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EFFECTS OF MOBILE COMMERCE ON CUSTOMER USAGE INTENTION

An Empirical Study in Viet Nam

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ABSTRACT

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Mobile commerce has been rapidly developing in the recent years and it plays an important role in many aspects. In Vietnam, there are limited studies researching mobile commerce and its impacts. Therefore, this study aimed to discover the factors that influence the intentions of Vietnamese consumers to use mobile commerce.

Based on the theoretical background, the research model and its hypotheses were tested and developed by collecting the data from a questionnaire survey. This research provides thirteen hypotheses to determine the main factors that contribute to intention to use of mobile commerce system. Based on the traditional Technology Acceptance Model (TAM), the research included more dimensions into the study including trust, cost and playfulness factors.

The results are based on the data analysis collected from 235 Vietnamese participants through a face-to-face, a paper survey and online questionnaire. The result showed that the intention to use dominantly affected the mobile commerce usage in this model. Perceived usefulness and perceived ease of use in this paper did not affect directly to intention to use, however, PU directly affected mobile commerce usage and PEOU indirectly affects intention to use through perceived playfulness. Intention to use has direct effect on perceived trust and perceived playfulness while mobile commerce usage has direct influence on perceived playfulness and perceived cost. Finally, it is hoped that this study could provide the outcomes to help further research to have a better insight into Vietnamese consumer behavior as well as business players to develop better strategies in mobile commerce market.

Key word: mobile commerce, technology acceptance model, consumer intention to use, perceived usefulness, ease of use, cost, playfulness

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ABBREVIATION

3G – Third Generation of Wireless Mobile Telecommunications

4G – Fourth Generation of Wireless Mobile Telecommunications.

CFA - Confirmatory Factor Analysis

E-commerce – Electronic Commerce

EFA - Exploratory Factor Analysis

IU – Intention to use

M-commerce – Mobile commerce

MU – Mobile commerce usage

PC – Perceived Cost

PEOU – Perceived Ease of Use

PP – Perceived Playfulness

PT – Perceived Trust

PU – Perceived Usefulness

SEM – Structural Equation Modelling

1. INTRODUCTION

This chapter is aiming to describe the topic of study that including the background and objectives. The first is the research background that is illustrated by analysing the mobile commerce situation in the world and in the Vietnamese market. The second is the objectives that explain the significance of this research and the aims of this paper need to be examined. The last part of chapter introduces the structure of whole research with the overview of each chapter.

1.1. Background of the Study

A mobile device is becoming one of the most popular means of digital assistants over the past few years in the world and developing in leaps not only in the amount usage but also in the high-end technology, it is a significant transformation on the way customers communicate and connect regardless the borders (The Economist, 2015). According to Chaffey (2017), the number of mobile consumers has surpassed the desktop consumers around the world. The data from Statcounter (2019) has indicated the rapid growth of mobile market share in comparison to desktop computers over the past year.

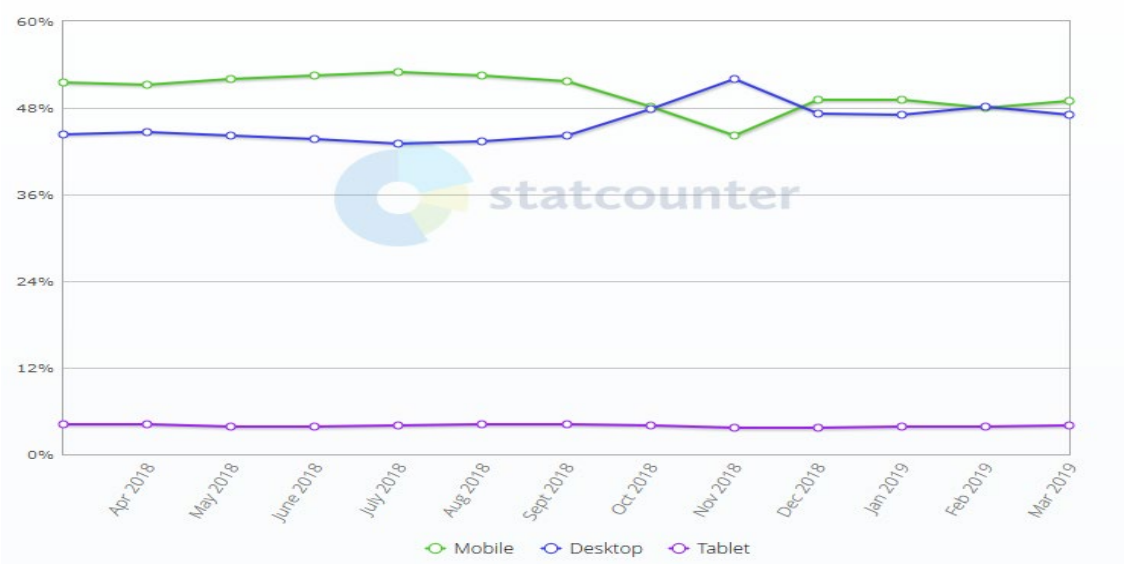

Figure 1. Desktop vs Mobile and Tablet market share worldwide from 03/2018 to 03/2019 (Source: Statcounter, 2019)

Beside the rapid development of mobile devices and smartphones, mobile commerce has become an important sector. People are no more bound in computer transactions due to the mobile phone's manipulation, especially with the designed applications for mobile users. Customers nowadays can shop online through their mobile devices including tablets, smartphones as mobile commerce services are optimized by creating mobile applications for multiple devices (Jahanshahi et al., 2012). With the huge amount of mobile usage, commerce and service on mobile device will definitely give an enormous attractive profit for many businesses.

Mobile commerce (m-commerce) is the new recent trend that simplifies online transactions and getting products or service in a simple touch of fingertips (Aditya, 2018). Based on the research in Statista Portal, the amount of global mobile commerce sales will surpass 613.2 billion Euro in 2019 from 85.25 billion dollars in 2015. In addition, the development of m-commerce is growing by the increasing usage of smart devices and the upgrading of technology. Nowadays, the mobile phone plays a vital role in an individual's life in supporting to entertainment, conducting business and connecting people around the world via social networks. Taking advantage of these opportunities, many businesses offer a variety of products to their customers as m-commerce services, infrastructure or investment. China and India are good examples in which many organizations are utilizing their potential market and big population to offer telecommunication and m-commerce services (Worldpay, 2018; Nexevo, 2017). Vietnam, a country with more than 97 million people, has approximately 84 percent of its population using smartphones (Vietnamnet, November 2017) and the new trend of mobile commerce will sooner or later influence the customer behaviour intentions. To date, there is limited research indicating the adoption and significance of m-commerce in Vietnam. In order to have a better understanding of the behaviour intentions of consumers to contribute to further researches and support the businesses in mobile commerce environment, this research will indicate that it is necessary to study the factors influencing consumers' intentions on m-commerce adoption in Viet Nam.

1.2. Research Question and Objectives

The development and state-of-art of technology indicates that it is the perfect time for m-commerce environment and business. With the rapid development of 4G network alongside with the increasing number of mobile consumers, there are millions of people using mobile applications and making mobile transactions everyday around the world. The tendency for m-commerce in Vietnam has appeared over the past few years and is expanding quickly in many big cities. Thus, it is vital to understand the consumer's usage intention on the m-commerce acceptance and also the critical drivers contributing to the adoption intention of m-commerce.

Therefore, the main question of this paper needs to be answered is: "*What are the main factors influencing the intention to use mobile commerce in Vietnam?*"

In order to support the research project and give a clear answer to the research question, the research objectives are set in a concrete direction. In addition, the readers can be assisted by these research objectives to understand the study subject easily. Hence, the research objective is as following:

This thesis aims to investigate the main factors affecting the intention to use m-commerce of customers in Vietnam, and evaluate from the perspectives of Vietnamese mobile phone users. Due to the condition in Vietnam including the infrastructure, multimedia contents, limited access, etc., there is a necessity to evaluate more quality drivers influencing the Vietnamese user's perception towards m-commerce. This paper will use the Technology Acceptance Model (TAM) with integrating more dimensions including perceived trust, perceived cost and perceived playfulness.

1.3. Structure of Study

This research is structured in chapters as follows:

The first chapter will present the introduction of research including the background and objectives of thesis. Then the structure of this study is presented beside the key concepts.

The second chapter will present some characteristics of Vietnamese consumers, then summary of Vietnamese market with the overview of mobile commerce in Vietnam in which the regulations and framework are applied for mobile commerce,.

The third chapter will give the theorical background which is related to mobile commerce. Firstly, the evolution of e-commerce and the concepts of m-commerce from the previous studies is given in short. Next, the dimensions theories approach m-commerce usage intention and the expansion of Technology Acceptance Model (TAM)

Chapter four describes the research model based on the theoretical framework and hypothesis aiming at developing research model for m-commerce adoption as well as explain the behavioural usage intention in Vietnam.

Chapter five is about the methodology used in this paper. So, this chapter starts with methodological approaches by giving type of research, research strategy, research method. Then the process of research is discussed consisting of data collection method and data analysis method of research.

Chapter six is also the most important part of this study in which data analysis and evaluation will be given with the actual results associated with theorical framework.

The last chapter will be the conclusion of the previous parts that include the implications, limitation and future research regarding to mobile commerce.

2. BACKGROUND INFORMATION ABOUT MOBILE COMMERCE IN VIETNAMESE MARKET

This chapter presents the overview about mobile commerce situation in Vietnam. Firstly, the characteristics and perception of customers in Vietnam about mobile commerce. The second part is the situation of m-commerce in Vietnam today and then the regulatory framework in the Vietnamese market are discussed that customers and businesses need to follow.

2.1. Customer Characteristics in Vietnam

It can be seen that the number of Vietnamese people using mobile phones to access the Internet is very high, but the amount of consumers using mobile devices to do online transactions is low. In addition, people prefer “cash over online transaction”, in the urban areas, 90 percent of online customers paid in cash (Dan Tri International News, 2019). Meanwhile in the rural and remote areas, there are many people who are not able to access the “modern payment facilities and services” (Vietnamnet.vn, 2018).

The question appeared in these issues that why many people do not like to purchase via their mobile devices. It could be because of the believes on safety, security of people or even the cost of services will prevent the consumers carrying out mobile transactions. The next chapter of this research will study and give an answer to these problems.

