ten executives from the banking industry for their comments and amended our survey form based on the feedbacks we received from them.

The target population for this study are Vietnamese bank customers. The surveys for this study were distributed at banks located in Hanoi in Vietnam. We have chosen Hanoi as it is the capital of Vietnam, and most of the major banks are located in Hanoi. We chose five major banks located in Hanoi and the questionnaire was given to every third customer who enters the bank. These customers include both adopters and non-adopters of online banking. A total of 156 respondents participated in the survey. Out of these 156 samples, 53 samples were eliminated due to partial respond, missing data and answered the demographic questions only. The reason why 53 samples were eliminated is due to the reason many customers were given the forms as they enter the bank but when they returned the forms before leaving the bank, they did not fill in the survey forms completely. Thus only 103 samples were usable given a response rate of 66 percent.

Variable measurement

Independent variables
A total of 17 items were developed to capture the four adoption factors. Each question was measured by five-point Likert scale. For instance, “1” denotes as strongly disagree, “2” denotes as disagree, “3” denotes as neutral, “4” denotes as agree and “5” denotes as strongly agree.

Dependent variable: consumer intention to use online banking
The intention for consumer to use online banking was measured using items adapted from the original TAM (Davis, 1989). In this study, some of the items for intention to use in the questionnaire were also consistent with that of Davis (1989), Jaruwachirathanakul and Fink (2005), Pikkarainen et al. (2004), Tan and Teo (2000).

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Number of items</th>
<th>Sources</th>
</tr>
</thead>
</table>

Table I. Construct and their sources
The consumer intention to use was measured using five-point Likert scale where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. Four items were used to capture the intention to use online banking (see the Appendix for the questionnaire used in this study).

Data analysis

Profile of respondents

In the survey, the gender distribution of the respondents is 50.5 percent males and 49.5 percent females. More than 70 percent of the respondents are still single. The results also indicate that the respondents are relatively young, with 74.7 percent between 21 and 30 years old. Majority of the respondents have college or higher education level: 21.4 percent are diploma or advanced diploma holders, 55.3 percent have degree or professional qualifications level and 17.7 percent have masters degree of education. A total 6 percent of the respondents have only high school qualification (Table II).

Factor analysis and scale reliability

In order to examine the psychometric properties of adoption factors for online banking and intention to use, the scale composite reliability (SCR) that focus on the standardized loadings and error of measurement for every item and the average variance extracted (AVE) measures have been calculated. Table III shows the Cronbach’s alpha for each construct, the AVE and the composite reliability (Pinho, 2008).

Molina et al. (2007) stated that the minimum proposed composite reliability value is 0.70. To complete the analysis, the AVE is computed, in which the minimum suggested value is 0.5 (Molina et al., 2007, pp. 691). Table III indicates that in every case, the scales are within the acceptable range and the composite reliability of all latent constructs

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>52</td>
<td>50.5</td>
</tr>
<tr>
<td>Female</td>
<td>51</td>
<td>49.5</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 20 years</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>21-25 years</td>
<td>34</td>
<td>33.0</td>
</tr>
<tr>
<td>26-30 years</td>
<td>43</td>
<td>41.7</td>
</tr>
<tr>
<td>31-35 years</td>
<td>15</td>
<td>14.6</td>
</tr>
<tr>
<td>36-40 years</td>
<td>4</td>
<td>3.9</td>
</tr>
<tr>
<td>≥ 41 years</td>
<td>6</td>
<td>5.8</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>73</td>
<td>70.9</td>
</tr>
<tr>
<td>Married</td>
<td>30</td>
<td>29.1</td>
</tr>
<tr>
<td>Highest level of academic qualification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>6</td>
<td>5.8</td>
</tr>
<tr>
<td>Diploma/Advanced diploma</td>
<td>22</td>
<td>21.4</td>
</tr>
<tr>
<td>Degree/Professional qualification</td>
<td>57</td>
<td>55.3</td>
</tr>
<tr>
<td>Master degree</td>
<td>18</td>
<td>17.5</td>
</tr>
</tbody>
</table>

Table II. Demographic profiles
Correlation analysis

Pearson correlation analysis was conducted to examine the relationship between the variables (Wong and Hiew, 2005; Jahangir and Begum, 2008). As cited in Wong and Hiew (2005) the correlation coefficient value (r) range from 0.10 to 0.29 is considered weak, from 0.30 to 0.49 is considered medium and from 0.50 to 1.0 is considered strong. However, according to Field (2005), correlation coefficient should not go beyond 0.8 to avoid multicollinearity. Since the correlation coefficient in the table are all less than 0.8, we can assume that there is no multicollinearity problem in this research. Further testing based on VIF and Tolerance (see Table IV) shows that the VIF values for all the variables are less than ten and Tolerance is more than 0.10 thus further supporting that there is no multicollinearity issues in our study (Hair et al., 2005; Chong and Ooi, 2008). As summarized in Table V, all the coefficient values met the discriminant validity criterion for every construct (Kline, 1998; Hoang et al, 2006).

