# DETERMINANTS OF MOBILE COMMERCE ADOPTION AMONG UNIVERSITY STUDENTS IN MALAYSIA

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**DOCTOR OF PHILOSOPHY**
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# DETERMINANTS OF MOBILE COMMERCE ADOPTION AMONG UNIVERSITY STUDENTS IN MALAYSIA

**By**

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## ABSTRACT

Mobile commerce has an increasing importance and development in offering a new platform to sell products effectively and efficiently. Despite numerous studies in the area of technology adoption, little is known about mobile commerce adoption in Malaysia and appropriate models that could explain the behaviours of young generations on the use of mobile commerce. This study attempts to propose a conceptual model for mobile commerce adoption by adapting the integrated TAM3 model and using Individual-Collectivism at Individual Level (ICAIL) as the moderating variable in the context of mobile commerce in Malaysia. In addition, this research also identifies factors that affect the perceived usefulness (i.e. subjective norm, image, output quality, result demonstrability), and perceived ease of use (self-efficacy, anxiety, perception of external control, playfulness) in the context of mobile commerce adoption among university students in Malaysia. A sample of 550 students from four universities in Malaysia was surveyed through a self-administrated questionnaire. The findings of this study found eight direct significant relationships between the tested variables, while nine hypotheses were not accepted. Firstly, in terms of perceived usefulness variable, image showed a significant relationship, whereas subjective norm, output quality and result demonstrability showed vice versa. Secondly, for perceived ease of use variable, factors of self-efficacy, perception of external control and playfulness showed significant relationships, while anxiety was found to be insignificant. Thirdly, while subjective norm had significant relationship with image, perceived usefulness indicated insignificant relationship with behavioural intention. Fourthly, perceived ease of use had significant relationships with perceived usefulness and behavioural intention. Finally, the perceived ease of use, perceived usefulness, subjective norm and behavioural intention showed insignificant relationship with the moderating variable, ICAIL. As a conclusion, the results from this study are important to the advancement of knowledge to the mobile commerce companies, services provider, financial services and government.



**Keywords**: m-commerce, technology acceptance model, individual-collectivism at individual level, perceived ease of use, perceived usefulness

## ABSTRAK

Kepentingan dan perkembangan perdagangan mudah alih dalam menawarkan platform baharu untuk menjual produk dengan berkesan dan cekap didapati semakin meningkat. Walaupun banyak kajian dalam bidang penggunaan teknologi, namun hanya sedikit yang diketahui tentang penggunaan perdagangan mudah alih di Malaysia dan model yang sesuai, yang dapat menjelaskan tingkah laku generasi muda terhadap penggunaan perdagangan mudah alih. Kajian ini mencadangkan model konseptual bagi penggunaan perdagangan mudah alih dengan mengintegrasikan model TAM3, dan menggunakan *Individual-Collectivism at Individual level (ICAIL)* sebagai pemboleh ubah pengantaraan dalam konteks perdagangan mudah alih di Malaysia. Tambahan lagi, kajian ini juga mengenal pasti faktor-faktor yang mempengaruhi kebergunaan yang ditanggap (iaitu norma subjektif, imej, kualiti output, kebolehpaparan hasil) dan mudah guna yang ditanggap (efikasi kendiri, kegusaran, persepsi kawalan luaran, sifat main-main) dalam konteks penggunaan perdagangan mudah alih dalam kalangan pelajar universiti di Malaysia. Sampel yang terdiri daripada 550 orang pelajar dari empat universiti di Malaysia telah ditinjau melalui soal- selidik yang ditadbir. Penemuan kajian ini mendapati lapan hipothesis hubungan langsung yang signifikan di antara pemboleh ubah yang diuji, manakala sembilan hipotesis lagi tidak diterima. Pertama, dari segi pemboleh ubah kebergunaan yang ditanggap, imej menunjukkan hubungan yang signifikan, manakala norma subjektif, kualiti output dan kebolehpaparan hasil menunjukkan sebaliknya. Kedua, bagi pemboleh ubah mudah guna yang ditanggap, efikasi kendiri, persepsi kawalan luaran dan sifat main-main menunjukkan hubungan yang signifikan, sementara kegusaran menunjukkan hubungan yang tidak signifikan. Ketiga, norma subjektif mempunyai hubungan yang signifikan dengan imej, namun, kebergunaan yang ditanggap menunjukkan hubungan yang tidak signifikan dengan hasrat tingkah laku. Keempat, mudah guna yang ditanggap mempunyai hubungan yang signifikan dengan kebergunaan yang ditanggap dan hasrat tingkah laku. Akhir sekali, mudah guna yang ditanggap, kebergunaan yang ditanggap, norma subjektif dan hasrat tingkah laku menunjukkan hubungan yang tidak signifikan dengan pemboleh ubah pengantaraan ICAIL. Kesimpulannya, dapatan kajian ini penting untuk kebaikan pengetahuan syarikat perdagangan mudah alih, penyedia perkhidmatan, perkhidmatan kewangan dan kerajaan.



**Kata kunci**: M-dagang, model penerimaan teknologi, *individual-collectivism at individual level*, mudah guna yang ditanggap, kebergunaan yang ditanggap