2.2. M-commerce in Vietnam

Viet Nam, one of the countries belonging to ASEAN, is an emerging economy with approximately 97 million people (population in 2018). It stands at rank 14th in the world about the most populous countries, rank 8th in Asia and rank 3rd in ASEAN. According to the information in chapter 1, around 84 percent of Vietnam population are using mobile devices, 68 percent of people owned smart devices (cellphone, tablet, smartwatch, etc.). It is predicted that the number of people who are using mobile

internet devices will increase in next three years by 31 percent (from 2017 to 2023, Statista)

Most of mobile devices in Vietnam are able to connect to a 3G and a 4G network. This has become really popular in Vietnam and it enables consumers easy to access the Internet and social networks regardless of their location. Thanks to the convenience of internet access, the mobile services in Vietnam have developed significantly over the past few years. According to Vietnamnet.vn, "39 percent of the population have purchased products or services online, of them 29 percent have placed at least one online order via a mobile device". Moreover, among 45 percent of domestic companies, 19 percent of them owned websites which "are compatible with mobile devices" (Vietnamnet.vn, 2017).

2018 can be seen as a "boom year" on mobile payment and e-commerce, especially on mobile shopping in Vietnam (Vietnamese Economic News, 2018). In fact, most of the commercial enterprises enable their consumers to use online payment services via mobile banking or via other agencies (Tiki, Momo wallet, Zalo Pay, etc.). It can be seen that the average growth of e-commerce in Vietnam is approximately 33-35 percent in the period of 2015-2025 (Vietnamese Economic News, 2018) and it contributes to the growth of mobile commerce in "the trend of using mobile devices" for individuals and cross-border trade of businesses at large.

2.3. Regulations of M-commerce in Vietnam

In general, mobile commerce in Vietnam has no official letter or specific regulatory framework to be managed and controlled. Hence, mobile commerce is managed and regulated under e-commerce regulations as a part of it.

There are some regulatory frameworks of e-commerce adapted on m-commerce which will be mentioned below.

Decree No. 52/2013/ND-CP (about Law on E-Commerce) stipulated and effective on 1st of July, 2013 refers to the limitations of e-commerce and counterfeit goods or intellectual property rights. Moreover, this Decree aims at developing e-commerce as well as enhancing the competitive advantages among investors.

Decree No. 72/2013/ND-CP about the "management, provision and use of Internet services and online information" is effective from 1st of September, 2013. This Decree applies for both domestic and foreign enterprises and individuals in Vietnam and ensures "information safety and security".

The Decree No. 08/2018/ND-CP which came to enforce on 15th of January, 2018 has abolished, amended and supplemented some regulations on e-commerce business in Decree No. 52/2013/ND-CP.

3. LITERATURE REVIEW

Nowadays, the research discussing mobile commerce adoption in Vietnamese market are limited, and the e-commerce studies are conducted in various business aspects. Therefore, the diverse information and resources about the similar fields are available to consult and explore thoroughly. It is crucial to refer to the related previous researches for theoretical background and literature review in this paper. Then, this chapter also describe the traditional Technology Acceptance Model (TAM) and extended model with the concept of variables of study model in order to have a better insight of this research.

3.1. The evolution of E-commerce

The Internet has offered a significant potential in terms of being communication channel from the very beginning started in the 1960s for military purposes (Leiner et al., 1997). When the Internet became popular, its development and innovation were constantly growing and contributed to success by improvement on interaction and functionality (Howe, 2016). Today, the Internet has worldwide network which connects millions of computers without border. The data in Table 1 below describes the Internet usage statistics in the world in the year 2019

Table 1. World Internet Usage and Population Statistics March, 2019

Regions	Population (2019 Est.)	Population (% of World)	Internet Users	Penetration Rate (% Pop.)	Growth (%) 2000-2019	Internet Users (%)
Africa	1,320,038,716	17.0	474,120,563	35.9	10,402	10.9
Asia	4,241,972,790	54.7	2,190,981,318	51.7	1,817	50.4
Europe	866,433,007	11.2	718,172,106	82.9	583	16.5
Latin America/ Caribbean	658,345,826	8.5	438,248,446	66.6	2,325	10.1
Middle East	258,356,867	3.3	170,039,990	65.8	5,076	3.9
North America	366,496,802	4.7	326,561,853	89.1	202	7.5
Oceania / Australia	41,839,201	0.5	28,437,577	68.0	273	0.7
WORLD TOTAL	7,753,483,209	100.0	4,346,561,853	56.1	1,104	100.0

(Sources: Internet World Stats, 2019)

Along with the rapid growing of the Internet, the mobile era has come which has helped people to communicate online through the Internet, and pushed the Internet adoption for mobile devices. Electronic commerce (e-commerce) appeared in this time in form of economic activity with digital transactions such as exchanging at goods, services, information or even payments (Pavlou, 2003).

The e-commerce scope covers wide range including marketing, advertising, business-to-business, business-to-customer or customer-to-customer and enhanced the commercial activities and value added of economy (Turban et al., 2015).

3.2.Concept of Mobile Commerce

Mobile commerce (M-commerce) is a very new concept with many definitions from various authors. According to Maria Cristina Enache (2016), M-commerce can be defined as "mobile e-commerce, because its transactions are basically electronic transactions, conducted using a mobile terminal and a wireless network". Based on Ngai's and Gunasekaran's (2007) definition, m-commerce has similarities with e-commerce but all its transactions happen through the mobile devices. M-commerce is stated as a new type of business system and extended more than e-commerce on its value chain, interaction or usage model (H. Feng, 2006). Tiwari and Buse (2007) indicated that m-commerce covers both areas: commercial and non-commercial with the larger aspects in mobile business.

According to the discussions and definitions mentioned above, mobile commerce can be understood as "any transactions, involving the transfer of ownership or rights to use goods and services, which is initiated and/or completed by using mobiles access to computer-mediated network with the help of mobile devices" (Tiwari and Buse, 2007, p.33).

M-commerce can be seen a part of e-commerce due to its activities but through a mobile device. According to Turban et al. (2015), there are five traits off m-commerce, which will be explained below

Firstly, ubiquity is defined as invisible and seamless (Okazaki et al., 2012). This means that m-commerce is presented everywhere in the reality. People using m-commerce are able to access the Internet via their mobile device regardless of their place to purchase, surf, search information, use services, etc. Thanks to the cover of wireless data service, people have had a new experience with mobile devices using mobile commerce and they have been facilitated with transactions literally everywhere around the world covered by the Internet.

Secondly, convenience was highlighted by Clarke (2008), the features of m-commerce refer to "agility and accessibility". There are various benefits of this trait to mobile consumers, for instance, users can utilize m-commerce to make a seamless transaction to create variety of services such as ordering, selling purchasing, checking product and messaging for example.

In addition, localization is also stated by Clarke (2008) as an aspect of m-commerce. A good case in this point is Global Positioning System (GPS) – one of the most popular features of smartphone. This feature enables m-commerce to identify users' location in a specific time and this becomes a distinctive attribute when comparing it with e-commerce and e-commerce services. Thank to GPS, m-commerce entrepreneurs are able to target their markets and customers through geolocation services. In contrast, the customers also follow their merchandise on shipping route or the nearby merchant store.

The fourth trait of m-commerce is personalization in terms of "customizable and personalize experience" (Wattal, 2007). In recent years, mobile devices have developed and become more personally based on the customers' preferences. In many businesses, personalization is really vital when profiling their customers to find the match of their preferences, then develop suitable products or services for each specific group of users. Moreover, personalization also covers the broader aspects including remembering personal information, record previous interactions and allow the custom order to order.

Finally, accessibility and interactivity are two final characteristics of m-commerce that enables users to easily access and smoothly continuously interact among sellers and buyers (Turban et al., 2015). This feature depends on the internet network as a pre-requisite of mobile device to make it operate. Mobile consumers have the ability to connect with a merchant and interact directly with the sellers. Otherwise, the sellers also have a chance to make an active channel to contact with their consumers for many promotional purposes.

3.3. Technology Acceptance Model (TAM)

The model normally used in m-commerce research is Technology Acceptance Model (TAM) which is proposed by Davis (1989). This model is not only about one discipline, it covers many aspects including psychology, business, management, information technology for example. Until today, there are several studies which have used TAM as their model to predict the attitude toward using, behavioural intention and actual system use. In fact, there was a rise of studies on using TAM to measure the consumer behaviour in recent year that contributed a huge implication and economic value to businesses on the way to understanding the consumer intentions in change of new technology.

TAM is built on the "Theory of Reasoned Action" (TRA) model (1975) that acknowledges the usage behaviour – because of the volitional factors – could not be directly responded by personal's intention or behavioural intention to use a system. (Ajzen and Madden, 1985). It is believed that individual intention in TRA theory is a reflection of "attitude toward behaviours" and "personal perception" (Hagger et al., 2002). TRA theory is used in many research fields to measure and predict the results of actions that obtained significance in both customer behaviour and businesses.

In comparison, TAM theory is used to predict the technology acceptance (Vankatesh et al., 2003). According to this model, when a new technology is presented to consumers, there would be some drivers affecting their decision-making as whether or not adopt a new technology. According to Davis's research, there are two main factors

indicating the personal perception on the user's acceptance and usage of technology: perceived usefulness (PU) and perceived ease of use (PEOU). He presented in his research in 1989 that the purpose of TAM is to explain the factors about the technology acceptance can justify the consumer behaviour on computing technology.

These are traditional TAM model with two key factors affecting behavioural intention as Figure 2

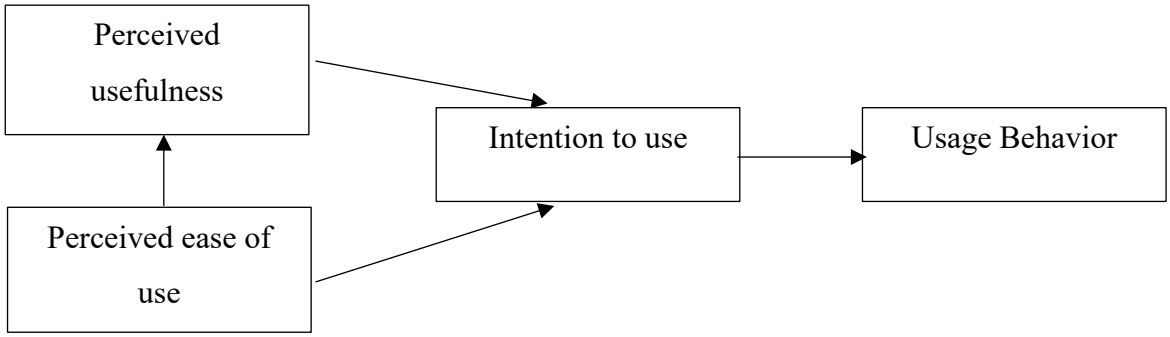

Figure 2. Technology Acceptance Model (Davis, 1989)

However, the traditional TAM model does not cover perceived playfulness and perceived cost on new information system adoption. Thus, TAM2 model by Davis and Venkatesh (2000) explains these factors on usage intention according to perceived usefulness.