Multiple regression analysis

Multiple regression analysis was conducted to examine the relationship between adoption factor for online banking and consumer intention to use online banking. It is a constructive statistical technique that can be used to analyze the associations between a set of independent variables and a single dependent variable (Hair et al., 2005).
In addition to the sample size, the estimated parameter ratio of 15:1 to 20:1 was sufficient to achieve a meaningful estimation of sample size (Hair et al., 2005). In this study, the sample size to the estimated parameter ratio was 17.16:1. Thus, it can be assumed that the sample size is adequate (Hair et al., 2005).

Based on this method, the four main independent variables (adoption factor for online banking) namely, perceived usefulness, perceived ease of use, trust and government support dependent variables (Consumer intention to use online banking) were entered together. The detail of the regression output was shown in Table IV. Histogram and Normal P-P plot of standardize residual that were conducted also indicate normality of the error term while scatter plot shows consistent variance of error terms (Homoscedasticity). From these analyses, it can be concluded that multiple regression model of this study meets the assumptions required to ensure validity of its significance test (Hair et al., 2005).

To determine the magnitude of effects in this study, Cohen’s rules for effects sizes were applied. According to Cohen (1990, p. 1309) as cited by Jitpaiboon and Rao (2007), $R^2$ ranges from 1.0 percent to 5.9 percent is considered as small, between 5.9 percent to 13.8 percent is medium and above 13.8 percent is large. From Table V, it can be observed that the coefficient of determination ($R^2$) was 0.228, representing that 22.8 percent of intention to use internet banking can be explained by the four independent variables (adoption factors for online banking). Thus the effect size for this study is large. The

### Table IV.
Regression analysis of adoption factors for online banking users on consumer intention to use online banking

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>P</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>1.732</td>
<td>0.451</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived usefulness</td>
<td>0.339</td>
<td>0.113</td>
<td>0.380</td>
<td>0.004</td>
<td>0.488</td>
<td>2.051</td>
</tr>
<tr>
<td>Perceived ease of use</td>
<td>-0.137</td>
<td>0.103</td>
<td>-0.168</td>
<td>0.187</td>
<td>0.451</td>
<td>2.216</td>
</tr>
<tr>
<td>Trust</td>
<td>0.181</td>
<td>0.082</td>
<td>0.198</td>
<td>0.031</td>
<td>0.885</td>
<td>1.129</td>
</tr>
<tr>
<td>Government support</td>
<td>0.240</td>
<td>0.078</td>
<td>0.276</td>
<td>0.003</td>
<td>0.900</td>
<td>1.111</td>
</tr>
</tbody>
</table>

$R^2$ = 0.228

Notes: * $p < 0.05$; ** $p < 0.01$

### Table V.
Correlation analysis of the independent variables and dependent variable

<table>
<thead>
<tr>
<th>Variables</th>
<th>Perceived usefulness</th>
<th>Perceived ease of use</th>
<th>Trust</th>
<th>Government support</th>
<th>Intention to use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived usefulness</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived ease of use</td>
<td>0.709 **</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td></td>
<td>0.130</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government support</td>
<td>1.121</td>
<td>0.137</td>
<td>-0.011</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Intention to use</td>
<td>0.330 **</td>
<td>0.165</td>
<td>0.243</td>
<td>0.296 **</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Notes: * Correlation is significant at the 0.05 level (two-tailed); ** correlation is significant at the 0.01 level (two-tailed)
The proposed model was adequate as the \( F \)-statistic = 7.225 (\( p \)-value = 0.000) was significant at the 1 percent level (\( p < 0.01 \)). This indicates that the overall model was reasonable fit and there was a statistically significant relationship between adoption factors for online banking and consumer’s intention to use online banking. The individual model variables reveals that perceived usefulness, (\( \beta = 0.339, p < 0.01 \)), trust (\( \beta = 0.181, p < 0.05 \)) and government support (\( \beta = 0.240, p < 0.01 \)) were found to have a significant and positive relationship with consumer intention to use online banking. Therefore, the hypotheses \( H1, H3, \) and \( H4 \) were supported. Meanwhile perceived ease of use (\( \beta = -0.137, p > 0.05 \)) had no significant relationship with consumer intention to use online banking. Hence, \( H2 \) is not supported.