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# CHAPTER ONE

# INTRODUCTION

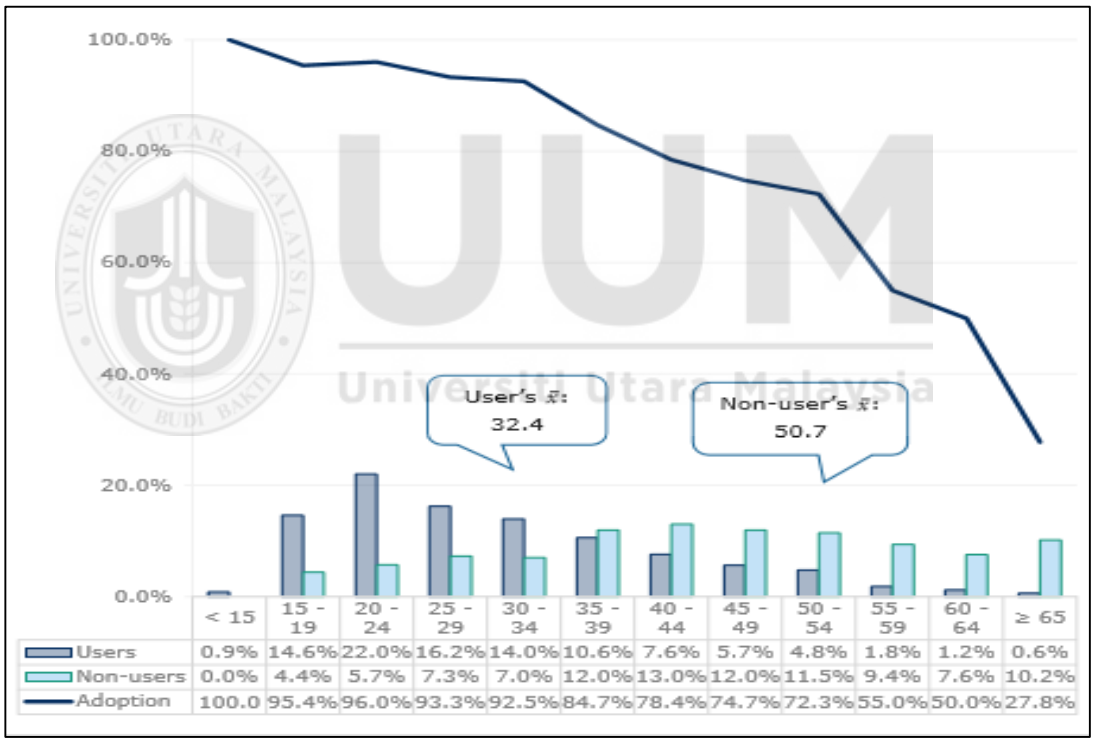
## 1.1 Introduction

This chapter intends to illustrate the backdrop against which the study takes place. It starts with a description of the background of the study before briefly discusses the research problem or the research gap. In addressing the research gap, the research objectives and the research questions are formulated and presented. Finally, the structure of this thesis is outlined.

## 1.2 Background of Study

Social media is defined as any online services through which users can create and share a variety of content (Bolton *et al.,* 2013). Recently, there are several social media tools via mobile marketplace applications. Naming a few, these are Facebook, Instagram, Twitter, and Carousell. Most companies use social media as a marketing tool to persuade people to purchase products or services offered by their companies. Exemplifying this situation is findings revealed by a study conducted by Shahizan *et al*. (2012) which found that most of the Small and Medium Enterprises (SMEs) in Malaysia use Facebook as a marketing tool to attract customers due to their beliefs that social media allows fast dissemination of information to customers. In a parallel development, Singapore had promoted a new mobile marketplace called 'Carousell' and the trading is simple in which mobile users have to snap an image, make a listing and sell their items to their friends using social media applications (The Star, 2013).

Besides that, several studies suggest that Gen Y is frequent use of social media to stay connected with friends and uses social media for information, entertainment through technology (Valkenburg *et al*., 2006; Lenhart & Madden, 2007; Park *et al*., 2009). The Malaysia Communication and Multimedia Commission has recently conducted a survey on usage of Internet user in Malaysia (MCMC, 2016). The results of the study as depicted in Figure 1.1 shows the percentage distribution of Internet users and non-users by age group (Bar chart) and adoption rate of Internet users by age group (Line graph).




| | < 15 | 15 - 19 | 20 - 24 | 25 - 29 | 30 - 34 | 35 - 39 | 40 - 44 | 45 - 49 | 50 - 54 | 55 - 59 | 60 - 64 | ≥ 65 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Users | 0.9% | 14.6% | 22.0% | 16.2% | 14.0% | 10.6% | 7.6% | 5.7% | 4.8% | 1.8% | 1.2% | 0.6% |
| Non-users | 0.0% | 4.4% | 5.7% | 7.3% | 7.0% | 12.0% | 13.0% | 12.0% | 11.5% | 9.4% | 7.6% | 10.2% |
| Adoption | 100.0 | 95.4% | 96.0% | 93.3% | 92.5% | 84.7% | 78.4% | 74.7% | 72.3% | 55.0% | 50.0% | 27.8% |

Figure 1.1
*Percentage Distribution Of Internet Users And Non-Users by Age Group (Bar Chart) and Adoption Rate of Internet Users by Age Group (Line Graph)*
Source: Malaysia Communication and Multimedia Commission , 2016

The figure shows that highest Internet user age group is between 20 -24 ages (22.0%) and the adoption of internet is 96.0% compared other age groups. The bar chart also

shows that average age of Internet users is 32.4 years old and non-users is 50.7 years. However, the adoption rate amongst Internet users was decreasing when the range of age ascends. Hence, result from the survey shows that generation Y is the frequent use of Internet compared to other generations.

In 2013, Malaysian government provides fund for young entrepreneurs who want to start online business in this country. For instance, the New Entrepreneur Foundation (NEF) was established for young ICT entrepreneurs with the purpose of providing training programmes to assist young entrepreneur to succeed in online business (BNM, 2012). In addition, the SME Bank also provides "Young Entrepreneurs Fund" which focus on youth aged 30 and below as well as offering a subsidy for interest rate for loans up to RM100, 000 with 7-year repayment period (BNM,2012). Furthermore, Malaysian government also has provided the "Youth Communication Package", for youth between 21-30 years old whose monthly income is RM3,000 and below, as well as offering a rebate of RM200 for the purchase of one unit of 3G Smart phones (BNM, 2012). This initiative allows youth generation to get access to mobile technology and hence be able to retrieve and share information easily anywhere and anytime. Thus, there is a lot of funding sources from various support groups and government agencies to encourage online entrepreneurship among the young generation.

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Figure 1.2:
*Percentage of Users Uses Who Are Willing to Use E-Commerce Options.*
Source: Nielsen Global E-commerce and the New Retail, 2015



The statistics on percentage of using or willing to use e-commerce options is presented in Figure 1.2. Studies by Nielsen Global E-commerce and the New Retail (2015) show that developing regions have increased their usage in e-commerce. For instance, China and Asia-Pacific are heavy users for all online retailing options such as online ordering, online automatic subscriptions and home delivery. Besides that, high usage of smartphone among users has created huge mobile commerce opportunities especially in China region which concerns on food safety in searching high-quality goods online.

Additionally, smartphone are most popular device for people to access the Internet (89.3%) compared to the netbook/notebook/laptop which show 46.0% used by Internet users to access the Internet. The percentage of Internet users and non-users by

ownership of Internet accessible devices (Bar chart), percentage of device used by Internet users to access the Internet (Line graph) are shown below.