3.3.1. Applying TAM to mobile commerce

Technology Acceptance Model (TAM) is designed to understand and predict the acceptance of technology on behaviour intention of user in recent years. There are a wide range of studies using TAM to conduct the research on m-commerce from the mobile shopping (Ko, Kim and Lee, 2009), mobile ticket (Dyna and Purwo, 2011) to mobile services (Chan and Rim, 2013) and mobile tourism (Yang and Zhang, 2013).

According to the study of Pagani about the new technology adoption, there are two main factors influencing the individual intention to use: perceived usefulness (PU) and perceived ease of use (PEOU) with the specific statistics among group. There are 31.3

percent of respondents among the age of 25 and 34 indicated that PU is the most important factor regarding mobile service adopting and PEOU is at the second rank with 26.7 percent of the respondents (Pagani, 2004, p.54)

3.3.2. Adoption Models of M-Commerce

There are a variety of researches analysing whose TAM on m-commerce in different dimensions, different contexts.

Technology Acceptance Model according to Wu and Wang (2004) investigated the determinants of user's m-commerce acceptance such as online shopping, services, banking, business investing. The results are found that except PEOU, the user's behavioural intention is influenced by all the variables. Moreover, Cheong and Part also suggested two more dimensions including perceived playfulness and perceived cost to Technology Acceptance Model.

The table mentioned below will summary some selected studies on mobile commerce adoption.

Table 2. Mobile Commerce Studies in previous years

Authors of Research	**Research topic**	**Independent Variables**	**Mediating Variables**	**Dependent Variables**
Toh Tsu Wei, Govindan Marthandan (2007)	M-Commerce in Malaysia	Perceived Usefulness, Perceived Ease of Use, Social Influence, Trust, Perceived Cost	-	M-Commerce Intention to use
Chan and Chong (2012)	M-Commerce Activities in HongKong	Age, Educational level, gender, perceived enjoyment, social influence, perceived security risks, perceived	Content delivery, transactions, location-based services and enterntainment.	M-commerce usage activities

		usefulness, perceived ease of use		
Lei, Hu and Zhu (2013)	Mobile E-Commerce	Privacy risk, psychology risk, financial risk, functional risk, time risk	Perceived Usefulness, Perceived Ease of Use, Perceived Risk	Usage Attitude. Usage Intention
Han and Nguyen (2015)	M-commerce in Vietnam	System quality, content quality, service quality, personal innovativeness, perceived cost	Perceived usefulness, perceived ease of use, perceived playfulness	Intention to use, mobile commerce usage
Pinghao Ye, Liqiong Liu (2017)	M-Commerce in China	App performance, device performance, service performance	-	User satisfaction
Kedwwadee Sombultawee (2017)	Mobile commerce in Thai	Performance expectancy, effort expectancy, social influence, online social support, direct incentives, convenience	-	Behavioural intention
Aditya Putra (2018)	M-Commerce in Indonesia	Perceived Trust. Subjective norm. Perceived Behaviour Control.	Perceived usefulness, perceived ease of use.	Attitude toward using. Behavioural intention.
Hammad Mushtaq (2018)	M-Commerce	Perceived Social Influence, Attitude towards OBA	Mobile Commerce Trust	Customer Recommendations

3.4. Theoretical Perspectives

The Technology Acceptance Model (TAM) and the models from previous studies are antecedents for this research. This part of chapter 3 will proceed to the theoretical perspective in order to develop the research model. The variables of model are determined through specific characteristics of m-commerce, the antecedent model of Han and Nguyen (2015), Aditya (2018). Firstly, intention to use and m-commerce usage are still kept as two main dependent variables in research model. Secondly, it is crucial to consider two variables of TAM consisting of perceived usefulness and perceived ease of use as the main factors of model. Thirdly, the perceived playfulness is added to traditional TAM as a mediating variable which mediates the relationships between perceived ease of use and intention to use m-commerce. Finally, the intention to use m-commerce is connected to the motivation of users as perception about trust and cost to m-commerce, then the concepts of perceived trust and perceived cost felt into the interest of this research as independent variables.

3.4.1. Independent Variables

Perceived Trust, Trust is a prominent determinant in the interaction among people, merchants, entrepreneurs, especially in commercial transactions. The concept of trust derived from the belief that actions are fulfilled by trustee according to expectation of trustor without any gap exploited (Luhmann, 1979). There are several researches examined Trust as a factor in e-commerce adoption (McKnight and Chervany, 2003; Gefen et al., 2003; Pavlou, 2003). Since m-commerce is considered as a part of e-commerce, the feature of trust is also applied in the model of m-commerce study (Zarmpou et al, 2012).

Perceived Cost, Cost or price is one of the core factors that affect the customers' usage behaviour and process of decision-making and could slow down the growth of m-commerce development (Turban et al., 2000). The consumers nowadays are more wisely in using the service when comparing the cost of service with the benefit that they can receive. They would not subscribe the service if its costs exceeded benefits.

There are several types of cost when using m-internet such as purchase cost (handset fee), usage cost (service, communication, subscription fee) or maintenance and upgrade cost (Luarn and Lin, 2005) which are divided into two parts: investment cost for proper device and subscription fee. The former cost is about users pay for their device to connect with mobile network. The latter cost is the monthly charge that users have to pay to maintain using the service such as per-minute fees, per-packet fees, etc. Sathye (1999) stated that cost is one of the factors that prevent Australian users to use Internet banking. Carlsson et al. (2006) also indicated in his research that cost factor is outweigh than privacy and security risk in terms of 3G services adoption in Finland. According to these studies, cost is a key predictor on the mobile commerce adoption toward m-commerce usage.

3.4.2. Mediating Variables

Perceived Usefulness, Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). The influence of perceived usefulness and Intention to use (IU) has been validated in several previous studies (Lin and Wang, 2006; Wei and Marthandan, 2007; Chan and Chong, 2012). They suggested that the intention to use and the actual usage of mobile commerce are strongly affected by the usefulness of m-commerce service. Additionally, Pagani (2004) showed that perceived usefulness standing at the first position among all the features on individuals' ranking on the m-commerce services. Hence, this determinant is a vital concept in terms of m-commerce usage for individuals' likelihood.

Perceived Ease of Use, Perceived ease of use (PEOU) is "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989). Beside the belief of useful application, many people might find that it is hard to use the new technology system (Davis, 1989). PEOU is one of the most important factors in many previous researches on new technology adoption of internet, e-commerce, m-commerce, etc. (Lu et al., 2003; Lin and Wang, 2005; Wang and Barner, 2007; Cho et

al., 2007). The complexity of new system will prevent the adoption of technology from the innovation (Roger, 1995).

Perceived Playfulness, The Internet is today not only used for study or work but also for entertainment. Many people believed that entertainment is one of the key factors when concerning the technology acceptance. It is apparent that the extended TAM theory needs to be added the entertaining feature as a concept of Perceived Playfulness (PPF) to contribute significantly on the intention to use and the m-commerce usage. (Moon and Kim, 2001)

In addition, the person who had the personal experience on using a new technology or any activity related to technology with pleasure and entertainment is more likely to accept new system and use it wider than the others (Davis, 1986; Teo et al., 1999; Moon and Kim, 2001). Therefore, the perceived playfulness is presented as a new factor in TAM model to examine the m-commerce usage intention.

3.4.3. Customer Intention to use

Intention can be understood as an intensity of customer who is willing to accomplish one specific behaviour (Blackwell, 2001). The behavioural intention refers to a subjective judgment in which things in the future will be done. Usage intention specifies personal preference for one item in a specific subject such as behaviour, thought or individual perception (Schiffman et al., 1995). Kotler (1994) stated that the attitude toward actual usage is defined as a subjective cognization of and individual preference, behavioural tendency or personal emotion.

3.5. Chapter Summary

The concepts of e-commerce and m-commerce were discussed in the beginning of chapter to have a better insight about research topic. Then the literature review of both Technology Acceptance Model and the extended models from previous studies were discussed. Based on Han and Nguyen's (2015) and Aditya's (2018) findings, this

research intends to modify their empirical model in the context of m-commerce. The proposed factors were modified according to the model of Han and Nguyen (2015), Aditya (2018) because of the importance of these factors in m-commerce environment and the perceptions of consumers in the Vietnamese market. The combination of both models enables to investigate thoroughly the topic of study. The following chapters will present the theoretical framework of this research according to the research question and then the research methodology used in this paper.

4. RESEARCH MODEL AND HYPOTHESES

The literature review identified in chapter 3 set a foundation for study on m-commerce. The theoretical framework of this study is based on Han and Nguyen's (2015), Aditya's (2018) model that corresponding to the original Technology Acceptance Model (TAM) and the Vietnamese situation. In essence, this study aims to adapt both models and empirically test in terms of m-commerce environment. Therefore, there are some changes made to adjust Han and Nguyen's (2015), Aditya's (2018) model in a new context. Based on the theoretical background from chapter 3, this chapter includes the development of research model and hypotheses to examine the relationships between constructs

4.1. Development of Research Model

According to the research question in chapter 1 and the literature review in chapter 3, the model developed for this study is based on Technology Acceptance Model (Davis, 1989) with two traditional factors: Perceived usefulness and Perceived Ease of Use. Then, it is combined with more determinants which affect m-commerce intention to use: perceived playfulness and perceived cost as show in Figure 3.