**Discussion**

This paper research has empirically validated the proposed research model. All the hypotheses regarding the relationship between the variables are developed and tested by using reliability test and multiple linear regression. In general, the results partially supported most of the developed hypothesized relationships. The significant effect influencing intention to use the internet banking from perceived usefulness, trust and government support are observed. However, we found that \( H2 \) is not supported. These findings will be discussed in following subsections (Figure 2).

**Perceived usefulness**

As mentioned earlier, perceived usefulness is found to be a significant determinant to predict the intention to use the internet banking. This is similar to the TAM model,
which has been applied in other technology adoption studies; users will adopt a technology if they find it useful. Therefore banks in Vietnam should try to let their customers know the advantages of using online banking when compared to traditional banking. Among some of the benefits of online banking include being more productive and easier communications to the bank staffs.

The main point from this is that consumers are willing to adopt online banking when they know the advantages of it when compared to traditional ways of banking. Therefore banks should further investigates the types of features which current bank users find useful or they will find useful and promote such features to encourage more customers to adopt online banking.

Perceived ease of use

Based on the relationship with intention to use, the findings in the study show that perceived ease of use has no significant effect on intention to use the internet banking. This result contradicts the prior studies (Jahangir and Begum, 2008; Amin, 2007; Shih and Fang, 2004). However, it is consistent with Pikkarainen et al. (2004) finding, which suggests there is no significant impact of perceived ease of use on the intention to use the internet banking.

This result also contradicts with the original TAM models. This unexpected result is probably due to the fact that the majority of the respondents in the study are relative young (between ages of 21-30 as shown in Table II). We can therefore infer that they believe they can learn online banking easily and ease of use will not be a barrier to their adoption of internet banking. Since the respondents consisted of a relative young age group, we believe that these customers will not be hindered from using the technology just because they believe it is difficult to use. This probably explains the reason the respondents do not perceive ease of use is a significant motivator in their intentions in this study.

Government support

Consistent with Tan and Teo (2000), Jaruwachirathanakul and Fink (2005) studies, government support is found to be a significant determinant to predict the intention to use the internet banking in this study. In Vietnam, where not a single law on e-commerce has been formalized, online services are restricted to checking account and balance information. As shown in the result of this study, trust on security and privacy of online banking will influence users’ adoption of online banking. The government can help to improve the confidence of users through establishing a clear cyber law. For Vietnamese government, they should encourage users to adopt online banking. This is because online banking will allow the banks to operate more efficiently, thus improving the competitiveness of the Vietnamese banking industry. Foreign investors would also be more willing to invest in a country if the country is making use of e-commerce technologies in their businesses. This is similar to Penang State (in Malaysia) government’s proposed plan to Wi-Fi enabled the whole of Penang State in Malaysia in order for the state to stay competitive. This practice has also been done in Singapore whereby Wi-Fi services are free in Singapore (Lemon, 2006). The Vietnamese government can also support to improve online banking adoption by providing internet infrastructure and internet bandwidth in Vietnam.
Trust
The results show that trust in security and privacy of online banking will influence the adoption of online banking in Vietnam. Without proper security and privacy protection, users will not use the online banking services provided by the banks. The result is understandable as banking transactions will usually involve monetary transactions. Therefore users especially from developing countries will be more cautious as they are more used to conducting monetary transactions face to face. According to Wang and Barnes (2007), some of the trust building strategies can include advertising campaign, privacy guarantee, company guarantee policy and statement (Wei et al., 2009). Thus Vietnamese banks should try to use these strategies to gain the confidence of users on online banking.

Implications
This study presents both theoretical and practical contributions. The model developed in this study represents an important improvement for TAM by adding two constructs, trust and government support. Trust on security and privacy, especially in a developing country is an important factor in influencing consumers’ intention to adopt online banking. Likewise, for many developing countries where the government plays major in the planning of the economy, the model is able to show the importance of government support in increasing consumer adoption of online banking. This model can be applied to future studies on online banking where the country is a fast growing economy such as Vietnam. This model is tested empirically to explain the intention to use internet banking in Vietnam. It gives a better understanding on the factors contributing to the internet banking success, especially for a developing country such as Vietnam. Past studies that were conducted in the Western/developed countries are different from this study given that many of their users have been using internet and e-commerce for a much longer time, some as early as the late 1990s when e-commerce was first introduced. In Vietnam however, internet is still relatively new and although most of the consumers have some exposures in internet, conducting banking transactions online still something that is new to them. Furthermore, e-business is relatively new in Vietnam and given that Vietnamese users might have different cultures when compared to users from Western countries, it is important to consider whether government support and trust will influence their decision to adopt online banking.