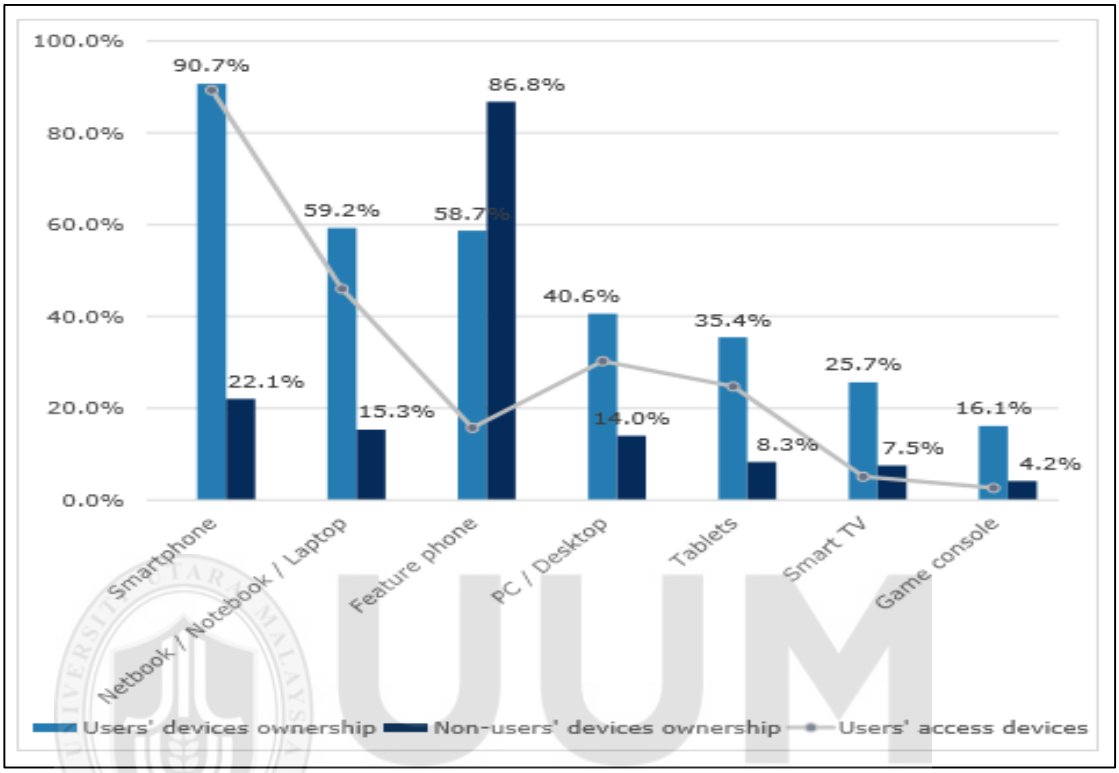



Figure 1.3
*The Percentage of Internet Users and Non-Users By Ownership of Internet Accessible Devices (Bar Chart), Percentage of Device Used By Internet Users to Access The Internet (Line Graph)*
Source: Malaysia Communication and Multimedia Commission, 2016

Nowadays, business environment is competitive and companies have to strive to provide good products and services for customers (Wei *et al*., 2009). The rapidly emerging wireless and mobile network which offer new platform to sell their products with efficiencies are known as M-commerce (mobile commerce). According to Schwiderski-Grosche and Knospe (2002), M-commerce is a subset of E-commerce and relates to a wireless e-commerce via the use of mobile devices in the business to business (B2B) or business to consumer (B2C) environments. Mobile commerce has

huge opportunities to grow in Malaysia because of high acceptance amongst various sections of the society (Rahman, 2013). The consumers feel convenient using mobile commerce because it reduces time and effort involved in the shopping process.

In terms of services, basically, there are three aspects that feature the m-commerce: mobile financial services (m-banking, m-payment, and m-brokering), mobile shopping (m-retailing, m-ticketing, and m-auctions) and mobile entertainment (m-gaming, m-music, m-video, and m-betting) (Khalifa & Shen, 2008). The literature documents the types of users for each of these aspects and it has revealed that generally, the Y generation is the frequent users of social media. They use these media primarily to stay connected with friends, obtain information and attain entertainment (Park & Valenzuela, 2009).

Due to the advanced technology in Malaysia, the users are passionate to find the best devices to access the Internet. Moreover, the rapid growth of mobile computing has motivated companies to increasingly capitalizing on this new innovative business channel. From the discussion above, there is a clear evident that the smartphone is the best communication devices to be chosen especially by young generation due to the unique characteristics of mobility. However, the adoption of m-commerce in Malaysia is still at infancy stage and there are limited literature studies about the important factors that influence the successful adoption of this technology. Henceforth, this study attempted to fill this knowledge gap so that the future of mobile communication in Malaysia can be better understood.

## 1.3 Problem Statement

With the wide growth of mobile network operators, one may presume that subsequently, there is a parallel growth in m-commerce usage. However, a survey by the Malaysia Communication and Multimedia Commission reveals that commonly mobile phone users use the technology for social communication and entertainment such as texting (92.7%), getting information (90.1%) and listening to music (64.2%) (MCMC, 2016). Quite surprisingly, the statistics for m-commerce related activities such as Internet banking (36.2%), shopping (35.3%) and selling goods/services (18.9%) are low. These findings create questions on the extent of technology usefulness in the m-commerce. Hence, triggers the motivation to conduct the study.

In order to understand the behaviour of potential users of m-commerce, several studies have been conducted in Malaysia. These studies have found several hindering factors pertaining to the willingness of using m-commerce, which marks the level of user adoption towards technology. Amongst the factors are, services/contents provided by mobile service provider, privacy, purchasing power, location-based services, perceived security risk and transaction (Muthaiyah, 2004; Wei *et al*., 2009; Yap & Hii ,2009; Noordin & Saifullah Sadi ,2010; Sadi & Noordin, 2011; Chong *et al*., 2012, Goi, 2016).

Among the most debatable issues found in the literature with regards to user adoption are, concerns on the level of security, the difficulty of making payments through m-payment, satisfaction to the quality of the web site performance. These concerns have impeded the rate of adoption on m-commerce. This circumstance posed challenges to m-commerce developers, as well as telecommunication industry. It signifies, the

urging need to address these challenges in order to increase the consumer adoption towards m-commerce, hence enabling these industries to stay relevant and competitive in the economy.