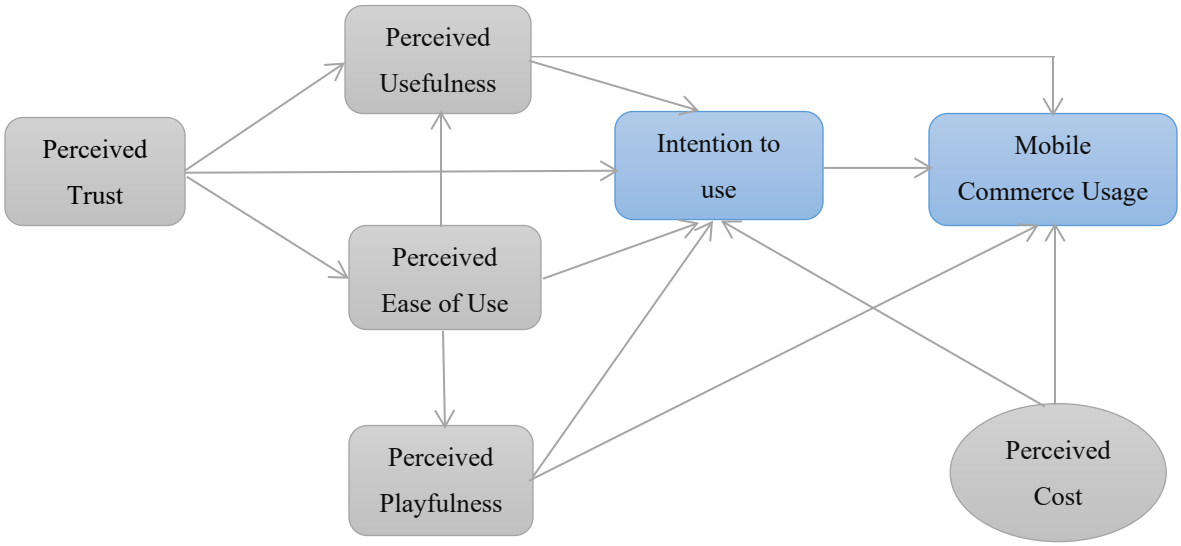

Figure 3. Research Model

In order to consist with the research objective in the context of m-commerce, the intention to use and m-commerce usage are specified as two dependent variables. According to the customer characteristics in Vietnam in chapter 2, trust and cost are identified as essential part of this model and they show the individual perceptions on m-commerce security, privacy and pricing. Therefore, they are approved as key independent variables that impact the dependent variables in this research model. Moreover, beside two main factor of TAM including perceived usefulness and perceived ease of use, perceived playfulness is crucial on new technology adoption of m-commerce. Hence, perceived usefulness, perceived ease of use and perceived playfulness are posited as mediating variables that can directly affect and mediate the influence on intention to use and m-commerce usage. The categories of variables are divided into groups as Table 3 below:

Table 3. Categories of research model

Dependent Variables	Intention to use, Mobile Commerce usage
Independent Variables	Perceived Trust, Perceived Cost
Mediating Variables	Perceived usefulness, Perceived Ease of Use, Perceived Playfulness

4.2. Hypothesis

This paper will discuss some variables mentioned in the literature review with two more variables in the extended model in relation to acceptance of technology which derived from the traditional TAM theory. Within this chapter, all the drivers will be examined and evaluated with supporting reasons for the proposed model.

Perceived Usefulness with Intention to use and Mobile commerce usage

Perceived Usefulness is considered as one of the most popular variables in information technology adoption and analysed for the preferred features on mobile services

(Pagani, 2004). The usefulness has strongly supported in both technology and information aspect as an essential predictor for new technology adoption (Mathieson, 1991). Davis et al. (1989), Venkatesh and Morris (2000) also indicated the significance of perceived usefulness on technology adoption. Mobile commerce utilization on individuals' perception is considered as the ultimate reason for the usefulness of their daily lives task, transaction or activity (Han and Nguyen, 2015)

Therefore, in this paper, the construct of this model not only evaluates the external m-commerce characteristics, but also helps consumers to obtain their task-related purposes effectively and efficiently. Hence, the hypotheses are proposed as below:

H1a: Perceived Usefulness has a positive influence on Intention to Use

H1b: Perceived Usefulness has a positive influence on M-commerce usage

Perceived Ease of Use with Intention to use, Perceived Usefulness and Perceived Playfulness

The relationship between perceived ease of use and perceived usefulness is derived from the traditional TAM model. The extended TAM model from Venkatesh and Davis (2000) revealed that perceived ease of use has significant effect on both perceived usefulness and intention to use. Moreover, Eze, Ten and Poong (2011) showed that perceived ease of use and m-commerce intention to use are significantly correlated meanwhile perceived ease of use has a significant effect on perceived usefulness on Han and Nguyen study (2015) about m-commerce. Similarly, Ho Cheong and Park (2005) presented that ease of use on mobile device usage has a significant effect on perceived playfulness according to the logic that the easier mobile internet usage a person perceives, the more playful he/she is likely to receive.

Hence, based on the literature, the hypotheses are designed as below:

H2a: Perceived Ease of Use has a positive influence on intention to use

H2b: Perceived Ease of Use has a positive influence on Perceived Usefulness

H2c: Perceived Ease of Use has a positive influence on Perceived Playfulness

Perceived Playfulness with Intention to use and Mobile commerce usage

Intention to use mobile commerce has a positive relationship with perceived playfulness (Lee et al., 2005). Jan and Haque (2014) indicated that perceived playfulness significantly affects online banking usage. According to study of Mun and Hwang (2003), they presented that perceived playfulness indirectly affects the intention to use through perceived ease of use meanwhile Karahanna (2000) showed that perceived playfulness has a positives effect on the intention to use of information technology. These previous studies have revealed that playfulness plays a vital role on the intention to use development (Teo et al., 1999; Moon and Kim, 2001). Therefore, the hypotheses are expected as follow:

H3a: Perceived Playfulness has a positive influence on Intention to Use

H3b: Perceived Playfulness has a positive influence on M-commerce Usage

Perceived Trust with Perceived Usefulness, Perceived Ease of Use and Intention to us.

The purpose of trust determinant is to examine the behaviour of m-commerce merchants among online transactions of users. In fact, trust is only evaluated when a consumer decides to buy something. In general, trust makes positive perceptions in terms of m-commerce outcomes and then creates positive attitude on m-commerce intention to use. The hypotheses are showed as follows:

H4a: Perceived Trust has a positive influence on Perceived Usefulness

H4b: Perceived Trust has a positive influence on Perceived Ease of Use

H4c: Perceived Trust has a positive influence on Intention to Use

Perceived Cost with Intention to use and Mobile commerce usage

The actual behaviour of customer on m-commerce usage is comparing the costs spent and benefits received when using services, they would not subscribe to mobile service if the cost surpassed their benefit. Additionally, mobile commerce development can be slowed by cost factor (Wei et al., 2009). In this paper, cost is examined in "Perceived cost" as independent variable that influence on M-commerce usage. This concept is considered as the extent that person perceived m-commerce usage costly. Thus, the proposed hypothesis as follow:

H5a: Perceived Cost has a negative influence on Intention to use

H5b: Perceived Cost has a negative influence on M-commerce usage

Intention to Use with Mobile commerce usage

A personal intention to use m-commerce has a positive influence on M-commerce usage. This hypothesis was supported in many previous researches in which they emphasized on the new technological acceptance an actual usage (Hung, Ku and Chan, 2003; Venkatesh and Davis, 2000). Therefore:

H6: Intention to Use has a positive influence on M-commerce Usage

In summary, all the hypotheses are listed in Table 4 in a concise form as below:

Table 4. The definition of hypotheses

Hypotheses	Description of hypothesis	Path
H1a	Perceived Usefulness has a positive influence on Intention to Use	PU→IU
H1b	Perceived Usefulness has a positive influence on M-commerce usage	PU→MU
H2a	Perceived Ease of Use has a positive influence on intention to use	PEOU→IU
H2b	Perceived Ease of Use has a positive influence on Perceived Usefulness	PEOU→PU
H2c	Perceived Ease of Use has a positive influence on Perceived Playfulness	PEOU→PP
H3a	Perceived Playfulness has a positive influence on Intention to Use	PP→IU
H3b	Perceived Playfulness has a positive influence on M-commerce Usage	PP→MU
H4a	Perceived Trust has a positive influence on Perceived Usefulness	PT→PU
H4b	Perceived Trust has a positive influence on Perceived Ease of Use	PT→PEOU
H4c	Perceived Trust has a positive influence on Intention to Use	PT→IU
H5a	Perceived Cost has a negative influence on Intention to use	PC→MU
H5b	Perceived Cost has a negative influence on M-commerce Usage	PC→MU
H6	Intention to Use has a positive influence on M-commerce Usage	IU→MU

4.3. Chapter Summary

Chapter 4 presented the argument to develop the research model based on the research objective in chapter 1 and the literature review in chapter 3 combining with customer characteristics in the Vietnamese market. Then, the hypotheses were proposed to examine the relationships between constructs under the research model. In the following chapter, the research methodology will be introduced with the type of method and process of research containing data collection and data analysis method.

5. RESEARCH METHODOLOGY

This chapter explains research methodology used to examine the proposed hypotheses in chapter 4. The research methodology is concerned with the overall approach to process of research from the theoretical background to the data collection and analysis. In the beginning of this chapter, the research methods are introduced and type of suitable method for this study is explained. Following this, the process of research containing data collection method and data analysis method is also discussed.

5.1. Type of Research Methodology

There are two types of research methods which can be used when conducting a study: qualitative and quantitative method. The qualitative method emphasizes on "too subjective", "difficult to replicate", "hard to generalize" or "lacking in transparency" (Bryan and Bell, 2011, p.408).

The quantitative method is a research strategy that focuses on collecting and analysing figures and data. According to Ghauri and Grønhaug (2002), this method is conducted based on the purpose of study, the questionnaire and it belongs to "objectivism for ontological consideration" (Bryan and Bell, 2011)

Because of the philosophical approach, a questionnaire will be the most suitable method for the data collection of study. There is no basic and standard for all the interview approach, however, it can be adjusted and designed to be suitable for each study that meet the requirement and purposes of research.

As mentioned in the first chapter, the main purpose of this study is to analyse the factors affecting the usage intention on m-commerce of Vietnamese consumers. Thus, the approach of research is performed with a deductive perspective. Saunders et al., (2003), stated that the deductive approach refers to develop the theories or test the data to get the relationships of variables, it might be true in this case but false in another case. In

fact, the study considers many previous researches and examines the concepts to find out the relationships and effects of variables on customers' usage intention.

Crowther and Lancaster (2008) mentioned that the quantitative strategy is "associated with the deductive approach". Hence, the quantitative method is the most suitable used for this thesis, as it emphasises quantifiable observations and then analyses statistics as a result of hypothesis testing (Bryan, 2008). Moreover, the quantitative methodology aims at measuring the constant relationships among variables and different hypotheses (Easterby-Smith et al, 2002).

