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## **Individual investors' satisfaction and loyalty in online securities trading using the technology acceptance model**

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**Abstract:** This research integrates perceived trust, perceived security, perceived privacy, and switching cost into the TAM in order to explain the relationship between customer satisfaction and customer loyalty. This study is one of the first comprehensive and systematic research efforts on the relationship between customer satisfaction and customer loyalty in the online

trading setting of Vietnam. Results of this study show that the integrated model demonstrated very high predictive power, explaining more than 64% of the variability of customer loyalty. The study also demonstrates that in Vietnam's online trading setting, perceived trust has positive impacts on perceived ease of use and perceived usefulness; perceived ease of use has a positive impact on perceived usefulness; perceived trust and perceived usefulness have positive impacts on satisfaction; and finally, customer satisfaction has a positive impact on customer loyalty.

**Keywords:** individual investor; securities trading; satisfaction; loyalty; security; privacy; trust; TAM.

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## **1 Introduction**

The revolution of information and communication technologies, especially as seen with the ubiquity of the Internet, is changing the business process of all service companies (Pham and Doan, 2014; Pham et al., 2019a, 2019b, 2019c). This is certainly true with securities brokerages (Roca et al., 2009). Online securities trading services allow investors to use the internet to conduct fast, efficient trading (Feng et al., 2014). Previously in the traditional trading setting, investors had to contact securities brokerage companies to place buy and sell orders through direct interactions with the company's employees (Lin and Wei, 1999). In the online securities trading environment, just a desktop or a mobile device connected to the Internet allows customers to make securities transactions through interactions with the securities brokerage's website, without having to talk directly to company personnel (Yang and Fang, 2004).

Online securities trading not only benefits clients but also securities brokerages (Roca et al., 2009). For individual investors, the first benefit is that they can perform securities transactions using a desktop computer connected to the Internet in a simple, quick, and convenient way (Huang et al., 2005). The second benefit is that online securities trading help investors save money and time (Liu, 2015). Customers can enjoy many online services provided by the securities brokerage firm without having to contact the firm by phone or in person (Feng et al., 2014). Specifically, services such as savings accounts, checking, securities trading, reports on market status, securities performance, or investment portfolio management and advisory services are made available online, enabling customers to make decisions and take actions regarding their finances electronically.

For brokerages, online securities trading helps save the certain costs associated with investing in physical locations and facilities since customers do not need to be at the trading offices to place buying or selling orders (Roca et al., 2009). Online securities trading also creates favourable conditions for securities firms to expand their customer base and increase their profitability because with the help of desktop computers or mobile devices connected to the Internet, customers can participate in securities trading anytime and anywhere (Liu, 2015). In addition, securities brokerages can more readily provide value-added services to customers, such as investment portfolio management and advisory services, which can ultimately increase profitability for the firms.

Unfortunately, although securities brokerage firms have focused their attention on improving the quality of online securities trading services, many of them seem to be lagging behind customers' increasing needs and expectations (Feng et al., 2014). In order to survive in a fiercely competitive online securities trading environment, it is clear that securities brokerage firms must provide customers with high-quality online securities trading services to bring customer satisfaction. Customer satisfaction with online securities trading services is extremely important because it determines customer loyalty to the securities brokerage firm. Customer loyalty is expressed by customers' behaviours including maintaining securities accounts with the firm, saying good things about the firm to relatives and friends, and increasing their usage of current or new services. Customer loyalty is fundamental to the growth of securities brokerages' operations and profits.

Numerous empirical studies have demonstrated a relationship between customer satisfaction and customer loyalty (Long and Vy, 2016; Pham et al., 2018a, 2018b). Moreover, many of these studies have used the technology acceptance model (TAM) to

predict customer satisfaction in the online commerce environment (Long and Thanh, 2016). The TAM employs two important variables, perceived ease of use and perceived usefulness. Both of these variables have effects on customer satisfaction for end users of an information technology system (Long et al., 2011). If the online securities trading system is considered as a special case of the information technology system, then perceived ease of use and perceived usefulness can be expected to be positively related to customer satisfaction regarding their use of an online security trading system.

While the traditional commercial environment is characterised by interactions between customers and the service company's employees, the e-commerce environment is characterised by interactions between customers and the service company's website (Bui et al., 2020; Pham et al., 2019b). Since the e-commerce environment lacks the potential clarity of use that the personal interaction inherent in the traditional commercial environment can provide, there is much more uncertainty in e-commerce transactions than in the traditional commercial environment (Luo et al., 2010; Pham et al., 2020). Trust between the customer and the firm can be negatively impacted as a consequence, resulting in erosion of customer loyalty and satisfaction (Huy et al., 2019a). Previous studies have emphasised the role of trust in customer satisfaction and, more specifically, have shown that trust is related to perceived ease of use and perceived usefulness (Hanafizadeh and Khedmatgozar, 2012).

Trust has been incorporated into the TAM in previous studies to explain customer satisfaction. However, these studies have not clarified the factors that determine trust. In the e-commerce environment, there are indications that perceived risk level can influence trust and is expressed by perceived security and perceived privacy, but are not definitive (Roca et al., 2009). In addition, switching cost is an important factor in the e-commerce environment, such as in the e-banking setting (Yang and Peterson, 2004). Prior research has not adequately explored the role of switching cost in the relationship between customer satisfaction and customer loyalty. This current study seeks to fill these research gaps.

Specifically, the objectives of this study include:

- 1 studying the relationship between perceived risk (perceived security and perceived privacy) and trust
- 2 examining the relationships between trust and variables in the TAM model
- 3 investigating the relationships between the TAM model variables and customer satisfaction
- 4 examining the relationship between customer satisfaction and customer loyalty, and the role of switching cost in the relationship.

This study contributes to the relevant literature. Specifically, this study can be considered as the first one to integrate variables such as perceived trust, perceived security, perceived privacy, perceived ease of use, perceived usefulness, satisfaction, loyalty, and switching cost into a research model under the context of online securities trading. This study examines the direct effect of switching cost on customer loyalty and its moderating role in the relationship between customer satisfaction and customer loyalty. Last but not least, although there have been many studies on the online securities trading system's acceptance, the majority of them were conducted in developed countries, thus this study can be viewed as one of the first studies on online securities trading in a newly

developing country, specifically, Vietnam. This country has experienced many economic achievements, resulting in its high economic growth rate in recent years. Further, its securities market's expansion has contributed significantly to this high economic growth rate.

## **2 Background**

### *2.1 Perceived security and perceived privacy*

E-commerce can be seen as an evolutionary form of traditional commerce (Long et al., 2011; Pham et al., 2020). In the e-commerce environment, customers conduct interactions and transactions through the service company's website (Jiang et al., 2015). Because these transactions and interactions are conducted without customers' physical appearance at the service company, perceived risk is considered to be higher in the e-commerce environment than in the traditional commerce environment (Pham et al., 2019a). Perceived risk refers to situations in which unfavourable outcomes can occur, resulting in undesirable outcomes for customers (Pavlou, 2003; Pham et al., 2019b).

Sources of perceived risk arise from such factors as the service company's behaviours or the technologies used by the service company in providing online services to customers (Featherman and Pavlou, 2003). More specifically, the risks associated with the service company's behaviours include the fact that the service company can act in an opportunistic way, causing losses to customers (Van et al., 2020b). These opportunistic behaviours may include posting inaccurate information about the service, leaking customers' personal and financial information, or deceiving customers for illegal profits.

Sources of perceived risk associated with the technologies used to provide online services to customers include factors that affect these technologies' capability and reliability, such as Internet outages and/or software errors in applications that can prevent customers' transactions from being performed, or performed in an incorrect manner (Van et al., 2020a).

In the online securities trading environment, it is not necessary for customers to go to securities brokerage firms' offices to conduct transactions. Instead, with just a computer or mobile device connected to the Internet, customers can complete transactions related to securities buying or selling. Lacking the immediate expertise available with a live individual employee at the brokerage, perceived risk in the online securities trading environment is higher than in the traditional securities trading environment. Prior studies have indicated that perceived security and perceived privacy are two factors that affect perceived risk in thee-commerce environment, including the online securities trading environment (Roca et al., 2009).

Perceived security refers to situations, conditions, or events in which data destruction, disclosure, editing, theft or illegal use can occur, causing financial and non-financial losses for customers using online securities trading services (Kim et al., 2008). When financial and personal information is stolen or used illegally, consequences for clients and securities brokerage firms can be enormous (Feng et al., 2014). This is also one of the reasons hindering the development of e-commerce in general and online securities trading in particular (Lee and Turban, 2001). Because the online securities trading environment is more risky than the traditional securities trading environment, individual

investors tend to desire a stronger sense of security when conducting transactions related to securities buying and selling.