Throughout the decades, since its first invention in 1996, the technology acceptance model (TAM) has been widely adopted by researchers all over the world in their studies (Davis 1989; Davis *et al*., 1989; Adam *et al*., 1992; Segars & Grover, 1993). In addition, over the decades, the original TAM model has been developed and extended to TAM2 and TAM3 to fit into the m-commerce user adoption acceptance studies, parallel with the context of technology being studied (Karahanna & Straub, 1999; Ventakesh, 2000; Ventakesh & Davis, 2000; Koufaris, 2002). Numerous investigators proved the significance and empirical support of TAM in predicting IT acceptance behaviour. In addition, previous studies have analysed and explained the adoption of m-commerce and mobile services using TAM and TAM2. These studies mainly focused on software development in determining user acceptance of innovative information technology (Wei *et al*., 2009). Unfortunately, studies that applied TAM3 to explore information technology in users' intention and usage behaviour are quite limited (Ventakesh & Bala, 2008). Since TAM3 has been upgraded through the integration of elements such as context, content, process, and individual differences, this model is suitable to be adapted in this study to gauge the extent to which, the possible consumer behaviour on the adoption and acceptance of m-commerce in Malaysia, can be explained.

Thus far, several past studies which examined the factors that influenced the adoption of m-commerce applied different methodology, approaches, and theories. Studies by Gitau and Nzuki (2014), Chan and Chong (2013), for example, applied longitudinal approach and have chosen three theories namely technology acceptance model, the theory of planned behaviour and diffusion of innovation to determine m-commerce adoption by online consumers. In parallel to TAM3 proposal, Chan and Chong (2013) employed demographic, motivation, and perceived security risk as independent variables while adding few other related determinants to gauge the m-commerce adoption by online consumers. This study has selected five mobile service companies in Kuala Lumpur and Penang, as their respondents. However, as technology develops rapidly each day, future studies need to measure the diffusion of m-commerce activities and its' relationships with self-efficacy, in the Malaysian context.

Study by Agarwal and Karahanna (2000) disclosed the positive influence of self-efficacy on an individual expectations about the implications of performing a specific behaviour. This outcome expectation refers to the perceived usefulness definition which is "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis *et al*., 1998). Parallelly, quite a number of studies found that self-efficacy has the positive influence on perceived ease of use of a technology (Venkatesh & Davis, 1996; Agarwal & Karahanna, 2000; Venkatesh, 2000; Wang *et al*., 2006; Shin, 2009). On the other hand, TAM3 theorizes that the determinants for perceived usefulness will not influence the determinants for perceived ease of use with the presence of other important social and cognitive constructs (Ventakesh & Bala, 2008; Faqih & Jaradat, 2015). Therefore, additional research needs to be conducted to confirm the results from the past studies.

Another important variable being debated in the mainstream research issue is the influence of culture concept in the adoption process. Generally, Hofstede's model is used to study the influence of culture at a country level. Nevertheless, previous studies have found important variations in cultural values at the individual level which may have effects on individual's behaviour (Srite & Karahanna, 2006; Zhang *et al*., 2012; Faqih & Jaradat, 2015; Zendehdel & Paim, 2015). Moreover, Fang (2012) found it is important to study the individual level cultural focusing on the behavioural intention of technology adoption because this analysis considers the significant variations within cultures. Past literature in China have conducted a meta-analysis of mobile commerce adoption and investigate the moderating effect of the culture of eastern and western. The findings indicate that culture does have specific moderating effects on mobile commerce adoption (Zhang *et al*., 2012).

Besides, past studies in Middle East country have found the moderate effects of individualism-collectivism at individual-level values on the adoption of mobile commerce in Jordan. (Faqih & Jaradat, 2015). Past empirical research by Zendehdel and Paim (2015) has examined UTAUT (performance expectancy, social influence, effort expectancy) with Hofstede's culture moderators and the findings indicated that social influence has a significant effect with collectivism/individualism to use the mobile internet (4G) services among Malaysian students. However, there has been scant research in Malaysia that applies Hofstede's culture moderators in determining m-commerce in Malaysia. In this regard, the current study examines the ICAIL in one country, specifically Malaysia that has rich, cultural heritage and diverse religions. The findings may provide a good context for further studies on consumer behaviour in Malaysia.

Given the above review, this study attempts to fill several gaps from the previous studies, as follows:

1. There is a need for additional test on perceived usefulness determinants (subjective norm, image, output quality, result demonstrability) and perceived ease of use determinants (self-efficacy, anxiety, perception of external control, playfulness) in examining users' intention to use mobile commerce.

2. A further test on the individualism-collectivism as individual level (ICAIL) with the integrated TAM 3.

## 1.4 Research Questions

The research questions to be addressed are as follows:

Main question:

Can the integrated TAM3 model be used for determining mobile commerce adoption among university students in Malaysia?

Sub questions:

1. To what extent does the perceived usefulness and perceived ease of use determine mobile commerce adoption among university students in Malaysia?

2. Does the Individual-Collectivism at Individual Level (ICAIL) moderate the relationship between these variables among university students in Malaysia?
   a) perceived usefulness and behavioural intention
   b) perceived ease of use and behavioural intention

c) subjective norm and behavioural intention

d) perceived usefulness and perceived ease of use

## 1.5 Research Objectives

In order to answer the research questions, the following objectives are proposed:

The main objective is to propose a conceptual model for mobile commerce adoption among university students in Malaysia by adapting integrated TAM3 model. In order to achieve this, the following sub objectives are formulated.

Sub Objectives:

1. To measure the effect of perceived usefulness and perceived ease of use towards mobile commerce adoption among university students in Malaysia.

2. To examine the moderating role of the Individual-Collectivism at Individual Level (ICAIL) on the relationship between these variables among university students in Malaysia.
    a. perceived usefulness and behavioural intention
    b. perceived ease of use and behavioural intention
    c. subjective norm and behavioural intention
    d. perceived usefulness and perceived ease of use

## 1.6 Significance of the Study

### 1.6.1 Practical Implication

This research contributes to the advancement of knowledge for marketers of mobile commerce companies. To achieve optimum results, marketers and management need to understand the various key factors that might affect the behaviour intention of mobile commerce users. Moreover, m-commerce providers can apply appropriate marketing strategies by promoting these services to users with higher educational levels and educate them. Therefore, it might help companies to develop their business, hence, increase the companies' profits.