5.2. Process of Research

Research process contains two main method: data collection method and data analysis method. The data collection method uses the primary data which is collected from m-commerce consumers in the Vietnamese market for research purpose. The data analysis method uses the secondary data from the previous papers and studies. In this study, the primary data is collected from the questionnaire survey while the secondary data is collected from the theoretical underpinning of Structural Equation Modelling method.

5.2.1. Data Collection Method

Survey Process

The draft of the questionnaire was sent to one Vietnamese Master student in Helsinki, Finland and one in Hanoi, Vietnam for pre-testing. Then, there were some discussions to receive advices in order to alter the items and adjust the survey to be clearer and more understandable. At first, the questionnaire was designed in English and later translated into Vietnamese because the target consumers are Vietnamese. This helped the participants receive the right message that the writer tried to deliver in this study. After that, it was translated back into English version to make sure the validity of this survey. The questionnaire was asked face-to-face, on paper form and sent via Facebook

as a Google survey link. In addition, to raise the reliability, the people who took part in the survey were always asked for their willingness when answering the questions.

The questionnaire was designed as three parts as below:

Part I: The demographic questions with the content of gender, age range, monthly income and educational level as well.

Part II: The questions concerning the attitude toward m-commerce usage intention with the frequencies of using m-commerce activities and reason why people use m-commerce

Part III: Questions referring to the factors affecting the intention to use m-commerce and actual mobile usage in Vietnam

Questionnaire development was conducted aiming to achieve the purpose of this paper. There are two types of questions used in the survey consisting of multiple-choice questions and 5-point scales. The measurement and scales in this paper was designed based on many previous studies (Davis, 1989; Cheong and Park, 2005; Wu and Wang, 2005; Kim et al, 2007; Faqih and Jaradat, 2014). A 5-point Likert scales is applied with ranging from 1 as “Strongly disagree” to 5 as “Strongly agree” to test the relationships among variables. There are 21 items measuring from 7 constructs in the final questionnaire that using 5-point Likert scales to examine the main factors that influence intention to use and m-commerce usage. The participants were asked to choose the answer that best defines their opinion about this statement. The questionnaire is described in the Appendix 3 in more detail.

Population and Sample

The data collection of this research is conducted based on survey questionnaire including face to face questionnaire, paper and electronic survey. The respondents are people from three big cities in Vietnam: Ha Noi, Ho Chi Minh City and Da Nang City and also some small cities and provinces in the Middle and the South of Vietnam. There

are these differences because the sample needs to be combined of people in many regions in terms of their habits, cultures, norms or own views. Moreover, it is expected that people from big cities are tending to adopt the innovative technology in terms of m-commerce intention to use rather than people from small cities and provinces. In addition, gender is also a vital factor on using social media of mobile devices and group of young people are one of the most important m-commerce users.

After conducting the survey, the answers of questionnaire are gathered and checked for the data analysis and validity. The answer of individuals who are not using mobile commerce are deducted immediately from the results. The data input only chose those with "Yes" answer on usage of m-commerce. There are 254 responses in total received from the survey in which 8 answers rejected the survey and 11 answers were excluded because of the invalidity and insincerity.

Limitation of Data Collection

There are some limitations occurred when conducting the survey and applying to the research model. The first is the investigation conducted only in a developing country (Vietnam) with a small group, then the findings are restricted when applying in developed countries or all developing countries. The second is the sample size of study which is small figures, then the results could not represent for Vietnamese population. The third is the changing of factors influencing m-commerce that can change the research model in the Vietnamese situation

5.2.2. Data Analysis Method

The method of data analysis used in this paper is IBM SPSS Statistics which is very commonly used in many quantitative methodology researches. After collecting the data from questionnaire, the data was coded into SPSS system with a code name for each item. The reliability is measured by factor analysis and reliability analysis (Cronbach's Alpha) to assure the adequate of the constructed tool. The statistics are analysed when variables are checked and processed. On the other hand, AMOS is used to measure the

Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM) to test the hypotheses of model. Following the Cronbach's Alpha method, the standardized factor loadings are calculated in order to for choosing the acceptable goodness-of-fit indexes.

Frequencies and Percentages

Frequency used in the measurement scale is an overview in which values and times of value can occur along with the percentage of observation (David and Sutton, 2004). In this study, the frequencies and percentages were used to target participants with the specific socioeconomic features such as gender, monthly income, age, educational level in order to examine the differences among group of people who have different perceptions toward mobile commerce

Regression Analysis

Multiple regression is one of the most popular statistics tools and applied to examine the linear relationship among dependent and independent variables. Specifically, there are three aspects that regression test among variables. The first aspect is using test of independence in order to examine as whether a relationship between variables. Secondly, regression will test how strong degree the relationship is among variables. Lastly, the multiple regression will find the mathematical expression of one dependent variable' score from various independent variables' score.

Reliability and Validity

The quality of research is determined by reliability and validity and improved by all the data analysed in both primary and secondary (Saunders et al, 2007). Then, it enables to acquire different points of view and various sources to enhance reliable context of this paper.

Validity can be defined as "the extent to which a measurement represents characteristics that exist in the phenomenon under investigation" (Malhotra and Birks.

2007, p.159). The pilot test can determine and help validity to figure out the issues that aims at mitigating or eliminating problems when designing a questionnaire. Using the scale in this case can enhance the validity that have been well examined in many previous studies. Moreover, in order to ensure the content validity, the translation of questionnaire from English to Vietnamese was adjusted that enables to assess a wide range of respondents as well as the native languages approach. In particularly, the content is ensured an easy understanding to target consumers when translating and wording. Thus, the results are assumed to be more reliable and accurate when conducting survey.

According to Malhotra and Birks (2007, p.313), the scale of survey is consistent with the reliability. This means that the reliability of a test is valid when the same repeated responses are brought into the same circumstances. So, in order to mitigate the error when conducting the survey, the consumers were asked to be willing take part in the survey and ready to share their ideas and viewpoints. Moreover, it is apparent that all the information of participants such as names or related contacts were hidden from the results to avoid the bias among participants. In addition, the measurement scales are considered to suit the length of survey and the constructs of all sessions. People would not be ready to spend their time on completing a survey if there was a long questionnaire.

On the other hand, there are some limitations need to be considered when applying the results to analyse the validity and reliability. Firstly, most of the participants are from three big cities of Vietnam (Ha Noi, Ho Chi Minh and Da Nang) and it is not generalizable to all the regions of Vietnam. Secondly, the research has not reached the people who are over 65 years old. It can be seen that the mobile usage intention of people is not active in this age range.

Cronbach's Alpha Method

In this paper, the level of measurement on reliability of instrument is noticeable. In order to examine the reliability based on the findings from survey, it is processed by

using the Cronbach's Alpha method. According to this method, the value of the test varies in range of 0 – 1 in which the greater the value the more reliable of internal consistency. In particular, the ideal value of Cronbach's Alpha method is more than 0.7 to make sure all the scales are more reliable for use (Nunnally, 1978). The details of Cronbach's Alpha analysis will be described in next chapter.

Convergent and Discriminant Validities

Convergent and Discriminant validities can be considered as a part of construct validity in which the extent is assessed to measure the interest variable. This means that the convergent validity is established by of the items in the same constructs having high correlations meanwhile the discriminant validity is established by the items in the different constructs having low correlations (Chin, 1998).

Exploratory Factor Analysis (EFA) is the important method to measure convergent and discriminant validities. EFA method belongs to interdependence techniques which is used to identify interrelationships between independent and dependent variables (Mayer, L.S., Gamst, G., Guanrino A.J., 2000). In this paper, the Principal Components Analysis use Varimax rotation to determine the factor loading with value at greater than 0.50 (Hair et al., 1998). Kaiser-Meyer-Olkin is ranged from 0.5 to 1, Bartlett test value is less than 3 and Significant value is lower than 0.05. The findings of EFA method will be measured and showed in Appendices.

Measurement Model

Confirmatory Factor Analysis (CFA) is used in this measurement model in order to determine the logic and relationship between variables as well as the construct of hypotheses model. The model in this paper consists of 21 items of seven constructs: Perceived Usefulness (PU), Perceived Trust (PT), Perceived Ease of Use (PEOU), Perceived Playfulness (PP), Perceived Cost (PC), Intention to use (IU) and Mobile commerce usage (MU). Table 5 shows the fitness indexes with the acceptable values in three categories consisting of absolute, incremental and parsimonious fit.

Table 5. The fitness indexes for measurement model and structural model

Name of category	Name of Index	Value accepted
Absolute fit	RMSEA	RMSEA < 0.09
	GFI	GFI > 0.9
	Chi-square	P-Value > 0.5
Incremental fit	AGFI	AGFI > 0.8
	CFI	CFI > 0.9
	NFI	NFI > 0.9
Parsimonious fit	Chisq/df	Chisq/df < 3

(Source: Awang 2012)

Convergent validity is examined by the value of Composite reliability (CR) and Average Variance Extracted (AVE)

Composite Reliability (CR) is used to calculate the factor loading of each item. CR is used to test the validity and similar the way that Cronbach's Alpha is applied Raykov, T. (1997). The acceptable value of CR is recommended to threshold of greater than 0.7 with its calculation is according to the formula as follows:

$$\rho_c = \frac{(\sum_{i=1}^{p} \lambda_i)^2}{(\sum_{i=1}^{p} \lambda_i)^2 + \sum_{i=1}^{p} (1-\lambda_i^2)} \quad (1)$$

Whereby: λ (lambda): standardized factor loading

i: item i from 1 to p

ε: respective error variance

Average Variance Extracted (AVE) is a measurement used to assess the convergent validity. It is the average amount of variance and suggested with the value greater than 0.5 when establishing the convergent validity (Chin, 1998). Moreover, the square root of AVE in the model is greater than the corresponding correlations between constructs (Chin, 1998). The formula of AVE is as follows:

$$\rho_{vc} = \frac{\sum_{i=1}^{p} \lambda_i{}^2}{\sum_{i=1}^{p} \lambda_i{}^2 + \sum_{i=1}^{p} (1-\lambda_i^2)} \quad (2)$$

Whereby: λ (lambda): standardized factor loading

i: item i from 1 to p

ε: respective error variance

Structural Equation Modelling (SEM)

The model is used as the statistical technique to test this empirical study. The fitness indexes of model are needed to evaluate the match of measurement model and data. However, according to Hair et al. (1995), Holmes-Smith (2006), there is no rule that the researchers have to follow, and there is at least one index fulfilled that fits category from the model. According to model of Awang (2012), these list of fitness indexes recommended for the structural model will be showed in Table 5 with name of category and value accepted for the model.