Perceived security is positively related to intention to use online securities trading (Gefen and Straub, 2000). Results from studies in the online securities trading environment show that the hacking of trading networks and customers' data is one of the biggest barriers to customers' online securities trading acceptance (Ranganathan and Ganapathy, 2002). Deploying means and tools to enhance perceived security can give customers the feeling that online securities trading is safe (Yousafzai et al., 2003). Perceived security requires securities brokerage firms to invest in state-of-the-art trading technologies, advanced encryption algorithms, and digital signatures to protect clients from data fraud (Kalakota and Whinston, 1997). In addition, in e-commerce studies, empirical evidence has shown that perceived security is an important determinant of e-commerce adoption, such as e-banking (Laforet and Li, 2005).

Regarding perceived privacy issues, evidence from empirical studies shows that perceived privacy influences acceptance of online securities trading (Poon, 2008). Perceived privacy refers to situations in which securities brokerages collect financial and personal information of clients and use it illegally (Lim, 2003). There are growing concerns about the improper use of customer financial and personal information by service companies in general and securities brokerage firms in particular (Castaneda et al., 2007). In many situations, customers do not want to provide their personal information when making securities transactions, because they do not know if this information can be used for other purposes, as for example, selling it to other service companies to make an illegal profit (Salam et al., 2005).

## 2.2 *Perceived trust*

In the context of the securities industry, perceived trust refers to situations, conditions, or events in which clients (individual investors) believe that a securities firm will act in an ethical and socially responsible manner in meeting customers' needs for online securities trading (Hu et al., 2015). In other words, brokerage firms will not take advantage of customers' fragile dependency on the need for the firm to act responsibly. Perceived trust relates to clients' belief that the security brokerage firm has ability, integrity, and benevolence in the process of meeting customers' online securities trading needs (Koo and Wati, 2010). Perceived trust plays a fundamental role in all economic transactions (Luo et al., 2010; Huy et al., 2019a). It is seen as a catalyst to bring success to economic transactions (Pavlou, 2003). Perceived trust helps build long-term and sustainable relationships between securities brokerage firms and clients (Liu, 2015; Bui et al., 2020). However, as previously noted, in the online securities trading environment, the level of uncertainty and risk is higher than in the traditional securities trading environment (Roca et al., 2009). As a consequence, perceived trust can be lacking and can hinder the growth and development of online securities trading activities (Feng et al., 2014).

The lack of perceived trust will tend to reduce the incentive to engage in online securities trading. Customers are not likely to want to trade with a securities brokerage firm that does not show signs of bringing about perceived trust (Chellappa and Pavlou, 2002). Clients are concerned that securities brokerage firms may take advantage of the client's dependency on the expertise of the firm and focus more on their profits than the best interests of the client (Lim, 2003). Given these concerns and the consequent

potential loss of business, brokerages need to focus on improving perceived trust to promote the use of online securities trading (Feng et al., 2014).

Securities firms can enhance perceived trust by investing in modern service technologies and software using advanced algorithms, digital signature, and firewalls (Doolin et al., 2005). In addition, online securities brokerage firms can choose reliable and high-speed Internet service providers to help clients complete online securities transactions quickly and precisely (Mukherjee and Nath, 2007).

### *2.3 Perceived ease of use and perceived usefulness*

As previously noted, perceived ease of use and perceived usefulness are two basic factors in the TAM (Huy et al., 2019b). Perceived usefulness is defined as the extent to which a person believes that using a technology or a system will enhance the outcome of his or her work (Davis, 1989). Perceived ease of use is defined as the degree to which a person believes that using a technology or a system will not take much mental or physical effort (Davis, 1989). Many studies have shown that perceived ease of use and perceived usefulness are positively associated with intention to use technology (Pham et al., 2013). Furthermore, studies have shown that perceived ease of use and perceived usefulness also affect user satisfaction with a given technology (Pham et al., 2018a).

### *2.4 Satisfaction and loyalty*

The concept of customer satisfaction has been defined as a customer's emotional response to an experience related to a specific transaction with an organisation (Boulding et al., 1993; Pham et al., 2018b). In the era of rapid growth in information technology and e-commerce, online customer satisfaction is defined as an overall assessment of the quality of products and services offered in the online market (Anderson and Srinivansan, 2003; Pham et al., 2019c). Evidence from empirical studies indicate that there is a positive relationship between service quality and customer satisfaction (Jun et al., 2004).

Typically, customer satisfaction is one of the most important goals of businesses (Long and Vy, 2016). Given the positive relationship between service quality and customer satisfaction, to improve customer satisfaction businesses must understand the service quality attributes desired by customers as well as the necessary actions necessary to enhance overall service quality (Jun and Cai, 2001; Pham et al., 2019a).

In earlier research, the idea of customer loyalty has been considered as a long-term commitment to the purchase or sponsorship of one or more products or services favoured by the customer (Jiang et al., 2015). Customer loyalty is established or accumulated when customers perceive a value from consuming a product or service (Pham et al., 2019c). In order to prosper in a highly competitive business environment, especially in the online environment, businesses are implementing a variety of what is known as customer caring strategies (Pham et al., 2018b). Here, businesses focus on providing high quality products and services to customers to bring about customer satisfaction (Pham et al., 2018a). The intent is that achieving customer satisfaction will lead to customer loyalty (Pham et al., 2019c).

## 2.5 *Switching cost*

Switching costs as a research variable have been considered from economic, psychological, and emotional perspectives (Yang and Peterson, 2004). There are many factors that influence switching costs, varying by the type of business, product, or customer group (Marinoso, 2001). Switching costs can be related to money, consumer behaviour, search considerations, or availability of relevant information (Morgan and Hunt, 1994). Previous research has explored relationships between switching costs and customer loyalty. One interesting finding is that when switching costs are significant or even where the switching may cause financial harm to the customer, dissatisfied customers may still maintain their relationship with the company providing the product and service (Lee et al., 2001). This seemingly irrational phenomenon is called ‘fake’ customer loyalty, in contrast to ‘committed’ customer loyalty (Yang and Peterson, 2004).

In the era of rapid growth in information technology and e-commerce, the Internet can help reduce switching costs, because finding information on price, quality, and quantity among competitors can be identified simply via the Internet (Pham et al., 2018a). It is important to study the effect of switching costs on customer loyalty and the role of switching costs in the relationship between customer satisfaction and customer loyalty in the context of online usage given the ubiquity and convenience of the Internet.

## 3 **Research model and hypotheses**

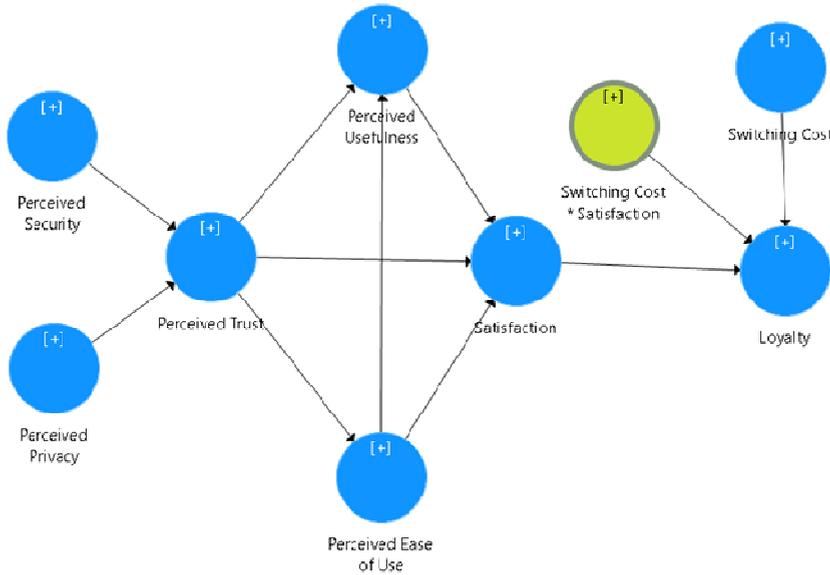
This study integrates variables namely perceived trust, perceived security, perceived privacy, perceived ease of use, perceived usefulness, satisfaction, loyalty, and switching cost into a research model under the context of online securities trading. This study examines the direct effect of switching cost on customer loyalty and its moderating role in the relationship between customer satisfaction and customer loyalty. Based on empirical evidence from previous studies. The proposed research model is as shown in Figure 1.

### 3.1 *The relationship between perceived security, perceived privacy, and perceived trust*

Perceived risk refers to situations where undesirable outcomes for customers can occur (Pham et al., 2019b). In the traditional commercial environment, customers interact directly with the service provider’s employees, while in the e-commerce environment, customers interact with the service company via the company’s website (Jun and Cai, 2001; Pham et al., 2020). Lacking the potential clarity of direct interaction with a company expert, perceived risk is considered to be higher in the e-commerce environment than in the traditional commercial environment (Featherman and Pavlou, 2003; Van et al., 2020a). In an online securities trading environment, customers can interact with a securities brokerage through computers connected to the Internet to complete transactions related to securities buying or selling (Roca et al., 2009). Perceived risk in the online securities trading environment is higher than in the traditional securities trading environment. Perceived security risk in online transactions refers to situations, conditions, or events in which data destruction, disclosure, editing, theft or illegal use can cause financial and non-financial losses to customers (Laforet and Li, 2005).