Besides that, financial services can improve their marketing communications to develop a positive attitude in order to satisfy youth generation expectations in using their mobile financial applications. Moreover, the findings will help financial services to better understand the behaviour and problems among youth in Malaysia to adopt m-commerce. In addition, the Malaysian government can also benefit from this finding as M-commerce is a part of the long-term national Multimedia Super Corridor plans. The government has invested heavily in the country's telecommunications infrastructure and helped to create M-commerce awareness among its citizens.

Finally, young generations who are early adopters of new technologies are able to understand their usage behaviour in using M-commerce in their daily life. This generation will have high-level awareness and confidence to try new technology. With the several of funds given by government and financial services, they have the opportunities to increase their level of income after graduating.

### 1.6.2 Theoretical Contributions

This study applied an integrated model of technology acceptance (TAM3) as the underpinning theory in investigating the use of mobile commerce. This model is developed from the combination of TAM2 with a revised determinants of perceived ease of use. Prior literature suggested TAM as a parsimonious model however integrated model TAM3 is more comprehensive and have the potential for actionable guidance. Comprehensiveness confirms the important factors are included in a theory while parsimony chooses some factors to be removed because of its less importance to the phenomenon and both of them have their own advantages in theory development. The findings from the research are important for theoretical contribution because there are many questionable areas regarding the relationships between perceived usefulness and perceived ease of use determinants.

This study investigates the effects of perceived ease of use and perceived usefulness in determining behavioural intention of adopting mobile commerce. The determinants of perceived usefulness are the subjective norm, image, output quality and result demonstrability while the specific system by anchoring their perceptions to mobile technology excellence is self-efficacy, the perception of internal control, anxiety, and playfulness. Besides that, the effect of culture and values are different from the western and eastern cultures, which leads to the variation in adoption of information technologies. Therefore, the findings from this study are important in determining the effect of ICAIL moderating role in the Malaysian context, compared to other developing countries.

## 1.7 Scope of Research

Mobile commerce adoption is a major topic and involves many cross-disciplinary fields. Hence, there is a need to specifically scope this study in order to ensure better understanding, as follows:

a) Generally, mobile commerce has been interpreted in different definitions by numerous researchers. This study applies the definition by Yang (2005); Yaseen and Zayed (2010) who stated that M-commerce is an extension of electronic commerce from wired to wireless telecommunications. The development of e-commerce has changed to the new method namely M-commerce which has ubiquitous characteristics compared to e-commerce in terms of origin, technology, and nature.

b) Besides that, the Internet has facilitated rapid growth in business, by applying business-to-business (B2B), business-to-employee (B2E) and business-to-government (B2G) transactions which allow firms to deal directly with consumers via online facilities (Alexander *et al*., 2006). In the context of M-commerce services, there are three types of end users such as B2C, C2C and B2B (Panis *et al*., 2002). This study applies B2C business and commerce model since it consists of the service level enhancement and value proposition for various interests of individuals. The examples of B2C m-commerce include mobile financial services (m-banking, m-payment, and m-brokering), mobile shopping (m-retailing, m-ticketing, and m-auctions) and mobile entertainment (m-gaming, m-music, m-video, and m-betting) (Khalifa & Shen, 2008).

c) The targeted population of this research is public university students in Malaysia. In this study, university students are chosen because they come from various states in Malaysia. Moreover, these students have dissimilar level in terms of their purchasing power because of differences in locations and background (Faqih & Jaradat, 2015). Apart from that, university students are more exposed to technology than other users (Schepers & Wetzels, 2007). Therefore, this study has taken public university students as samples who have different behaviour in m-commerce usage.

d) This study uses a cross-sectional approach where samples of public universities are taken from the list of statistic number of students' enrollment in Public Higher Education Institutions (HEIs) in 2013-2014 (MOHE, 2014). In selecting the universities, the public universities are divided into four Zones, of which, are Northern region, East coast region, Central region and Southern region of Malaysia. The highest number of students' enrolment in 2014 is taken in each Zone. The questionnaire is distributed to the undergraduate students in the chosen universities. Sampling technique in the form of proportionate random sampling was used, by taking into account the different sample frame sizes according to the universities.

## 1.8 Definitions of Key Terms

In order to establish consistency and to avoid confusion, the following key terms are defined:

1. Adoption - Individual's decision to become a user of a product or a service (Gitau & Nzuki,2014)

2. Perceived ease of use – The degree to which a person believes that using an IT will be free of effort (Davis *et al*., 1989).

3. Perceived usefulness - The degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989).

4. Individualism-collectivism at individual level (ICAIL) - The individual who highlights his/her own needs and prefer to act as an individual rather than a member of a group (Srite & Karahanna, 2006).

5. Subjective norm – The degree to which an individual perceives that most people who are close to him think he should or should not use the system (Fishbein & Ajzen, 1975).

6. Image - The individual recognizes that his or her social system will be improved from using an innovation (Moore & Benbasat, 1991).

7. Output quality - The individual perception on the effects on a new system (Ventakesh & Davis, 2000).

8. Result demonstrability – The tangibility of the results of using the innovation (Moore & Benbasat, 1991).

9. Self-efficacy – A perceptions of individual capabilities to use technology or system in order to accomplishment their task (Compeau & Higgins, 1995).

10. Anxiety - Individual who lack confidence and have fear to use the technology or system (Ventakesh, 2000).

11. Playfulness- Individual ability to be creative and having high imagination with technology or system (Webster & Martocchio, 1992).

12. Perception of external control- Individual believes that organization support the system (Ventakesh *et al*., 2003).

## 1.9 Structure of Thesis

The thesis is divided into five chapters. The first chapter explains the background of research by highlighting several issues on mobile commerce in Malaysia. It also gives the analysis on Malaysia's mobile commerce market to illuminate the opportunities for mobile commerce in Malaysia. In so doing, this chapter covers the research problems, research objectives, research question, key terms definition and contribution of this study.

The second chapter focuses on the literature review of which information is gathered from previous and current researches that are related to the study. The underpinning theory is discussed to strengthen the objectives of the study and provides the importance of the subjects. Subsequently, the theoretical framework, research model and development of the hypotheses are presented in third chapter. In addition, this section explained the relationship among key elements and research hypotheses development that was derived from the theoretical framework.

Next, chapter four discussed on the applicable research design and procedures adopted in this research. Moreover, this chapter explained research instrument development, instrument variables and reliability, instrument scale, sample size, population and sampling, sources and methods of data collection, data analysis and Structural Equation Modelling (SEM) procedures. The interpretation of the data is important to ensure that the objectives of the study are achieved.