Apart from theoretical values, the results of the study will benefit the practitioners, internet banking system developers, bank decision makers and banking service providers. The results and findings in the study shed lights on the future plans and solutions to encourage broader implementation and usage of internet banking. For further research, the result of this research can be used to support the finding and analysis in the context of internet banking and improving banking services.

For bank managers and decision makers in Vietnam, they can plan their strategies based on the findings from this study. Firstly, the banks should promote the advantages that online banking when compared to traditional ways of banking. As stated by Eriksson et al. (2005), banks might be tempted to focus on improving the online banking web sites’ user interface to be more user friendly and attractive, but the perceived advantages of online banking is more important than the ease of use. Banks should also further investigates what other features are useful to the Vietnamese customers, and design their online banking systems based on this, and actively
promote them. It is also possible that certain customers are still not aware of the benefits of online banking. This can be done through educating the users for example, when they are in the banks. Bank’s decision makers should provide investments to continually include more useful features of online banking to attract users into using the services.

Trust on the security and privacy of online banking is one of the factors that play a role in determining adoption of online banking in Vietnam. Therefore banks in Vietnam should ensure that security and privacy of the online banking systems are properly developed and users should also be made aware of their systems are secured and personal information is protected. As online security required is one of the key attractions, top management from the banks must ensure that their strategies should include ways to ensure that the online banking systems are secured. Such recommendations were also made by Grabner-Krauter and Faullant (2008). They suggested that it is not enough to attract Austrian users to adopt online banking simply by just having an easy to use web site and instead, it is vital to address the issue of security to increase the acceptance of online banking. The same is found in this study whereby Vietnamese customers are more concerned about security and privacy than ease of use.

The Vietnamese government can help to ensure that there are clear regulations and laws on internet transactions. Having a clear and solid law on this will ensure that customers are more confident that security and privacy issues are taken care of for online banking. The Vietnamese government can also help the banking industry by ensuring a better internet infrastructure (i.e. wireless network) and helps to encourage users to use online banking. This will ensure that the banks will be more efficient and thus help to increase Vietnamese banks’ competitiveness. Decision makers from banks should also work together with the Government to come up with cyber laws that help to improve the confidence of customers on the security and privacy of online banking.

Limitation and future study
There are several limitations in this research study. First, the current study is only focused from the perspective of Vietnamese users. Although the idea of conducting a study in Vietnam will give insights into online banking adoption issues in a developing country, future study can apply model used in this study to other developing countries. Second, as with previous adoption studies, the factors selected may not cover all the reasons that could influence the adoption of the internet banking scenario in Vietnam. Therefore future studies can consider looking into factors related to cultural issues, which might have an influence in the adoption of online banking services. Third, the demographic profiles of this study are of a group of relatively young age users. Therefore future study should explore results taken from a different age group. For example, respondents from the older age group might find it more of a challenge to conduct online banking transactions, thus ease of use might be a factor influencing the adoption of online banking for other age group of users. Future researchers can thus conduct a comparison between users from different age group for future studies. Lastly, our study only looks at the relationships between the adoption factors and intention to adopt online banking. Future study can test whether there are any causal relationships between the independent variables such as perceived ease of use on perceived usefulness or trust on perceived usefulness and perceived ease of use.
References


Appendix. Survey questionnaire

**Independent variables**

**Perceived usefulness**
- Internet banking makes it easier for me to conduct my banking transactions
- Internet banking allows me to manage my finances more efficiently
- Internet banking increases my productivity
- Internet banking made communications with banks much easier
- Overall, I believe internet banking is more useful than traditional ways of banking

**Perceived ease of use**
- I find Internet banking easy to use
- Learning to use internet banking is easy for me
- My interaction with internet banking is clear and understandable
- It is easy for me to remember how to perform tasks with internet banking
- It is easy to get Internet Banking to do what I want it to do

**Trust**
- I trust that transaction conducted through internet banking is secure and private
- I trust payments made through internet banking channel will be processed securely
- I believe my personal information on Internet banking will be kept confidential

**Government support**
- Government encourages and promotes the usage of internet and e-commerce
- The internet infrastructure and facilities such as bandwidth is sufficient for online banking
- The government is driving the development of online banking
- The government has good regulations and laws for internet banking

**Dependent variable**

**Consumer intention to use internet banking**
- Assuming that I have access to internet banking, I intend to use them
- I intend to use internet banking if the cost and time is reasonable for me
- I believe I will use internet banking in the future
- I intend to increase my use of the internet banking in the future

Table AI.
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