Consequently, customers expect a higher level of perceived security when deciding to conduct online transactions related to securities trading (Lee and Turban, 2002).

**Figure 1** Research model (see online version for colours)



Besides perceived security risk, perceived privacy risk is also a factor related to overall perceived risk. Perceived privacy risk refers to situations where securities brokerages collect customers' personal financial information with the potential to use it unethically or illegally. An example would be selling it to other service companies to make a profit (Castaneda et al., 2007).

Evidence from empirical studies has shown that perceived security and perceived privacy are related to perceived trust in the e-commerce environment, such as the e-banking environment (Pham et al., 2019b). Moreover, evidence also indicates that in the online securities trading setting, perceived security and perceived privacy affects perceived trust (Lian and Lin, 2008). Therefore, the following hypotheses are proposed:

- H1 Perceived security is positively related to perceived trust.
- H2 Perceived privacy is positively related to perceived trust.

### *3.2 The relationship between perceived trust, perceived ease of use, and perceived usefulness*

Evidence indicates perceived trust plays a fundamental role for transactions in the e-commerce environment in general and in the online securities trading environment in particular (Hu et al., 2015). Perceived trust is considered a catalyst leading to successful securities trading (Yang et al., 2015). It can help build long-term sustainable relationships between brokerage firms and their clients (Koo and Wati, 2010).

Customers routinely worry about the securities firm's potential for opportunistic behaviours given customers' dependency on the brokerage to conduct their trades for

them. Increasing perceived trust can build customers' confidence that the securities brokerage firm has the essential capacities of ability, integrity, and benevolence necessary to meet customers' securities trading needs (Flavian and Guinaliu, 2006). This, in turn, can produce repeat business for online securities transactions (Koufaris and Hampton-Sosa, 2004).

Perceived ease of use and perceived usefulness are two fundamental factors in TAM (Long et al., 2011; Huy et al., 2019b). While perceived usefulness refers to situations where a person believes that using online securities trading technology will benefit him or her, perceived ease of use involves situations where participating in online securities trading appears not to take much mental or physical effort (Roca et al., 2009). Empirical studies in the e-commerce environment in general, and in the e-banking environment and online securities trading environment in particular, have shown that perceived trust has a positive relationship with perceived usefulness and perceived ease of use, and that perceived ease of use is positively associated with perceived usefulness (Pavlou, 2003). Therefore, the following hypotheses are proposed:

- H3 Perceived trust is positively related to perceived usefulness.
- H4 Perceived trust is positively related to perceived ease of use.
- H5 Perceived ease of use is positively related to perceived usefulness.

### *3.3 Relationships among perceived trust, perceived ease of use, perceived usefulness, and customer satisfaction*

Perceived trust is the catalyst for the success of economic transactions in general, and transactions in the online securities investment environment in particular (Ivanochko et al., 2015). Without trust, customers would not want to engage in online securities trading (Chen and Barnes, 2007). Evidence from empirical studies in the field of e-commerce, online banking, and online securities trading has shown that perceived trust is positively associated with customer satisfaction (Pavlou, 2003; Huy et al., 2019a).

In TAM, perceived ease of use refers to situations where a person believes that using a certain technology does not take significant effort (Davis, 1989). Perceived usefulness refers to the extent to which a person believes that using a technology will yield an increase in desired results (Davis, 1989). Both perceived ease of use and perceived usefulness are important components of TAM (Pham et al., 2020). Evidence from empirical studies in the e-commerce environment has shown that customers will be satisfied when they feel that a technology is easy to use and benefits them (Koo and Wati, 2010). Some studies in the online banking environment and online securities trading environment have demonstrated similar results (Pham and Doan, 2014). Therefore, the following hypotheses are proposed:

- H6 Perceived usefulness is positively related to customer satisfaction.
- H7 Perceived trust is positively related to customer satisfaction.
- H8 Perceived ease of use is positively related to customer satisfaction.

### *3.4 Relationship between customer satisfaction and customer loyalty*

Customer loyalty is one of the most important factors determining the sustainable development and success of a service provider (Pham et al., 2019c). Customer loyalty involves customers' intentional behaviours towards continuing and enhancing transactions with the service provider (Jiang et al., 2015). Customer loyalty is also expressed via the tendency to introduce the company and its services to others (Jun et al., 2004). In general, satisfied customers tend to have a higher level of use of the services provided by the company than dissatisfied customers (Parasuraman et al., 2005). Satisfied customers have a higher repurchase intention and are more likely to recommend the company's products and services to their relatives and friends (Pham et al., 2018a). Overall, evidence from empirical studies in both traditional and e-commerce environments has shown that customer satisfaction leads to customer loyalty (Long and Vy, 2016). Therefore, the following hypothesis is proposed:

H9 Customer satisfaction is positively related to customer loyalty.

### *3.5 The role of switching costs in the relationship between customer satisfaction and customer loyalty*

Switching costs possess the potential to have significant impact on customer behaviours. For customers switching costs can be related to money, behaviour, search, or product knowledge (Lee et al., 2001). When switching costs are high, or the switching is painful, there is some evidence that dissatisfied customers may still maintain their current relationship with the company. This phenomenon is also called fake loyalty, as opposed to committed loyalty (Sharma and Patterson, 2000). Overall, studies have shown that switching costs affect customer loyalty (Hauser et al., 1994). Consistent with the results of previous studies, the following hypothesis is proposed:

H10 Switching costs are positively related to customer loyalty.

Previous studies have also shown that switching costs have a moderating effect on the relationship between customer satisfaction and customer loyalty. For example, Lee et al. (2001) conducted a study on mobile phone services and found that switching costs have a moderating effect on the relationship between satisfaction and loyalty. Similarly, Sharma and Patterson (2000) conducted a study on personal financial planning services and showed that switching costs have a positive moderating effect on the relationship between satisfaction and loyalty. To date, there has been no research on the role of switching costs in the relationship between customer satisfaction and customer loyalty in the online securities trading environment in a country with an emerging economy. Based on the results of previous studies, the following hypothesis is proposed:

H11 Switching costs have a positive moderating impact on the relationship between customer satisfaction and customer loyalty.

## 4 Research method

### 4.1 *Survey tool development and its translation into Vietnamese*

This study analyses the relationships among perceived security, perceived privacy, perceived trust, perceived ease of use, perceived usefulness, customer satisfaction, customer loyalty, and switching costs. These relationships are shown in the research model mentioned above. The study was conducted in the country of Vietnam with its emerging economy.

Content validity is analysed by assessing whether items measure exactly what they are supposed to measure (Nunnally, 1978). In order to have content validity, the measurement scales in this study were borrowed and adapted from prior studies and have been confirmed in terms of validity and reliability.

Measurement scales for perceived security and perceived privacy were adapted from Cheung and Lee (2001), Ranganathan and Ganapathy (2002), O’Cass and Fenech (2003), Flavian and Guinaliu (2006) and Roca et al. (2009). Measurement scales for perceived ease of use and perceived usefulness were adapted from Davis (1989) and Roca et al. (2009). Measurement scales for perceived trust were adapted from Jarvenpaa et al. (2000), McKnight et al. (2002), Koufaris and Hampton-Sosa (2004) and Roca et al. (2009). Measurement scales for satisfaction were adapted from Yang et al. (2004) and Rod et al. (2009). Measurement scales for switching costs and loyalty were adapted from Yang and Peterson (2004).

More specifically, there are four items each for perceived security, perceived privacy, perceived trust, perceived ease of use, and perceived usefulness; five items for customer satisfaction; six items for customer loyalty; and three items for switching costs. In addition, demographic information of customers (individual investors), such as gender, age, education, internet usage level, and online trading system’s usage time were also included in the questionnaire.

The measurement scales of the questionnaire were sent to a group of lecturers for content validity review. This group consisted of four lecturers with teaching experience in the following areas: finance, operations management, statistics, and quantitative analysis for business. All had online stock investment experience as individual investors. The team members agreed on the measurement scales’ content validity.

A Vietnamese scholar conducted the translation of the questionnaire into Vietnamese. Another researcher who was fluent in both English and Vietnamese translated the Vietnamese version back into English for the purpose of evaluating Vietnamese and English versions’ consistency and accuracy. Two other researchers who were fluent in both English and Vietnamese examined the Vietnamese and English versions independently and agreed that the translation was consistent and accurate. The Vietnamese version’s preliminary questionnaire was tested by 30 customers who were individual investors (often conducting online securities trading activities). Some necessary wording adjustments were made based on the feedback of these customers.

A shortened version of the measurement scales is provided in the appendix. Participants were asked to answer items regarding perceived security, perceived privacy, perceived trust, perceived ease of use, perceived usefulness, customer satisfaction, customer loyalty, and switching costs using a Likert scale with five levels where 1 is ‘totally disagree’ and 5 is ‘totally agree.’