The next section is the presentation of data analysis and results of the study. This chapter synthesize the various analyses, findings and examined the implication of the results to help readers understand the findings, the analysis of data via SPSS software and Partial Least Square (SmartPLS) is spelt out in detail. Finally, the last chapter discusses the research findings by relating them to the objective of the study.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter reviews the theory that underpins this study. In so doing, it discusses all the related variables to be used in the study and the relationships among them. The first section explains the electronic commerce (e-commerce) development followed by the Internet development in Malaysia before opening a discussion on the mobile commerce development. In sum, the objective of this chapter is to justify a research stage pursuant to the identified gap of the study against the current development of the m-commerce adoption.

## 2.2 Electronic Commerce (E-commerce) Development

With the rapid growth of the Internet and web technologies, the traditional technique in dealing with transactions in commercial activities has changed to new methods such as e-commerce. Maamar (2003) pointed out that "E-commerce is a commercial transaction that involves the transfer of information across the Internet". Most of the businesses have adopted E-commerce to compete with their rivals in the global market. In this regard, the level of online business transactions is rapidly increasing and customers have implemented e-commerce to entertain the global business.

Statistics indicate that the highest user groups in Malaysia are students and professionals because they are knowledgeable with the Internet that resulted in their preference of using Internet to make transactions (Jehangir *et al*., 2011). Nevertheless, there are debates in the literature that argue the obstacles that hinder consumers from

using these e-commerce transactions extensively. Exemplifying these obstacles are legal issues, security privacy, and e-readiness in implementing e-commerce in Malaysia ( Jehangir *et al*., 2011). Malaysians are followers rather than pioneers due to the obstacles that hinder them from investing in e-commerce ( Jehangir *et al*., 2011). There are two types of barriers identified in the literature; the internal barriers and the external barriers. For instance, organizational performance, strategies and management are internal barriers whereas infrastructure, technology, economy, politics, legal, social and culture are external barriers (Bough, 2004).

Despite serving as a platform for global business attraction and socio economic development in the nation, e-commerce services have limitation among customers. One of the identified factors is the availability of a wired network connection. Hence, to address the limitation, a new technology with unique features such as ubiquity, personalization, flexibility and localization has been developed that allows potential customer to purchase product online at anytime and anywhere. As such, in the subsequent sections, Internet development is discussed followed by m-commerce development.

### 2.2.1 Internet Development in Malaysia

The Internet has triggered new ideas and different innovation from previous technologies and brought a huge change in our society (Xue, 2005). In the mid-1990s, the government planned to develop ICT in order to achieve Vision 2020. Hence, in 1996, the National Information Technology Council (NITC) was established and the National IT Agenda (NITA) which provides a framework focusing on people, infrastructure and applications was launched (NITC, 1996). Therefore, Malaysia's

Internet initiative and development began in 1990 with the first Internet service provider (ISP) established in Malaysia known as Malaysia Institute of Microelectronic Systems (MIMOS). This organisation has launched the network known as Joint Advanced Integrated Networking (JARING) which expanded through regional and international connections. Meanwhile, in November 2006, Telekom Malaysia became the second operator, which operated the second ISP known as TMNet, and since then, provides the Internet services in Malaysia (MCMC, 2015). According to Bhalla and Bhalla (2010), wireless networks have gone through several phases as presented in Table 2.1.

Table 2.1
*Development of Wireless Networks*

| Generation | Development of Wireless Networks |
|---|---|
| 0 Generation (0G). | In early 1970s, technology creation and evolution on mobile wireless industry has started. Technologies used in 0G systems are mobile radio telephones, PTT (Push to Talk), MTS (Mobile Telephone System), IMTS (Improved Mobile Telephone Service) and AMTS (Advanced Mobile Telephone System). |
| 1st Generation (1G). | Began in 1980s, 1G wireless networks used analogue radio signals by using a technique called Frequency-Division Multiple Access (FDMA). |
| 2nd Generation (2G) (2G - 2.75G) | 2G: In 1991, 2G cellular telecom networks were commercially launched on the GSM standard in Finland. 2G technologies can be divided into Time Division Multiple Access (TDMA) based and Code Division Multiple Access (CDMA) based standards.<br>2.5G: The advancement of cellular wireless technology which are GPRS (General Packet Radio Service). The networks support services such as Wireless Application Protocol (WAP) access, Multimedia Messaging Service (MMS), SMS mobile games, and search and directory. |

Table 2.1 (Continued)

| Generation | Development of Wireless Networks |
|---|---|
| | 2.75G: EDGE (Enhanced Data Rates for Global Evolution) is an extended version of GSM which allows fast transmission of information and can function on any network with GPRS. |
| 3rd Generation (3G) | The basic feature of 3G Technology is fast data transfer rates and 3G technologies make of use TDMA, CDMA and value added services such as mobile television, GPS (global positioning system) and video conferencing. |
| (3G - 3.75G) | 3.5G: High-Speed Downlink Packet Access (HSDPA) provides a smooth evolutionary path for UMTS-based 3G networks and allowing for higher data transfer speed. |
| | 3.75G: High Speed Uplink Packet Access (HSUPA) is related to HSDPA and enhance person-to-person data applications with higher and symmetric data rates. |
| 4th Generation (4G) | 4G is the extension in the 3G technology and have high quality audio/video streaming over end to end Internet Protocol (IP). This technology has the capacity to transfer data and multimedia with a high speed of 100 megabits per second. |
| 5th Generation (5G) | 5G technology is a new mobile revolution and this technology most powerful because the advanced features and applications. These days, mobile users have much awareness of cell phone (mobile) technology and have huge demand for high value technology in the future. |

Source: Adopted from Bhalla and Bhalla, 2010

Telecommunication industry in Malaysia which include both fixed and mobile service providers (Mohd Fuaad *et al*., 2013) has been dominated by four major mobile operators namely Maxis, Celcom, DiGi, U Mobile and one dominant fixed operator,

Telekom Malaysia (Abdul Karim et. al, 2006). In 2013, four Telecom Companies namely Maxis, Celcom, DiGi and U Mobile launched their 4G Long Term Evolution (LTE) Services (MCMC, 2013). The report also highlighted details on the launch date, specific areas, population coverage and the total number of subscriptions for these Telecoms Companies as presented in Table 2.2.