5.3. Chapter Summary

Chapter 5 presented the research methodology used in this study to examine the proposed hypotheses in chapter 4. After explaining the type of research method used in this study, the details of research process consisting of data collection method and data analysis method were discussed. The data collected from survey was coded into statistical system for analysing the results. Therefore, the next chapter will present the results of data analysis and the hypotheses testing to answer the question in chapter 1.

6. RESULTS

This chapter of study will present the results of data analysis according to the survey collected from questionnaire. The structure of this chapter is divided into four sections, the first is sample characteristics that will be discussed from the general information of respondents in order to give an overview of sample. The second is the scale analysis in which data is assessed and evaluated based on the research methodology. Following by testing the hypotheses and then finally the results are analysed and discussed.

6.1. Sample Characteristics

This paper aims to examine the intention to use m-commerce toward actual m-commerce usage of Vietnamese consumers, then there are two aspects that respondents need to satisfy the requirement in order to release the valid results. This means that the participants firstly are Vietnamese from the age of 18 years old, and the second requirement is that the participants are aware of mobile commerce and have had experience on using m-commerce. The data collection is conducted from the beginning of February until the end of March with a face to face questionnaire, paper and electronics survey and successfully received 254 participants. However, eight people rejected the survey and eleven participants did not meet the requirements of questionnaire, then leaving 235 final responses.

Demographic Results

The sample size of survey (N) collected and submitted in the database according to two aforementioned criteria consists of 235 responses, in which there are 99 respondents (42.1%) are male and 136 respondents (136) are female. The participants are primarily aged from 25 to 35 with 116 responses (49.4%) which accounts for the highest proportion. Meanwhile, 73 people (31.1%) are between age of 18-24 and 28 people (11.9%) from 36-55 years old. There are only 18 respondents recorded who are more than 55 years old. These figures from the data collection ensure the participants who are from various age groups to some extent. In addition, there are few of respondents

who are from aged 55 and over, it is an undeniable limitation of this research. The reason for this limitation is the awareness of people of this age on using mobile devices and mobile commerce. In Vietnam, most people who are using a mobile device and aware of mobile device are young consumers (Vietnam NetCitizens Report, 2011) because young people easily adapt new information technology in their daily activities.

In general, the data result includes relatively young female customers in Vietnam who are having high educational level with different range monthly income. Specifically, the details of demographic characteristics in this research is mentioned in the table below with four factors (age, gender, education and income level)

Table 6. Demographic Characteristics (N = 235)

Characteristics		**Frequency**	**Percentage (%)**
Gender	Male	99	42.1
	Female	136	57.9
Age	18-24	73	31.1
	25-35	116	49.4
	36-55	28	11.9
	Over 55	18	7.7
Educational Level	Under High school	0	0
	High school	10	4.3
	College or University	187	79.6
	Postgraduate and over	38	16.2
Monthly Income (VND)	Under 5 million	64	27.2
	From 5-10 million	76	32.3
	From 10-20 million	65	27.7
	Over 20 million	30	12.8

In terms of educational level, the results indicate that most of participants have a high educational level as 187 out of 235 people are having a College or a University degree and 38 people are having postgraduate or over educational background. There are 10 respondents recorded as high school level and there is no one who has under high

school education. Because the differences from the findings of education level has illustrated an unequal distribution of participants alongside with the significant skewness of people who had higher education, it would be distort the correlation among variable of education and customer ethnocentrism.

According to the findings, the respondents' income was collected with 64 responses (27.2%) of less than 5 million VND (equivalent approximately 191 euros), 76 people (32.3%) earned from 5 to 10 million VND (from 191-381 euros), 65 people (27.7%) earned from 10-20 million VND (from 381-763 euros) and 30 responses of participant (12.8%) earned over 20 million VND per month (over 763 euros). These figures showed the different range of monthly income to determine the increase of middle class in the society, this leads to the differences in quality and quantity of products or service that consumers achieved. It is also apparent from Table 6 that the number of respondents who have low-income (lower than 10 million) is higher than the number of respondents who have high income. According to section 3.2 and 3.3, most of consumers may lack of legal rights awareness because they are missing the knowledge about legal framework in Vietnam and they feel unsafe when using mobile services.

(Figures are based on the exchange rate of 1.4.2019 with 1 EUR = 26218 VND, Eximbank.com.vn)

Frequencies

The second part of survey is aiming to study the frequency of activities and purpose of consumers when using m-commerce. It is apparent that the top three most frequent activities of m-commerce usage are social network (90.6% of all cases), messaging (75.3% of all cases) and entertainment (74.5% of all cases), followed by news and mobile shopping, online payment and others (60.9%, 36.6%, 28.9% and 15.3% respectively of all cases). These activities contributed to the perception of playfulness aspects when studying m-commerce of Vietnamese consumers

Table 7. Top frequent activities of M-commerce (Multiple responses)

Activities	Responses		Percentage (%)
	N	Percent	
Social Network	213	23.7	90.6
Messaging	177	19.7	75.3
Entertainment	175	19.5	74.5
News	143	15.9	60.9
Mobile shopping	87	9.6	36.6
Online payment	68	7.5	28.9
Others	36	4.0	15.3

It can be seen in Table 8 that there are three top purposes that customers for using mobile commerce including using for "For studying or working" (84.6% of all cases), followed by "Immediate accessing to the Internet" (70.6% of all cases) and "Availability of the Internet" (65.9% of all cases)

Table 8. Top purposes for using m-commerce

Purposes	Response		Percentage (%)
	N	Percent	
For studying or working	199	32.1	84.6
Immediate accessing to the Internet	167	27.0	70.6
Availability of the Internet	155	25.0	65.9
Curiosity of new technology or service	48	7.8	20.4
Friends recommended	38	6.1	16.2
Others	12	1.9	5.1

6.2. Scale Analysis: Measurement Assessment

Data collected from the survey was coded into SPSS system and recorded as raw data in this programme. The questions of this part are 5-point Likert scales, so the numbers of answers received from the participants are the responses for these questions. The

data analysis of 5-point Likert scales consists of two level: measurement assessment and structural model. This part is the first level which presents the measurement assessment to calculate the Cronbach's Alpha, factor loadings, pattern matrix, convergent and discriminant validities (Average Variance Extracted analysis)

6.2.1. Reliability Analysis

Reliability is used to examine the degree of construct indicators in which they are consistent in measurement model. The reliability is firstly examined by Cronbach's Alpha and the correlations of items. In this paper, the Cronbach's Alpha results are shown in Table 9 below with the value range is from 0.746 to 0.915. These figures indicate that the items of model are acceptable which are greater than threshold of 0.7, then the correlation test of constructs are satisfactory

Table 9. Reliability with Cronbach's Alpha

Constructs	**Items**	**Reliability Cronbach's Alpha**
Perceived Usefulness	3	0.746
Perceived Ease of Use	3	0.819
Perceived Playfulness	3	0.767
Perceived Trust	3	0.915
Perceived Cost	3	0.904
Intention to Use	3	0.828
Mobile Commerce Usage	3	0.806

6.2.2. Validity Analysis

The factor analysis is used to measure the construct validity in this study by examining the results of 21 items from 5-point Likert scale questions through Principle Component Analysis with Varimax Rotation method. The Kaiser-Meyer-Olkin (KMO) result reaches the value of 0.806, which meet the threshold between 0.5 and 1. The Bartlett's test result is at the value of 2890.549 with the significant p-value at 0.000

meet the requirements for factor analysis. The Appendix 1 shows the Exploratory Factor Analysis with the results of KMO, Bartlett's test, Rotated Component Matrix and Pattern Matrix which are the data for measurement model in the following part.

Measurement model

Beside the Cronbach's Alpha results for reliability analysis, the measurement model is tested by CFA. From the results in Table 10, most of the value in both models reach the requirement for recommended value. Only the results of GFI are lower than the threshold. However, the difference between the real values of measurement model and structural model with threshold are small. Therefore, the values of GFI in this situation are acceptable. The Confirmatory Factor Analysis model is shown in Appendix 2 with complete results for all items of research model.

Table 10. Model fit indices summary

Measure	Threshold	Value of measurement model	Value of Structural model
CMIN/DF	≤ 3.00	2.613	2.621
CFI	≥ 0.90	0.906	0.904
GFI	≥ 0.90	0.864	0.863
AGFI	≥ 0.8	0.806	0.807
RMSEA	≤ 0.09	0.083	0.083

The Convergent Validity is evaluated by the value of Composite reliability (CR) and Average variance extracted (AVE) from the measurement model. Table 11 below summarizes the all the results of CR and AVE in which CR values are from 0.772 to 0.914 (meet the requirement of exceeding 0.7) and AVE values are from 0.531 to 0.779 (meet the recommended value of exceeding 0.5). Moreover, the square root values of AVE are calculated in the correlation table below to compare with the correlation of constructs. It is apparently that the square root value of AVE for each item is greater than the value of correlation among each construct, this indicated that the discriminant validity of these constructs is satisfactory (Fornell and Larcker, 1981)

Table 11. Composite Reliability, Average Variance Extracted and Correlations

	CR	AVE	PU	PEOU	PP	PT	PC	IU	MU
PU	0.874	0.703	**0.838**						
PEOU	0.836	0.637	0.368	**0.798**					
PP	0.772	0.531	0.469	0.506	**0.729**				
PT	0.914	0.779	0.382	0.310	0.563	**0.883**			
PC	0.895	0.743	0.482	0.566	0.220	0.487	**0.862**		
IU	0.833	0.626	0.314	0.237	0.514	0.543	0.173	**0.791**	
MU	0.811	0.590	0.419	0.222	0.560	0.574	0.293	0.517	**0.768**

The values of Diagonal elements are equal the square root of Average Variance Extracted (AVE). Other elements are the correlations

6.3. Structural Model: Hypotheses Testing

Based on the previous calculation of measurement assessment, the figures described an acceptable finding from the recommended threshold. Then the data are used in the next process of analysis – structural model for the hypotheses testing and the relations between variables. When analysing the structural model, the model-fit indexes were also used to test the qualification of structural model (Hair et al., 1995). The model-fit values shown in Table 10 indicating the acceptable scores for all the indexes and it has no significant change on model-fit between the structural model and the measurement model. This means that the data of hypotheses were qualified in structural model (CMIN/df = 2.621, GFI = 0.863, CFI = 0.904, AGIF = 0.807, p = 0.000, RMSEA = 0.083)

Table 12 presents the results of hypotheses testing with structural paths with regression estimates, standard errors, covariances and P-values. Based on the findings, most of the research hypotheses were accepted, as only 3 of 13 proposed hypotheses were found insignificant (H1a, H2a and H5a). H1a represented the effect between perceived usefulness (PU) and intention to use (IU) which means that the direct effect between PU and IU was not supported. Similarly, the direct effect between perceived ease of use (PEOU) and intention to use (IU), between perceived cost (PC) and IU were not

supported. However, PU has positive effect on m-commerce usage (MU) with supported hypothesis (H1b) meanwhile the PEOU can influence indirectly IU through perceived playfulness (PP) and indirectly MU through PU.