4.2 *Data collection*

The data collection was conducted using a securities brokerage's clients. This firm is one of Vietnam's largest securities brokerages in terms of number of customers, market share, and revenue. With the help of this firm, the questionnaire was sent to individual online investors. An email was sent out explaining the purpose of the research was to help the firm develop solutions aimed at improving the customers' satisfaction and loyalty. A total of 335 complete and valid responses were collected for the statistical analysis. Table 1 below presents demographic information on the participants.

**Table 1** Profiles of the survey respondents

<i>Profile</i>	<i>Category</i>	<i>Total</i>	<i>Proportion (percent)</i>
Gender	Male	167	49.9
	Female	168	50.1
Age	Less than 20	11	3.3
	20–24	48	14.3
	25–34	147	43.9
	35–44	102	30.4
	45 - 54	11	3.3
	55 or over	16	4.8
Education	High school	11	3.3
	Bachelor	233	69.6
	Master degree or above	91	27.2
Internet usage level	2–4 times per week	152	45.3
	5–8 times per day	13	3.9
	9 or more per day	170	50.8
The company's online trading system's usage time	Less than 5 months	127	37.9
	5 months–1 year	34	10.1
	2 years–3 years	64	19.1
	4 years–5 years	19	5.7
	Over 5 years	91	27.2

Male respondents account for 49.9%. By age, 3.3% are under 20 years old, 14.3% between 20 and 24 years old, 43.9% between 25 and 34 years old, 30.4% between 35 and 44 years old, 3.3% between 45 and 54 years old, and 4.8%, 55 years old or more. In terms of the highest education level attained, 3.3% had a high school diploma; 69.6%, bachelor's degrees; and 27.2%, master's degrees or higher. In describing Internet usage, 45.3% of the respondents use two to five times a week; 3.9%, from five to eight times a day; and 50.8%, nine times or more a day. Regarding online trading system usage, 37.9% of the respondents had used the system for less than five months; 10.1%, between five months and a year; 19.1%, between two and three years; 5.7%, between four and five years; and 27.2%, over five years.

The sample size in this study is 335, which is suitable for obtaining reliable statistical results. The construct with largest number of items is customer loyalty with six items.

The required minimum sample size becomes 60, or ten times the number of items constituting the loyalty construct (Chin, 1998).

One of the concerns when conducting survey research is non-response bias. In order to consider whether non-response bias exists, differences between early and late respondents in terms of items constituting the constructs were analysed. Specifically, t-tests were performed and the results showed that there are no differences between the two groups at the 5% significance level, thereby confirming that non-response bias is not a problem in this study (Armstrong and Overton, 1977).

### *4.3 Statistical techniques*

In this study, statistical techniques, such as descriptive statistics, correlation coefficients, factor analysis, and structural equation modelling were used. Structural equation modelling technique is used to estimate path coefficients for the relationships hypothesised in the research model. To obtain reliable hypotheses test results, the two-step process suggested by Bollen (1989) was followed. Specifically, in step one, the measurement model was evaluated and validated. In step two the structural model was analysed to test the hypotheses. Note that the model is reliable and valid when both measurement and structural models are reliable and valid. The statistical software packages used for data analysis were SPSS 25 and SmartPLS 3.2.9.

## **5 Results**

Following Bollen (1989)'s suggestions, the measurement model was first reviewed. It should be noted that common method bias can be a concern because the data collection was based on one method: email. The Harmon test was performed to see if common method bias exists (Podsakoff et al., 2003). According to this test, all items loaded onto a common factor. The results showed that the common factor explained less than 50% of the variability. This suggests that common method bias does not exist. Furthermore, descriptive statistics of items that make up abstract variables were also examined and showed no outliers.

Factor analysis was conducted using SmartPLS 3.0 to evaluate the measurement model in terms of reliability, convergent validity, and discriminant validity. After removing one item of perceived security, one item of perceived privacy, one item of perceived trust, two items of customer satisfaction, and two items of customer loyalty (because their VIF values were greater than 5, or their loadings onto respective constructs were less than 0.6), the measurement model indicated high reliability, convergent validity, and discriminant validity. (Note that convergent validity is confirmed when factor loadings are greater than or equal to 0.6 (Bagozzi and Yi, 1988.) Table 2 shows that factor loadings were all greater than 0.7. Reliability was assessed based on Cronbach's alpha coefficient, composite reliability coefficient, and AVEs. Cronbach's alpha coefficients and composite reliability coefficients were greater than 0.8; AVE values were greater than 0.6, indicating that the measurement model was reliable.

**Table 2** The measurement model statistics

<i>Construct</i>	<i>Indicator</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
1. IL	IL1	0.891							
CR = 0.915	IL2	0.82							
CA = 0.915	IL3	0.819							
AVE = 0.729	IL4	0.882							
2. IS	IS1							0.91	
CR = 0.912	IS4							0.829	
CA = 0.912	IS5							0.902	
AVE = 0.776									
3. PEU	PEU1		0.887						
CR = 0.932	PEU2		0.913						
CA = 0.932	PEU3		0.814						
AVE = 0.775	PEU4		0.904						
4. PP	PP1			0.885					
CR = 0.898	PP2			0.851					
CA = 0.898	PP4			0.854					
AVE = 0.746									
5. PS	PS1				0.887				
CR = 0.898	PS2				0.851				
CA = 0.898	PS4				0.851				
AVE = 0.745									
6. PT	PT1					0.781			
CR = 0.859	PT3					0.874			
CA = 0.859	PT4					0.799			
AVE = 0.671									
7. PU	PU1						0.855		
CR = 0.931	PU2						0.898		
CA = 0.931	PU3						0.9		
AVE = 0.771	PU4						0.86		
8. SC	SC1								0.86
CR = 0.862	SC2								0.755
CA = 0.862	SC3								0.847
AVE = 0.676									

Notes: IL – loyalty; IS – satisfaction; PEU – perceived ease of use; PP – perceived privacy; PS – perceived security; PT – perceived trust; PU – perceived usefulness; SC – SWITCHING COST. All loadings are statistically significant at p-value < 0.001.

Discriminant validity is assessed by comparing the square root of AVE of each factor with correlation coefficients of that factor with other factors. Table 3 shows the square roots of the AVEs (located on the diagonal) and correlation coefficients between the constructs. It is readily evident that the square root of AVE of each factor was greater than correlation coefficients of that factor with the other factors, confirming discriminant validity of the measurement model.

**Table 3** Construct correlation and discriminant validity

<i>Construct</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
IL	0.854							
PEU	0.656	0.88						
PP	0.423	0.481	0.864					
PS	0.651	0.737	0.464	0.863				
PT	0.676	0.809	0.439	0.852	0.819			
PU	0.617	0.781	0.458	0.732	0.735	0.878		
IS	0.798	0.701	0.531	0.747	0.73	0.692	0.881	
SC	0.414	0.368	0.757	0.482	0.414	0.387	0.542	0.822

Notes: IL – loyalty; IS – satisfaction; PEU – perceived ease of use; PP – perceived privacy; PS – perceived security; PT – perceived trust; PU – perceived usefulness; SC – switching cost. diagonal numbers are square root of AVEs.

**Table 4** Heterotrait-Monotrait HTMT values

<i>Construct</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
IL	-							
PEU	0.656	-						
PP	0.423	0.48	-					
PS	0.649	0.735	0.465	-				
PT	0.676	0.81	0.437	0.852	-			
PU	0.617	0.78	0.458	0.731	0.735	-		
IS	0.796	0.699	0.53	0.748	0.73	0.691	-	
SC	0.413	0.369	0.758	0.485	0.415	0.388	0.543	-

Notes: IL – loyalty; IS – satisfaction; PEU – perceived ease of use; PP – perceived privacy; PS – perceived security; PT – perceived trust; PU – perceived usefulness; SC – switching cost.

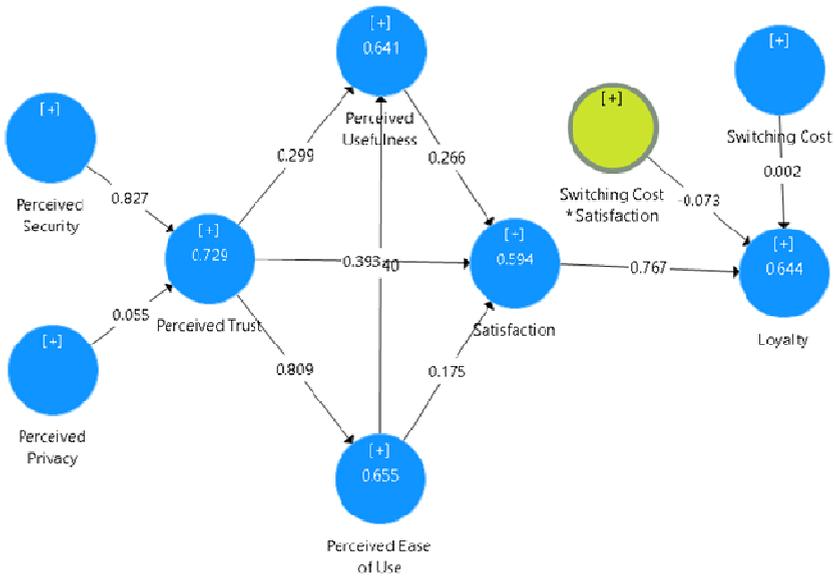
Another way to evaluate discriminant validity is based on HTMT values. Table 4 presents HTMT values. All of these values were less than 0.85 (except for perceived trust at 0.852, just slightly higher than 0.85). This once again confirmed the measurement model's discriminant validity.