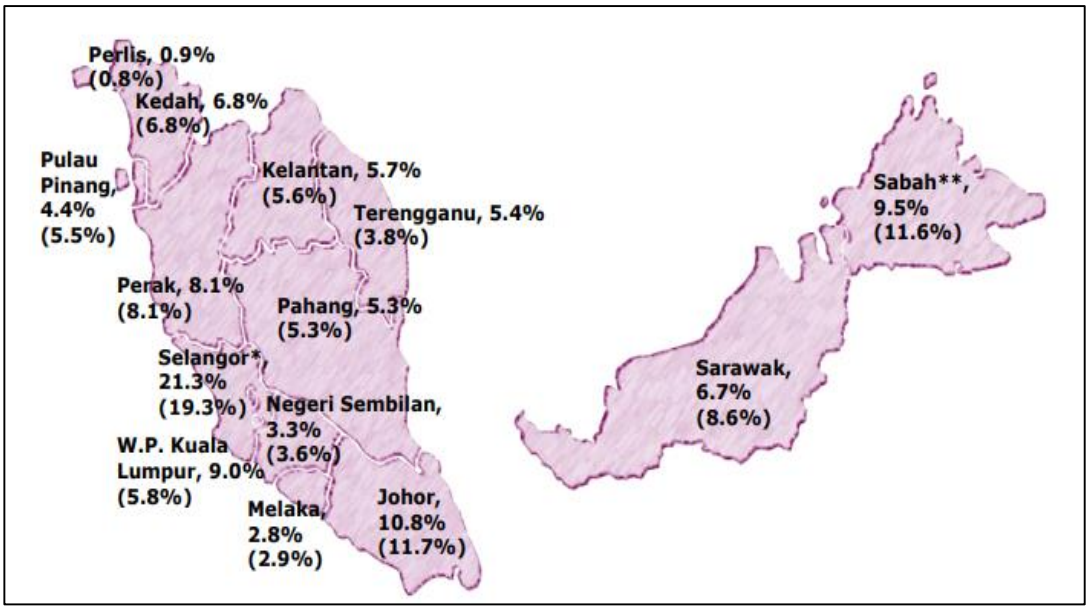
Table 2.2
*Report for Telecoms Companies (Maxis, Celcom, DiGi and U Mobile)*

| **Date Of Launched** | **Telecoms Companies** | **Services** | **Areas** | **Population Coverage** | **Total Number Subscriptions** |
|---|---|---|---|---|---|
| January 2013 | Maxis | 4G LTE | Kuala Lumpur, Selangor and Negeri Sembilan. | 11.2% | 300,000 |
| April 2013 | Celcom | 4G LTE | Selangor, Kuala Lumpur, Penang, Johor, Melaka and Perak | 1.79% | 70,000 |
| July 2013 | Digi | 4G LTE | Klang Valley, Johor and Sabah | 2.58% | 32,000 |
| December 2013 | U Mobile | 4G LTE | Subang Jaya, Sunway, Puchong, Berjaya Time Square and Taman Molek, Johor Bahru | 0.65% | 4,538 |

Source: Malaysian Communication and Multimedia Commission, 2013

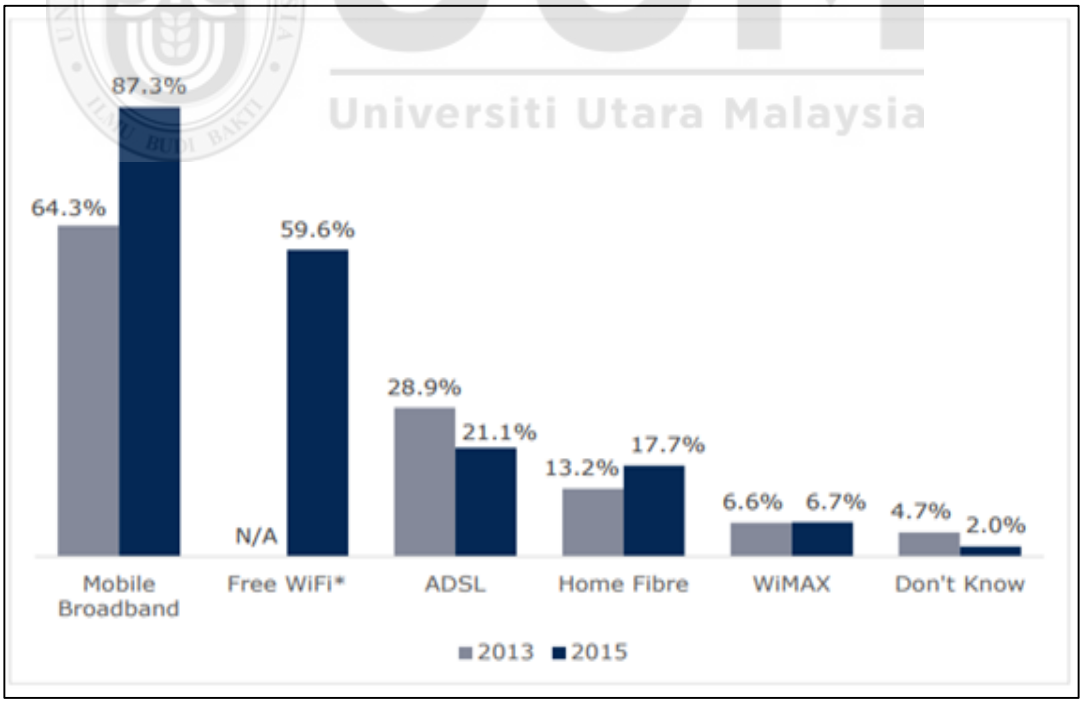
According to the Malaysian Communication and Multimedia Commission (MCMC, 2013) eight telecom companies have been granted the licenses, which allocated 2.6GHz spectrum in December 2012. The licenses are to provide wireless mobile broadband access services starting from January 2013 until December 2017. The service providers are also required to cover a minimum population of 10% every year, and to achieve 50% coverage by year 2017.The eight telecom companies granted the licenses are as the following:

1. Maxis Broadband Sdn Bhd
2. Celcom Axiata Bhd
3. Digi Telecommunications Sdn Bhd
4. U Mobile Sdn Bhd
5. YTL Communications Sdn Bhd
6. Puncak Semangat Sdn Bhd
7. REDtone Marketing Sdn Bhd
8. Packet One Networks (M) Sdn Bhd




**includes W.P. Putrajaya, **includes W.P. Labuan*

Figure 2.1
*Percentage distribution of Internet users by state of residence compared with national projected population base, in bracket.*
Source: Malaysian Communication and Multimedia Commission, 2016




*Free Wi-Fi was excluded in the 2013 questionnaire

Figure 2.2
*Percentage of Internet Users by The Type of Internet Access in 2013 and 2015*
Source: Malaysian Communication and Multimedia Commission, 2016

The result from the statistic in Figure 2.2 indicated that the Malaysians user choose mobile broadband to access the Internet which shows 23% increase from 64.3% (2013) to 87.3% (2015). However, the percentage of accessing Internet via ADSL has declined from 28.9% (2013) to 21.1% (2015) and home fibre technology is only 17.7% in 2015. This situation is understandable because Malaysian users preferred mobile broadband which has a higher bandwidth connection speeds with a lower price, to a fixed broadband. Hence, the statistic shows that mobile broadband is a viable alternative compared to fixed broadband due to faster speeds and larger data allowances.