As the results on Table 12, trust has significant effect on PU, PEOU and IU variables (H4a, H4b, H4c). However, trust has more significant influence on PU than on PEOU and IU (CR = 4.507). Other results are also mentioned in the table that there are positive correlations between PP to IU, PP and perceived cost (PC) to m-commerce usage (H3a, H3b and H5b). This means that these hypotheses with direct effects are accepted. On the other hand, the intention to use (IU) had the highest dominance to M-commerce usage when comparing with PU, PP and PC (CR = 3.588). Hence, intention to use m-commerce became one of the most important aspect to explore.

Table 12. Structural Model

Hypothesis	**Path**	**Regression Estimate**	**S.E**	**CR**	**P-value**	**Results**
H1a	PU→IU	0.042	0.070	0.604	0.546	**Reject****
H1b	PU→MU	0.192	0.078	2.469	0.014	Accept**
H2a	PEOU→IU	-0.073	0.081	-0.909	0.363	**Reject****
H2b	PEOU→PU	0.125	0.032	3.848	0.000	Accept***
H2c	PEOU→PP	0.172	0.038	4.538	0.000	Accept***
H3a	PP→IU	0.322	0.115	2.796	0.005	Accept*
H3b	PP→MU	0.331	0.105	3.151	0.002	Accept*
H4a	PT→PU	0.225	0.05	4.507	0.000	Accept***
H4b	PT→PEOU	0.176	0.048	3.650	0.000	Accept***
H4c	PT→IU	0.280	0.064	4.391	0.000	Accept***
H5a	PC→IU	-0.087	0.59	-1.474	0.141	**Reject****
H5b	PC→MU	0.137	0.051	2.697	0.007	Accept*
H6	IU→MU	0.306	0.085	3.588	0.000	Accept***

: Significant at 0<p< 0.01, **: significant at 0<p<0.05, *: significant at 0<p<0.001*

Generally, with the thirteen proposed hypotheses, the outcomes accepted ten models meanwhile leaving three paths being rejected. Moreover, there is no significant difference between model fit of measurement model and structural model. This means that the structural model (SEM) was referred by these numbers to the positive traits because its data could be explained as equally and adequately as measurement model (CFA)

6.4. Discussion and Analysis

According to the results from Table 12, all the hypotheses were not entirely accepted based on the structural model analysis. There were three hypotheses which were not supported by the statistical measurement. The first and the second are perceived usefulness and perceived ease of use that did not affect the intention to use of m-commerce. Based on the findings from previous studies, perceived usefulness and perceived ease of use significant affect intention to use m-commerce (Pavlou, 2003; Leng et al., 2011). However, some researchers have indicated in their studies that different findings such as perceived usefulness or perceived ease of use were not found the influence toward intention to use directly (Venkatesh and Davis. 1996; Lee, 2009). In this paper, the findings described the situation in the Vietnamese market that both perceived usefulness (PU) and perceived ease of use (PEOU) were not found as influential power affecting directly toward intention to use (IU) m-commerce. However, the outcome showed in Table 12 that PU has a significant effect toward mobile commerce usage directly and the effect of PEOU to IU and m-commerce usage (MU) were fully mediated through perceived playfulness.

Another unsupported hypothesis is the influence of perceived cost to intention to use. According to the results, perceived cost (PC) has no significant effect on intention to use but significantly affects mobile commerce usage. Wei et al., (2008) and Han & Nguyen (2015) also described the similar results in their studies on Malaysian and Vietnamese market about the effect of perceived cost on mobile commerce usage. Cost is considered as a barrier preventing the m-commerce usage of the Vietnamese users

with the negative relationship between perceived cost and m-commerce usage. The findings also showed that the cost of using m-commerce (subscription, handset or communication fee) will affect the change of m-commerce adoption. Therefore, it can be seen that the more reasonable cost of m-commerce, the higher adoption rate toward m-commerce usage.

Apart from three unsupported hypotheses, the other findings affirmed the correlations between constructs in this model that combined by traditional TAM and two more extended constructs under m-commerce context. PU, PEOU and perceived trust (PT) are part of classis TAM, however, only PT is accepted as an influential power toward intention to use. Beside PU, PEOU and PT of TAM model, perceived playfulness and perceived cost were demonstrated to have the significance at p-value < 0.01 meanwhile intention to use significantly affects m-commerce usage at p-value <0.001. As the previous findings, the IU was a mediator that demonstrated the relationships of variables to m-commerce usage according to TAM model.

In addition, perceived playfulness has a significant effect on both IU and MU. These findings are crucial in indicating that the consumers in general feel m-commerce is enjoyable, pleasure and exciting when engaging m-commerce activities. As the results from Table 12 show PEOU also significantly affects PP, thus m-commerce also needs the easiness, the higher easiness users perceived on m-commerce the better playfulness was felt by consumers. The outcome is consistent with previous studies of Ha et al. (2007), Wei et al. (2009). However, this paper has conducted specific m-commerce activities preferred by Vietnamese users. The findings revealed that the customers perceived playfulness with the most popular activities such as social network, messaging and entertainment and followed by receiving news and executing online transactions (shopping, payment, etc.).

The strongly significant influence of IU indicated that most aspects towards MU are primarily derived from the internal factor related to individual aspects. The internal individual aspects concerned to the variables that have effects on IU: perception of

consumers related to the easiness, playfulness or trust. On the other hand, the striking outcome indicated trust has contributed directly to the significant effect on IU and surpassed both PU and PEOU in this model. This means that the better consumers trust m-commerce, the higher their intention to use it.

6.5. Research Findings Summary

The study aimed to investigate the general factors which influence the intention behaviour of the user in Vietnam. Based on the combination of Technology Acceptance Model(TAM) and extended model as additional factors, the empirical study is examined by collecting the data from participants through questionnaire of survey, then analysed by Structural Equation Modelling (SEM) to test the correlations and relationship between hypothesized constructs of research model.

After a study which applied the Technology Acceptance Model, the research has found that m-commerce usage is affected dominantly by intention to use and followed by perceived playfulness and perceived cost. Trust supported directly the intention to use meanwhile perceived usefulness has direct effect on mobile commerce usage and perceived ease of use indirectly affects the intention to use through perceived playfulness. The results of this study can provide guidelines to develop useful strategies for business, vendors, merchants and service providers related to m-commerce in order to acquire more customers, expand and encourage frequent usage in the future

7. CONCLUSION

This chapter will conclude the study through the implications in both theoretical and managerial aspect. Then, suggestion for further studies will follow at the end of this paper.

7.1. Research Implications

The objective of this research was to try to examine the factors affecting consumers' intention to use towards the actual behavioural mobile commerce usage as viewed through the TAM model. The findings of this study indicated the support of the proposed model and back-up for previous studies. The results of this research have both theoretical and managerial implications, benefiting the researchers who are interested in Technology Acceptance Model and businesses concerned m-commerce with framework.

7.1.1. Theoretical Implications

According to some the comprehensive literature from previous studies, this research was built to determine the factors which can influence the behavioural intentions of Vietnamese consumers on mobile commerce and examine the hypotheses by using the statistical methods. The results of this study are used to have a better insight of traditional Technology Acceptance Model and its extended model in mobile commerce environment.

The constructs of the model in this research was simplified because of some limitations. Thus, the factors derived from model were extracted to stimulate further studies for the Vietnamese market. The important factors from TAM model are perceived usefulness (PU), perceived ease of use (PEOU), intention to use (IU) and actual m-commerce usage (MU) with adding variable of trust, playfulness and cost in developing countries according to Wei et al., (2008) and Han & Nguyen (2015). Moreover, as mentioned in 3.3, the Vietnamese habits focus on trust when conducting transactions through mobile commerce services.

The support results have contributed significantly to the literature about the intention to use and actual usage. This model was applied on m-commerce adoption that presented new perspectives in many countries, especially in developing countries like Vietnam. The outcomes of study described that mobile commerce adoption had similarity with technological development which used Technology Acceptance Model. This study is also crucial as a method to predict the reactions of mobile users to on the change or development of economic transactions. Finally, this model was used to suggest the effects of intention to use as significant highlight, therefore business parties could take its advantages when explaining and applying in the managerial implications.

7.1.2. Managerial Implications

The outcomes of this study can be used to get a better strategy for business professionals that focuses on the factors affecting m-commerce intention to use to stimulate the m-commerce transactions. This benefits companies, businesses, parties, service providers, merchants related to m-commerce to build their reputation on m-commerce framework in Vietnam and get insight from the research for an optimum result. In the highly competitive environment, businesses need to consider their leading factors to promote the users' intention to use on m-commerce systems, grasp a better insight when allocating their capital and resources and convey the most preferable factors to consumers.

There are three notable outcomes from this study that influence the usage intention on mobile commerce in Vietnam: the users' actual behavioural intention to m-commerce system, perception of users about trust to m-commerce, perceived cost to actual m-commerce.

Firstly, the relationship between the intention to use and m-commerce usage showed that intention to use has given a substantial contribution to m-commerce usage when comparing to other direct factors. Hence, it is recommended that the business players should invest in their strategies focusing on intention to use prospective of mobile commerce consumers. Even though PU and PEOU did not directly and significantly

affect IU, PU has a directly significant effect on MU and PEOU indirectly affects IU through PP. Therefore, the service providers should focus on the content and applications which are usable and valuable for m-commerce users. Then, the designed contents and services aim at m-commerce characteristics such as the personalization, accessibility or ubiquity for example. With regards to PEOU and PP, the m-commerce providers should pay attention to the easiness of applications and the user-friendliness when using the system.

The second is trust of users to m-commerce system. Trust was found as overwhelming importance in the Vietnamese case and it surpassed PU and PEOU. The finding implies that the relationship between consumers and business players that is built on trust should be one of the major factors for service providers. M-commerce services are used when security is high and privacy is protected. The suggested method for trust strategies are the privacy guarantees, advertising campaign or policies from company or similar. (Wang and Barnes, 2007).