After confirming the measurement model's reliability, convergent validity, and discriminant validity, the structural model was examined to test statistical hypotheses. Figure 2 shows path coefficient estimates and R-squared values. Figure 3 shows t-value estimates.

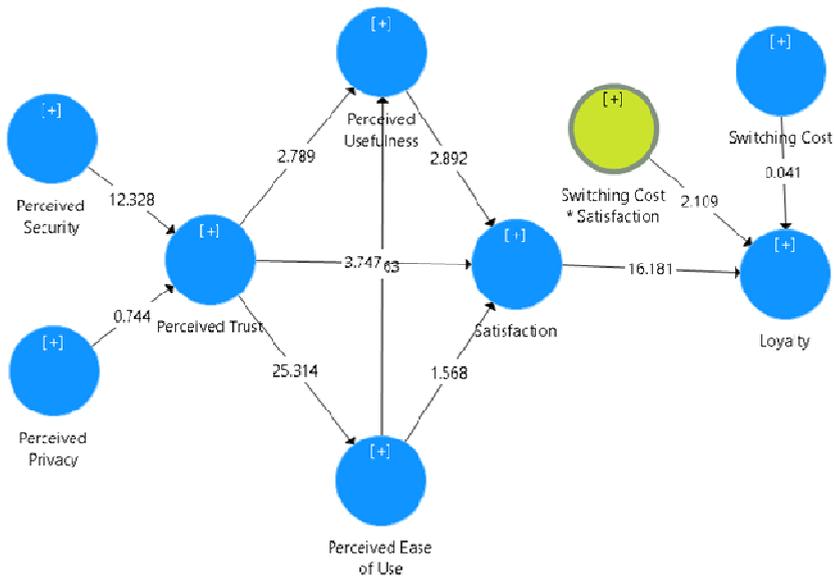
As shown in Figure 2, path coefficients from perceived security and perceived privacy to perceived trust were positive. Path coefficients from perceived trust to perceived ease of use, perceived usefulness, and satisfaction were positive. Path coefficient from perceived ease of use to perceived usefulness was positive. Path coefficients from satisfaction and switching costs to loyalty were positive. Path coefficient from switching cost \* satisfaction to loyalty was negative. The R-squared values lay in endogenous variables' circles. In Figure 3, most of the t-values were greater than 2, except for t-value of 0.744 for path coefficient from perceived privacy to

perceived trust; 1.568 for path coefficient from perceived ease of use to satisfaction; and 0.041 for path coefficient from switching costs to loyalty.

**Figure 2** Path coefficient estimates and R-square values (see online version for colours)



**Figure 3** Estimates of t-values (see online version for colours)



Based on Figure 2 and Figure 3, results from statistical hypotheses testing are summarised in Table 5. The results show that hypotheses H1, H3, H4, H5, H6, H7, and

H9 are statistically supported, while hypotheses H2, H10, and H11 are not statistically supported.

**Table 5** Hypotheses test results

<i>Relationship</i>	<i>Hypothesis</i>	<i>Path coefficient</i>	<i>t-value</i>	<i>p-value</i>	<i>Result</i>
PS-PT	H1	0.827	12.328	0.000***	Supported
PP-PT	H2	0.055	0.744	0.432ns	Not Supported
PT-PU	H3	0.299	2.789	0.004***	Supported
PT-PEU	H4	0.809	25.314	0.000***	Supported
PEU-PU	H5	0.540	5.622	0.000***	Supported
PU-IS	H6	0.266	2.892	0.004***	Supported
PT-IS	H7	0.393	3.666	0.000***	Supported
PEU-IS	H8	0.175	1.568	0.109ns	Not Supported
IS-IL	H9	0.767	16.181	0.000***	Supported
SC-IL	H10	0.002	0.041	0.965ns	Not Supported
SC*IS-IL	H11	-0.073	2.109	0.026ns	Not Supported

Notes: IL – loyalty; IS – satisfaction; PEU – perceived ease of use; PP – perceived privacy; PS – perceived security; PT – perceived trust; PU – perceived usefulness; SC – switching cost; \*\*\* $p < 0.001$ .

## 6 Discussion and implications

### 6.1 Discussion

The path coefficient of perceived security to perceived trust was 0.827 (t-value, 12.328; p-value  $< 0.001$ ;  $f^2$ , 1.978). This indicates that H1: Perceived security has a positive relationship with perceived trust is statistically supported. This result is similar to the results of Koufaris and Hampton-Sosa (2004), Kim et al. (2009) and Roca et al. (2009). The path coefficient of perceived privacy to perceived trust is 0.055 (t-value, 0.744; p-value = 0.432;  $f^2$ , 0.009), indicating that H2: Perceived privacy has a positive relationship with perceived trust is not statistically supported. This result is similar to Belanger et al. (2002), Kim et al. (2009), and Roca et al. (2009). The path coefficient of perceived trust to perceived usefulness is 0.299 (t-value, 2.789; p-value  $< 0.01$ ;  $f^2$ , 0.086), indicating that H3: perceived trust has a positive relationship with perceived usefulness is statistically supported. This result is similar to Lee et al. (2007), Koo and Wati (2010) and Pham et al. (2020). The path coefficient of perceived trust to perceived ease of use is 0.809 (t-value, 25.314; p-value  $< 0.01$ ;  $f^2$ , 1.894), indicating H4: Perceived trust has a positive relationship with perceived ease of use is statistically supported. This result is similar to Pavlou (2003).

The path coefficient of perceived ease of use to perceived usefulness is 0.540 (t-value, 5.622; p-value  $< 0.01$ ;  $f^2$ , 0.28), indicating that H5: Perceived ease of use has a positive relationship with perceived usefulness is statistically supported. This result is similar to that of Davis (1989), Pavlou (2003) and Roca et al. (2009). The path coefficient of perceived usefulness to satisfaction is 0.266 (t-value, 2.892; p-value  $< 0.05$ ;  $f^2$ , 0.063), indicating that H6: Perceived usefulness has a positive relationship with satisfaction is

statistically supported. This result is similar to that of Lee et al. (2007), Roca et al. (2009) and Koo and Wati (2010).

The path coefficient of perceived trust to satisfaction is 0.393 (t-value, 3.666; p-value < 0.01;  $f^2$ , 0.12), indicating that H7: Perceived trust has a positive relationship with satisfaction is statistically supported. This result is similar to that of Roca et al. (2009) and Koo and Wati (2010). The path coefficient of perceived ease of use to satisfaction is 0.175 (t-value, 1.568; p-value = 0.109;  $f^2$ , 0.02), indicating that H8: Perceived ease of use has a positive relationship with satisfaction is not statistically supported. This result is similar to that of Chan and Lu (2004), Cheng et al. (2006) and Roca et al. (2009).

The path coefficient of satisfaction to loyalty is 0.767 (t-value, 16.181; p-value < 0.01;  $f^2$ , 1.282), indicating that H9: Satisfaction has a positive relationship with loyalty is statistically supported. This result is similar to that of Yang and Peterson (2004). The path coefficient of switching cost to loyalty is 0.002 (t-value, 0.041; p-value = 0.965;  $f^2$ , 0.001), indicating that H10: Switching cost has a positive relationship with loyalty is not statistically supported. The path coefficient of switching cost\*satisfaction to loyalty is -0.073 (t-value, 2.109; p-value = 0.026), indicating that H11: Switching cost has a positive moderating effect on the relationship between satisfaction and loyalty is not statistically supported because of the negative sign of the path coefficient (-0.073).

This study makes unique contributions to the relevant literature because it can be considered one of the first comprehensive and systematic research studies on the relationship between customer satisfaction and customer loyalty in the online trading setting in Vietnam, a newly emerging economy. This study integrates perceived trust, perceived security, perceived privacy, and switching cost into the TAM in order to explain the relationship between customer satisfaction and customer loyalty. This integrated model has very high predictive power, explaining more than 64% of the variability of customer loyalty. The study shows that in Vietnam's online trading setting, perceived trust has positive impacts on perceived ease of use and perceived usefulness; perceived ease of use has a positive impact on perceived usefulness; perceived trust and perceived usefulness have positive impacts on satisfaction; and finally, satisfaction has a positive impact on loyalty. Therefore, strategies and programs that increase perceived trust, perceived ease of use, and perceived usefulness can play an important role in increasing satisfaction. In turn, satisfaction can lead to individual investors' loyalty.

## 6.2 *Implications*

The results of this study indicate that perceived trust has direct effects on perceived ease of use, perceived usefulness, and satisfaction. Perceived ease of use has no positive impact on customer satisfaction, but has a positive effect on perceived usefulness. Perceived usefulness has a positive effect on customer satisfaction. Therefore, solutions to increase perceived trust, perceived ease of use, and perceived usefulness will directly or indirectly increase individual investor satisfaction.

Perceived trust is seen as the basic foundation for the success of all transactions in the economy, including online securities transactions. Because perceived risk in the online securities trading environment is higher than in the traditional securities trading environment, perceived trust plays a very important role in the success of online securities trading. Lack of perceived trust will hinder the growth and development of

online securities transactions. In other words, perceived trust will create favourable conditions for nurturing long-term and sustainable relationships between the securities firm and its individual investors/clients.

Perceived trust refers to situations in which individual investors believe that the securities brokerage firm has the capacity for the ability, integrity, and benevolence expected by their online securities traders. With trust comes the belief that the firm will not take advantage of their customers by pursuing their profits at the clients' expense. Without perceived trust, individual investors would not be motivated to engage in online securities trading transactions. In other words, individual investors will not want to deal with a securities brokerage firm if this firm does not demonstrate trustworthiness.

Two factors, namely perceived security and perceived privacy, in this study are hypothesized to influence perceived trust. However, only perceived security is statistically supported. The possible explanation for the fact that perceived privacy is not statistically supported is that experienced individual investors have some belief that securities brokerage firms employ measures to protect clients' personal information. This is consistent with the interpretation of Belanger et al. (2002), Kim et al. (2009) and Roca et al. (2009).

In order to enhance perceived trust in the online securities trading environment, securities firms must invest in building modern online trading technology infrastructure and software which are encrypted by advanced algorithms, digital signatures, and firewalls to help ensure that all interactions, including online securities transactions, are carried out accurately and quickly. Marketing and communication strategies should be effectively implemented to convey a clear message to individual investors that the firm's capabilities and reputation are reflected in these online trading technologies and that these technologies are reliable, always in a state of readiness to best meet individual investors' expectations and needs.

Firm investments in state-of-the-art online trading technology infrastructure and advanced software must be ongoing to protect individual investors against the possibility of financial information being destroyed, disclosed, modified, stolen, or illegally used, causing financial and non-financial losses to the investors. The deployment of means and tools to enhance perceived security will bring the feeling to individual investors that online securities trading is safe. This study adds to the empirical evidence showing that perceived security is a decisive factor determining online securities trading acceptance, especially when network and customer data attacks are frequent.

Besides perceived trust, perceived ease of use and perceived usefulness play an important role in improving individual investor satisfaction. Specifically, perceived usefulness has a positive effect on satisfaction, while perceived ease of use has a positive influence on perceived usefulness. This means that if the use of the online securities trading system is seen as not requiring complicated effort, so that individual investors can achieve their goals effectively and efficiently, customer satisfaction will increase. Consequently, the securities brokerage firm needs to build a simple and effective online securities trading interface to make individual investors feel that using this online stock trading system is user friendly and that transactions and interactions can be completed in a convenient, quick, and accurate way. Moreover, information on the firm's website and online securities trading system must be properly arranged to create favourable conditions aiding individual investors in their search for necessary information to complete transactions and interactions involving securities trading or other activities. By

doing so, individual investors will feel that using online securities trading services is not about effort, but benefit, leading to increased satisfaction.

This study also shows that switching costs do not directly affect customer loyalty. This is similar to Yang and Peterson (2004). In addition, switching costs do not have a positive moderating effect on the relationship between satisfaction and loyalty, which is similar to Yang and Peterson (2004). The explanation may be that advances in Internet technology have made the Internet not only a communication tool but also an effective marketing tool. This has significantly reduced the switching costs in the online service environment in general and the online securities trading environment in particular. Searching for information about services and comparing different securities firms can be conducted relatively quickly and effectively with the help of the Internet. Access to competing brokerages is just a mouse click away. Many barriers to switching have been removed. Therefore, switching costs have no direct effect on customer loyalty and no positive moderating effect in the relationship between customer satisfaction and customer loyalty.

Building a loyal customer base is one of the most important goals for securities brokerage firms. In order to gain loyal customers, it is imperative for securities brokerage firms to generate customer satisfaction. These firms must continue to diversify services provided to their customers, and improve the quality of these services. When customers perceive the variety and high quality of services offered, they will feel the value added in their relationships and interactions with the securities firm, and become loyal to that firm.

## **7 Conclusions, limitations and future research directions**

This study can be considered as one of the first systematic and in-depth studies on the relationship between satisfaction and loyalty in the online securities trading environment in the country of Vietnam, with its newly emerging economy. Specifically, this research has integrated perceived security, perceived privacy, perceived trust, and switching costs into the Technology Adoption Model to help explain satisfaction and loyalty in individual investors. The results show that perceived privacy has no effect on perceived trust; perceived ease of use has no effect on satisfaction; and switching costs have no direct effect on loyalty and no moderating effect on the relationship between satisfaction and loyalty. However, perceived trust has positive effects on perceived ease of use, perceived usefulness, and satisfaction. Perceived ease of use has a positive effect on perceived usefulness. Perceived usefulness has a positive effect on customer satisfaction, and customer satisfaction has a positive effect on customer loyalty. The results also show that the integrated model is highly predictable, explaining 59.4% of the variability of customer satisfaction and 64.4% of the variability of customer loyalty. Strategies and action plans have been analysed to increase perceived trust, perceived ease of use, perceived usefulness to increase individual investors' satisfaction with, and loyalty to, securities firms. In spite of these results, this study still has some limitations.

The first drawback is that this study's sample includes individual investors of one of the largest securities firms in Vietnam. Therefore, caution should be exercised in extrapolating results of this study to other securities brokerages in Vietnam or other countries with emerging economies.

The second drawback relates to the roles of perceived ease of use and switching costs. In this study, perceived ease of use has no effect on satisfaction and switching costs have

no role in the relationship between satisfaction and loyalty. Although the explanation for non-statistical relationships may be temporarily acceptable, there may be more complex mechanisms or contexts where perceived ease of use and switching costs might be effective.

The third drawback is that although the integrated research model has high predictive ability, explaining 59.4% of the variability of customer satisfaction and 64.4percent of the variability of customer loyalty, there might be still a number of other factors that affect these two variables that have not been included in the model. Future studies should consider these limitations in order to confirm the results of this study and their extrapolation to other securities brokerages in Vietnam and in other countries with emerging economies.

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## References

- Anderson, R.E. and Srinivansan, S.S. (2003) 'E-satisfaction and e-loyalty: a contingency framework', *Psychology and Marketing*, Vol. 20, No. 2, pp.123–138.
- Armstrong, J. S. and Overton, T. (1977) 'Estimating nonresponse bias in mail surveys', *Journal of Marketing Research*, Vol. 51, pp.71–86.
- Bagozzi, R.P. and Yi, Y. (1988) 'On the evaluation of structural equation models', *Journal of the Academy of Marketing Science*, Vol. 16, No. 1, pp.74–94.
- Belanger, F., Hiller, J.S. and Smith, W.J. (2002) 'Trustworthiness in electronic commerce: the role of privacy, security, and site attributes', *Journal of Strategic Information Systems*, Vol. 11, Nos. 3–4, pp.245–270.
- Bollen, K.A. (1989) 'A new incremental fit index for general structural equation models', *Sociological Methods and Research*, Vol. 17, No. 3, pp.303–316.
- Boulding, W., Kalra, A., Staelin, R. and Zeitham, V.A. (1993) 'A dynamic process model of service quality: from expectations to behavioral intentions', *Journal of Marketing Research*, February, Vol. 30, No. 1, pp.7–27.
- Bui, N., Pham, L., Williamson, S., Mohebbi, C. and Le, H. (2020) 'Intention to use mobile commerce: evidence from emerging economies', *International Journal of Enterprise Information Systems*, Vol. 16, No. 1, pp.1–30.
- Castaneda, J.A., Montoso, F.J. and Luque, T. (2007) 'The dimensionality of customer privacy concern on the internet', *Online Information Review*, Vol. 31, No. 4, pp.420–439.
- Chan, S. and Lu L. (2004) 'Understanding Internet banking adoption and use behavior: a Hong Kong perspective', *Journal of Global Information Management*, Vol. 12, No. 3, pp.1–23.
- Chellappa, R. and Pavlou, P.A. (2002) 'Perceived information security, financial liability, and consumer trust in electronic commerce transactions', *Journal of Logistics Information Management*, Vol. 15, No. 3, pp.35–42.
- Chen, Y-H. and Barnes, S. (2007) 'Initial trust and online buyer behavior', *Industrial Management and Data Systems*, Vol. 107, No. 1, pp.21–36.
- Cheng, T.C.E., Lam, D.Y.C. and Yeung, A.C.L. (2006) 'Adoption of Internet banking: an empirical study in Hong Kong', *Decision Support Systems*, Vol. 42, No. 3, pp.1558–1572.