Finally, the relationship between cost and m-commerce usage in this paper has suggested creative strategies for promotional pricing method in order to attract customers who have price consciousness. In the Vietnamese situation, it is reasonable with this finding due to the high cost of Internet services, subscription or mobile devices cost when comparing the average income of Vietnamese customers.

7.2. Suggestion for future studies

According to the limitations of this study mentioned in chapter 5, the findings in preceding chapter and the implications, it is apparent to call attention stimulate further studies in this subject. Although this study tried to have a better insight about the factors driving the m-commerce intention to use in Vietnam, there are some notable limitations. Firstly, the research is restricted by conducting the investigation in a developing country (Vietnam) with a small user group, hence there must be caution when applying these findings. The next research which investigates the topic in developing and developed countries will improve this model. Secondly, the sample size

of this study is quite small and cannot represent for the whole Vietnamese population. A further study should consider a better sample method in order to get a better way of measuring the intention behaviour of consumers. Finally, there are more factors affecting m-commerce adoption included in the future studies because the intention behaviour of the users on mobile commerce is changing over time.

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APPENDICES

APPENDIX 1: Exploratory Factor Analysis

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.806
Bartlett's Test of Sphericity	Approx. Chi-Square	2890.549
	df	210
	Sig.	.000

Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
PC2	.905						
PC1	.883						
PC3	.875						
PT2		.840					
PT3		.806					
PT1		.790					
IU2			.855				
IU3			.792				
IU1			.783				
PEOU2				.869			
PEOU1				.808			
PEOU3				.794			
MU1					.813		
MU2					.786		
MU3					.740		
PP3						.774	
PP2						.762	
PP1						.714	
PU3							.829
PU2							.790
PU1							.658

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Pattern Matrix[a]

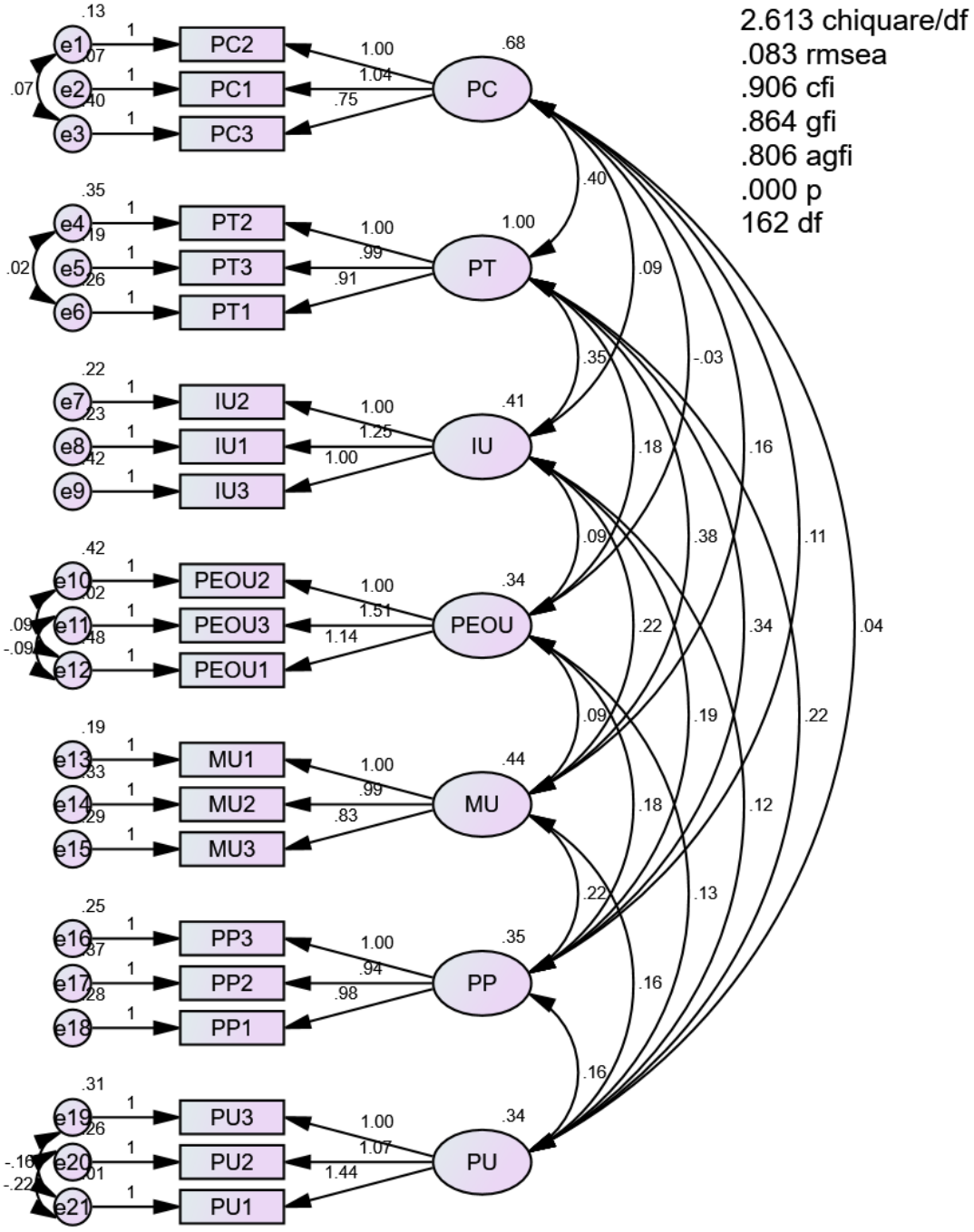
	Factor						
	1	2	3	4	5	6	7
PC2	.941						
PC1	.855						
PC3	.802						
PT2		.909					
PT3		.878					
PT1		.781					
IU2			.910				
IU1			.758				
IU3			.676				
PEOU2				.889			
PEOU3				.734			
PEOU1				.692			
MU1					.877		
MU2					.736		
MU3					.621		
PP3						.771	
PP2						.707	
PP1						.682	
PU3							.789
PU2							.740
PU1							.531

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

APPENDIX 2: Confirmatory Factor Analysis



Standardized Regression Weights

			Estimate
PC2	<---	PC	.913
PC1	<---	PC	.955
PC3	<---	PC	.696
PT2	<---	PT	.861
PT3	<---	PT	.915
PT1	<---	PT	.872
IU2	<---	IU	.805
IU1	<---	IU	.857
IU3	<---	IU	.704
PEOU2	<---	PEOU	.669
PEOU3	<---	PEOU	.990
PEOU1	<---	PEOU	.695
MU1	<---	MU	.834
MU2	<---	MU	.752
MU3	<---	MU	.713
PP3	<---	PP	.766
PP2	<---	PP	.676
PP1	<---	PP	.740
PU3	<---	PU	.723
PU2	<---	PU	.774
PU1	<---	PU	.993

Squared Multiple Correlations

	Estimate
PU1	.986
PU2	.599
PU3	.523
PP1	.547
PP2	.457
PP3	.586
MU3	.509
MU2	.566
MU1	.695
PEOU1	.483
PEOU3	.979
PEOU2	.448
IU3	.495
IU1	.735
IU2	.648
PT1	.761
PT3	.838
PT2	.741
PC3	.485
PC1	.912
PC2	.834

APPENDIX 3: Survey Outline

QUESTIONNAIRE ON MOBILE COMMERCE USAGE INTENTION

(ENGLISH VERSION)

Dear Participants,

I am a student from Vaasa University of Applied Science, School of International Business, Finland. I am conducting research for my Final Thesis about the impacts of Mobile Commerce on Usage Intention. I would be really happy if you could take a few minutes to complete this questionnaire. I assure that all your personal data and information provided will be used only for academic purpose. Last but not least, the results from survey will be reported only in aggregate form

PART I: GENERAL QUESTIONS

Some personal information about yourself.

What is your gender?

1. Male
2. Female

What is your age?

1. 18-24 years old
2. 25-35 years old
3. 36-55 years old
4. Over 55 years old

What is the highest education level you have gotten?

1. Under high school education
2. High school

3. College or University
4. Postgraduate and over

What is your monthly income?

1. Under 5 million VND per month
2. From 5 million to 10 million VND
3. From 10 million to 20 million VND
4. More than 20 million VND

PART II: CUSTOMER ACTIVITIES TOWARDS MOBILE COMMERCE

Frequency of Mobile usage and purpose of mobile usage (Impact)

Top activities performed with mobile devices: (Please choose 3 answers below that apply to you)

1. Social network
2. Messaging
3. News
4. Mobile banking
5. Mobile shopping
6. Playing game
7. Web surfing
8. Entertaining (music, video, etc.)
9. Others

Please tell me the purposes that make you use mobile commerce

1. For studying or working
2. Availability of the Internet.
3. Immediate accessing to the Internet
4. Friends recommended
5. Others

Have you experienced with mobile commerce?

1. Yes
2. No

(If "Yes", please answer questions in next part)

PART III: FACTORS AFFECT INTENTION TO USE AND USAGE BEHAVIOUR

Influence factors

Please choose your suitable answer according to your opinion about the statement below:

1 = Strongly disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

What are your opinions about mobile commerce application that you are using – perceived usefulness, I find

Description	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
Using mobile commerce increase my productivity					
Using m-commerce makes it easier to buy goods/services.					
M-commerce useful in conducting my transactions.					

Perceived Ease of Use, I find

Description	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
M-commerce easy to use.					
M-commerce easy to do what I want it to do					
My interaction with m-commerce is clear and understandable					

Perceived Playfulness, I feel

Description	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
Using m-commerce gives me pleasure					
Using m-commerce is exciting					
Good when interacting with m-commerce					

Perceived Trust, I feel

Description	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
Using m-payment for monetary transaction in m-commerce is safe					

My personal data are in confidence while using m-commerce					
Using m-commerce to purchase goods and/or services is trustworthy					

Perceived Cost, I find

Description	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
The communication/access fee is expensive to me					
The subscription fee is high to me					
The cost of handset is expensive to me					

Intention to use M-commerce

Description	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
I intend to use m-commerce in the near future					
I believe my interest towards m-commerce will increase in the future					
I will recommend others to use m-commerce					

Mobile Commerce Usage

Description	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
I frequently use mobile commerce					
I spend much time using m-commerce					
I use many kinds of mobile commerce application					