- Cheung, C. and Lee, M. (2001) 'Trust in Internet shopping: Instrument development and validation through classical and modern approaches', *Journal of Global Information Management*, Vol. 9, No. 3, pp.23–35.
- Chin, W. (1998) 'Issues and opinion on structural equation modeling', *MIS Quarterly*, Vol. 22, No. 1, pp.7–16.
- Davis, F.D. (1989) 'Perceived usefulness, perceived ease of use, and user acceptance of information technology', *MIS Quarterly*, Vol. 13, No. 3, pp.319–339.
- Doolin, B., Dillon, S., Thompson, F. and Corner, J.L. (2005) 'Perceived risk, the internet shopping experience and online purchasing behavior: a New Zealand perspective', *Journal of Global Information Management*, Vol. 13, No. 2, pp.66–88.
- Featherman, M.S. and Pavlou, P.A. (2003) 'Predicting e-service adoption: a perceived risk facets perspective', *International Journal of Human-Computer Studies*, Vol. 59, No. 4, pp.451–474.
- Feng, T.T., Tien, C., Feng, Z.Y. and Lai, P.J. (2014) 'Web site quality and online trading influences on customer acceptance of securities brokers', *Asia Pacific Management Review*, Vol. 19, No. 1, pp.25–45.
- Flavian, C. and Guinaliu, M. (2006) 'Consumer trust, perceived security and privacy policy: three basic elements of loyalty to a web site', *Industrial Management and Data Systems*, Vol. 106, No. 5, pp.601–620.
- Gefen, D. and Straub, D. (2000) 'The relative importance of perceived ease of use in IS adoption: a study of e-commerce adoption', *J. Association for Inform. Systems*, Vol. 1, No. 1, pp.1–30.
- Hanafizadeh, P. and Khedmatgozar, H.R. (2012) 'The mediating role of the dimensions of the perceived risk in the effect of customers' awareness on the adoption of Internet banking in Iran', *Electron. Commerce Res.*, Vol. 12, No. 2, pp.151–175.
- Hauser, J.R., Simester, D.I. and Wernerfelt, B. (1994) 'Customer satisfaction incentives', *Marketing Science*, Spring, Vol. 16, No. 4, pp.129–145.
- Hu, S.K., Lu, M.T. and Tzeng, G.H. (2015) 'Improving mobile commerce adoption using a new hybrid fuzzy MADM model', *International Journal of Fuzzy Systems*, Vol. 17, No. 3, pp.399–413, <http://dx.doi.org/10.1007/s40815-015-0054-z>.
- Huang, S.M., Hung, Y.C. and Yen, D.C. (2005) 'A study on decision factors in adopting an online stock trading system by brokers in Taiwan', *Decision Support Systems*, Vol. 40, No. 2, pp.315–328.
- Huy, L., Thinh, N., Pham, L., and Strickler, C. (2019a) 'Customer trust and purchase intention: how do primary website service quality dimensions matter in the context of luxury hotels in Vietnam', *International Journal of E-Services and Mobile Applications*, Vol. 11, No. 1, pp.1–23.
- Huy, L., Nguyen, P., Pham, L. and Berry, R. (2019b) 'Technology readiness and satisfaction in Vietnam's luxury hotels', *International Journal of Management and Decision Making*, Vol. 18, No. 2, pp.183–208.
- Ivanochko, I., Masiuk, V. and Gregus, M. (2015) 'Conceptualizing m-business', in *2015 Wireless Telecommunications Symposium (WTS) Wireless Telecommunications Symposium*, Symposium conducted at the meeting of IEEE, New York, NY, DOI: 10.1109/WTS.2015.7117281.
- Jarvenpaa, S.L., Tractinsky, N. and Vitale, M. (2000) 'Consumer trust in an internet store', *Information Technology and Management*, Vol. 1, No. 12, pp.45–71.
- Jiang, L., Jun, M. and Yang, Z. (2015) 'Customer-perceived value and loyalty: how do key service quality dimensions matter in the context of B2C e-commerce', *Service Business*, Vol. 27, No. 2, pp.1–17.
- Jun, M. and Cai, S. (2001) 'The key determinants of internet banking service quality: a content analysis', *The International Journal of Bank Marketing*, Vol. 19, No. 7, pp.276–291.
- Jun, M., Yang, Z. and Kim, D. (2004) 'Customers' perceptions of online retailing service quality and their satisfaction', *International Journal of Quality & Reliability Management*, Vol. 21, No. 8, pp.1149–1174.

- Kalakota, R. and Whinston, A.B. (1997) *Electronic Commerce: A Manager's Guide*, Addison Wesley, Reading, MA.
- Kim, D., Steinfield, C. and Lai, Y. (2008) 'Revisiting the role of web assurance seals in business-to-consumer electronic commerce', *Decision Support Systems*, Vol. 44, No. 4, pp.1000–1015.
- Kim, G., Shin, B. and Lee, H.G. (2009) 'Understanding dynamics between initial trust and usage intentions of mobile banking', *Information Systems Journal*, Vol. 19, No. 3, pp.283–311.
- Koo, C. and Wati, Y. (2010) 'Toward an understanding of the mediating role of 'trust' in mobile banking service: an empirical test of Indonesia case', *Journal of Universal Computer Science*, Vol. 16, No. 13, pp.1801–1824.
- Koufaris, M. and Hampton-Sosa, W. (2004) 'The development of initial trust in an online company by new customers', *Information & Management*, Vol. 41, No. 3, pp.377–397.
- Laforet, S. and Li, X. (2005) 'Consumers' attitudes towards online and mobile banking in China', *International Journal of Bank Marketing*, Vol. 23, No. 5, pp.362–380.
- Lee, J., Lee, J., and Freick, L. (2001) 'The impact of switching costs on the customer satisfaction-loyalty link: mobile phone service in France', *Journal of Services Marketing*, Vol. 15, No. 1, pp.35–48.
- Lee, K.S., Lee, H.S. and Kim, S.Y. (2007) 'Factors influencing the adoption behavior of mobile banking: a South Korean perspective', *Journal of Internet Banking and Commerce*, Vol. 12, No. 2, pp.1–9.
- Lee, M.K.O. and Turban, E. (2001) 'A trust model for consumer internet shopping', *International Journal of Electronic Commerce*, Vol. 6, No. 1, pp.75–91.
- Lian, J., and Lin, T. (2008) 'Effects of consumer characteristics on their acceptance of online shopping: comparisons among different product types', *Computers in Human Behavior*, Vol. 24, No. 1, pp.48–65.
- Lim, N. (2003) 'Consumers' perceived risk: sources versus consequences', *Electronic Commerce Research and Applications*, Vol. 2, No. 3, pp.216–228.
- Lin, X., and Wei, B. (1999) 'Service quality dimensions of securities brokerage firms: what customers consider as important', *Journal of Professional Services Marketing*, Vol. 20, No. 1, pp.135–146.
- Liu, C.H. (2015) 'The impact on switching intention of e-trading systems for the securities industry', *Global Journal of Business Research*, Vol. 9, No. 1, pp.5–88.
- Long, P. and Thanh, L.T. (2016) 'NegotiAuction: an investigation of its possible adoption', *International Journal of Strategic Decision Sciences*, Vol. 7, No. 3, pp.1–16.
- Long, P. and Vy, P.D. (2016) 'Internet banking service quality, customer satisfaction and customer loyalty', *International Journal of Strategic Decision Sciences*, Vol. 7, No. 1, pp.1–7, <https://doi.org/10.4018/IJSDS.2016010101>.
- Long, P., Lan, N.P. and Duong, T.T.N. (2011) 'Determinants of e-commerce adoption in Vietnamese small and medium sized enterprises', *International Journal of Entrepreneurship*, Vol. 15, pp.45–62.
- Luo, X., Li, H., Zhang, J. and Shim, J.P. (2010) 'Examining multi-dimensional trust and multi-faceted risk in initial acceptance of emerging technologies: an empirical study of mobile banking services', *Decision Support Systems*, Vol. 49, No. 2, pp.222–234.
- Marinosa, B.G. (2001) 'Technological incompatibility, endogenous switching costs and lockin', *The Journal of Industrial Economics*, Vol. 49, No. 3, pp.281–298.
- McKnight, D.H., Chudhury, V. and Kacmar, C. (2002) 'The impact of initial customer trust on intentions to transact with a web site: a trust building model', *Journal of Strategic Information Systems*, Vol. 11, No. 4, pp.297–323.
- Morgan, R. and Hunt, S. (1994) 'The commitment-trust theory of relationship marketing', *Journal of Marketing*, Summer, Vol. 58, No. 3, pp.20–38.

- Mukherjee, A. and Nath, P. (2007) 'Role of electronic trust in online retailing: a re-examination of the commitment-trust theory', *European Journal of Marketing*, Vol. 41, Nos. 9/10, pp.1173–1202.
- Nunnally, J.C. (1978) *Psychometric Theory*, McGraw-Hill, New York.
- O'Cass, A. and Fenech, T. (2003) 'Web retailing adoption: Exploring the nature of internet users web retailing behaviour', *Journal of Retailing and Consumer Services*, Vol. 10, No. 2, pp.81–94.
- Parasuraman, A., Zeithaml, V.A. and Malhotra, A. (2005) 'E-S-QUAL – a multiple-item scale for assessing electronic service quality', *J. Serv. Res.*, Vol. 7, No. 3, pp.213–233.
- Pavlou, P.A. (2003) 'Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model', *International Journal of Electronic Commerce*, Vol. 7, No. 3, pp.69–103.
- Pham, L. and Doan, N.P.A. (2014) 'Intention to use e-banking in a newly emerging country: Vietnamese customer's perspective', *International Journal of Enterprise Information Systems*, Vol. 10, No. 2, pp.103–120.
- Pham, L., Cao, N.Y., Nguyen, T.D. and Tran, P.T. (2013) 'Structural models for e-banking adoption in Vietnam', *International Journal of Enterprise Information Systems*, Vol. 9, No. 1, pp.31–48, doi:10.4018/jeis.2013010102.
- Pham, L., Kim, K., Walker, B., DeNardin, T. and Le, H. (2019a) 'Development and validation of an instrument to measure student perceived e-learning service quality', *International Journal of Enterprise Information Systems*, Vol. 15, No. 2, pp.15–42.
- Pham, L., Williamson, S., Mohebbi, C., Nguyen, B. and Nguyen, H. (2019b) 'The mediating role of perceived value in the effect of multi-dimensional risk in mobile banking', *International Journal of Enterprise Information Systems*, Vol. 15, No. 4, pp.1–25.
- Pham, L., Limbu, Y., Bui, T., Nguyen, H. and Pham, H. (2019c) 'Does e-learning service quality influence e-learning student satisfaction and loyalty? Evidence from Vietnam', *International Journal of Educational Technology in Higher Education*, Vol. 16, No. 7, pp.1–26.
- Pham, L., Pham, N., Le, H. and Luse, D. (2018a) 'Technology readiness and customer satisfaction in luxury hotels: a case study of Vietnam', *International Journal of Entrepreneurship*, Vol. 22, No. 2, pp.6–25.
- Pham, L., Williamson, S. and Berry, R. (2018b) 'Student perceptions of e-learning service quality, e-satisfaction, and e-loyalty', *International Journal of Enterprise Information Systems*, Vol. 14, No. 3, pp.19–40.
- Pham, L., Williamson, S., Lane, P., Limbu, Y., Nguyen, P. and Coomer, T. (2020) 'Technology readiness and purchase intention: role of perceived value and online satisfaction in the context of luxury hotels', *International Journal of Management and Decision Making*, Vol. 19, No. 1, pp.91–117.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J. and Podsakoff, N.P. (2003) 'Common methods biases in behavioral research: a critical review of the literature and recommended remedies', *Journal of Applied Psychology*, Vol. 88, No. 5, pp.879–903.
- Poon, W.C. (2008) 'Users' adoption of e-banking services: the Malaysian perspective', *Journal of Business and Industrial Marketing*, Vol. 23, No. 1, pp.59–69.
- Ranganathan, C. and Ganapathy, S. (2002) 'Key dimensions of business-to-consumer web sites', *Information and Management*, Vol. 39, No. 6, pp.457–465.
- Roca, J.C., García, J.J. and de la Vega, J.J. (2009) 'The importance of perceived trust, security and privacy in online trading systems', *Information Management and Computer Security*, Vol. 17, No. 2, pp.96–113.
- Rod, M., Ashill, N., Shao, J. and Carruthers, J. (2009) 'An examination of the relationship between service quality dimensions, overall internet banking service quality and customer satisfaction: a New Zealand study', *Marketing Intelligence and Planning*, Vol. 27, No. 1, pp.103–126.
- Salam, A., Iyer, L., Palvia, P. and Singh, R. (2005) 'Trust in e-commerce', *Communications of the ACM*, Vol. 48, No. 2, pp.72–77.

- Sharma, N. and Patterson, P.G. (2000) 'Switching costs, alternative attractiveness and experience as moderators of relationship commitment in professional, consumer services', *International Journal of Service Industry Management*, Vol. 11, No. 5, pp.470–490.
- Van, H., Pham, L., Williamson, S., Huong, V., Hoa, P. and Trang, P. (2020a) 'Impact of perceived risk on mobile banking usage intentions: trust as a mediator and a moderator', *International Journal of Business and Emerging Markets*, Vol. 12, No. 1, pp.94–118.
- Van, H., Pham, L., Williamson, S., Chan, C., Thang, T., and Nam, V. (2020b) 'Explaining intention to use mobile banking: integrating perceived risk and trust into the technology acceptance model', *International Journal of Applied Decision Sciences*, in press.
- Yang, K.C., Chye, G.N.S., Fern, J.C.S. and Kang, Y. (2015) 'Understanding the Adoption of mobile commerce in Singapore with the technology acceptance model (TAM)', in *Assessing the Different Roles of Marketing Theory and Practice in the Jaws of Economic Uncertainty*, pp.211–215, Springer International Publishing, Coral Gables, FL.
- Yang, Z. and Fang, X. (2004) 'Online service quality dimensions and their relationships with satisfaction', *International Journal of Service Industry Management*, Vol. 15, No. 3, pp.302–326.
- Yang, Z. and Peterson, R. T. (2004) 'Customer perceived value, satisfaction, and loyalty: the role of switching costs', *Psychology and Marketing*, Vol. 21, No. 10, pp.799–822.
- Yang, Z., Jun, M. and Peterson, T.R. (2004) 'Measuring customer perceived online service quality: scale development and managerial implications', *International Journal of Operations and Production Management*, Vol. 24, No. 11, pp.1149–1174.
- Yousafzai, S.Y., Pallister, J.G. and Foxall, G.R. (2003) 'A proposed model of e-trust for electronic banking', *Technovation*, Vol. 23, No. 11, pp.847–860.

## Appendix

### *Measurement scales*

#### *Perceived security*

- 1 I think the online trading system has sufficient technical capacity to ensure that the data I send cannot be modified by a third party.
- 2 The online trading system has enough security measures to protect my personal and financial information.
- 3 When I send data to the online trading system, I am sure that they will not be intercepted by unauthorized third parties.
- 4 I think the online trading system has sufficient technical capacity to ensure that no other organization will supplant its identity on the internet.

#### *Perceived privacy*

- 1 I am concerned that the online trading system will use my personal information for other purposes without my authorization.
- 2 I think that too much of my personal and financial information will be collected by the online trading system.

- 3 I am concerned about the privacy of my personal and financial information during a transaction.
- 4 My personal and financial information will be shared with other entities without my authorization.

*Perceived trust*

- 1 The online trading system is trustworthy.
- 2 The online trading system has a good reputation as financial dealer and stockbroker.
- 3 The online trading system is competent and effective as financial dealer and stockbroker.
- 4 I do not doubt the honesty of the online trading system.

*Perceived ease of use*

- 1 Learning to use the online trading system is easy.
- 2 The online trading system is easy to use.
- 3 It would be easy for me to become skilful at using the online trading system.
- 4 My interactions with the online trading system are clear and understandable.

*Perceived usefulness*

- 1 I would find the online trading system useful in conducting my securities transactions.
- 2 Using the online trading system would make it easier for me to conduct securities transactions.
- 3 Using the online trading system enables me to accomplish securities transactions more quickly.
- 4 Using the online trading system would improve my performance in conducting securities transactions.

*Customer satisfaction*

- 1 The online trading system comes up to my expectations of what makes a good online trading system.
- 2 I am satisfied with my experience of the online trading system's services.
- 3 I am satisfied with the online trading system's internet-based transactions.
- 4 I am satisfied with the products/services offered by the online trading system.
- 5 Overall, I am satisfied with the online trading system.

*Customer loyalty*

- 1 I say positive things about the online trading system to other people.
- 2 I would recommend the online trading system to those who seek my advice about online securities transactions.
- 3 I would encourage friends and relatives to use the online trading system.
- 4 I would post positive messages about the online trading system on some Internet message board.
- 5 I intend to continue to conduct securities transactions with the online trading system.
- 6 I intend to do more business with the online trading system.

*Switching costs*

- 1 It takes me a great deal of time and effort to get used to another securities brokerage firm's online trading system.
- 2 It costs me too much to switch to another securities brokerage firm's online trading system.
- 3 In general, it would be a hassle switching to another securities brokerage firm's online trading system.