The growth of technology are impacting strongly to the Malaysian user in their daily life. The user prefer to choose the best devices which provide greater function such as faster access connection. Due to the rapid adoption of the Internet among user with mobile devices, this studies is important to explore in details the m-commerce development in Malaysia. Therefore, the next section will discuss the definition of m-commerce, mobile commerce development, the differences between m-commerce and e-commerce, advantages and challenges in implementing mobile commerce.

### 2.2.2 Definition of M-commerce

With the speedy evolution of network, much effort has been put to define mobile commerce objectively. M-commerce is the usage of mobile devices in dealing with various transactions such as buying and selling products or services to their clients at anytime and anywhere through wireless network (Jaradat & Al- Rababaa, 2013). Stafford (2003) in defining m-commerce states that mobile commerce is done via wireless handheld devices using any type of wireless network allowing consumers to

deal with market transactions. The term "any monetary transaction that is conducted by using a mobile network" is also used in defining mobile commerce (Clarke, 2001; Ngai & Gunasekaran, 2007).

Similarly, Chaffey (2009) stated that electronic transactions conducted via mobile devices such as mobile phones, personal digital assistant (PDA) and any wireless network are referred to as M-commerce. The m-commerce "as the extension of electronic commerce" is the most common definition among researchers (Yang, 2005; Yaseen & Zayed, 2010). From the above definitions, it can be concluded that there are numerous definitions of mobile commerce. Therefore, this study follows the definition by Yang (2005); Yaseen and Zayed (2010), which stated that m-commerce is an extension of electronic commerce from wired to wireless telecommunications and have ubiquitous characteristics which allow the customers to connect at anytime from anywhere.



### 2.2.3 Mobile Commerce (M-commerce) Development

Recently, the Internet and mobile communications is growing faster and has created developing market for mobile commerce (Md. Aminul *et al*., 2010). Most of the observers predict that the usage of mobile connections by business and individual user will spread rapidly even though the m-commerce market in its infancy stage (Islam *et al*., 2010). Moreover, m-commerce market is becoming one of the most productive growth markets in today's business environment due to the rapid adoption of the Internet among consumers with mobile devices (Kim *et al*., 2007).

As such, m-commerce market in Malaysia is expected to grow rapidly by 59.6% in 2015 (Wong, 2014). Furthermore, the percentage of Internet user increased from 74.3% in 2014 to 90.7% in 2015. Thus, this lead to the increase of the m-commerce market size in Malaysia. Additionally, the survey also reported that 89.3% of users use smartphone as the main device to access the Internet (MCMC, 2016). Therefore, m-commerce in Malaysia has a very promising future and responsible parties such as the government should play main role to create awareness and increase the adoption of m-commerce among Malaysians.

Many industries have implemented mobile commerce in their business. According to Andam (2003), there are several industries, which are affected by mobile commerce. Firstly, financial services such as banks that offer mobile banking for the convenience of their customer in dealing with any transactions. Secondly, telecommunications companies which provide several services such as bill payment and account review which can all be conducted from the same handheld devices. Finally, Service Company also provides information services, which include the delivery of entertainment, financial news and traffic updates to a single mobile device. Due to widespread applicability of m-commerce in many industries, studies in this area is a worthwhile effort and they can help the digital technology in Malaysia to prosper.

### 2.2.4 Difference Between M-commerce and E-commerce

There are several differences between M-commerce and E-commerce as shown in Table 2.3.

Table 2.3
*Difference Between E-commerce and M-commerce*

| | **E-commerce** | **M-commerce** |
|---|---|---|
| Origin | | |
| Sponsorship | Government-sponsored Internet | Private mobile phone industry |
| Business entry Cost | Low | High |
| Customer access cost | Free or low cost Internet access | High mobile service charge |
| Customer base | Highly educated computer uses | Less educated cell phone customers |
| Technology | | |
| Message transmission | Packet-switched data transmission | Circuit switched from streamline voice communications |
| Protocol | TCP/IP, HTPML | GSM, TDMA, CDMA, 3G |
| Standardization | High standardization | Multiple incomplete standards |
| Connectivity | Global | Mainly regional |
| Bandwidth | High | Low |
| Identity | URL with IP domain name | Phone Number |
| Application development | General computer applications | Device-specific applications |
| Interface device | Personal computers | Cell phone and PDAs |
| Mobility | Fixed location | Mobile |
| Display | Big screen | Small screen |
| Main input mode | Keyboard for full text input | Voice with small key pad |
| Main output mode | Text and graphics | Voice with small text display |
| Local processing power | Powerful CPU with large memory and disk space | Limited processing power with small memory chip |
| Software and programming | Support of variety of programming languages | Java or specific script language |
| Trend | Towards sophistication | Towards minimization |
| Services | | |
| Service range | Global | Regional |

Table 2.3 (continued)

| | E-commerce | M-commerce |
|---|---|---|
| Delivery destination | PC in office connected to the Internet | Person accompanied by a mobile devices |
| Transaction complexity | Complete and complex transactions | Simple transactions |
| Information provided | Rich Information | Simple and short messages |
| Timing | Less time-critical | Time critical |
| Location-based service | No | No |
| Target mobility | Service to a fixed point | Service to a moving target |
| Backend business connection | Strong connection to backend business information system | Weak connection to backed business information systems |
| Service classification | B2C (business to consumer) and B2B (business to business) | P2P (person to person) and P2S (person to system) |

Source: Adopted from Zhang, Yuan and Archer (2002)

Besides that, mobile commerce has unique characteristics compared to e-commerce.

Figure 2.3 shows mobile commerce characteristics and examples.

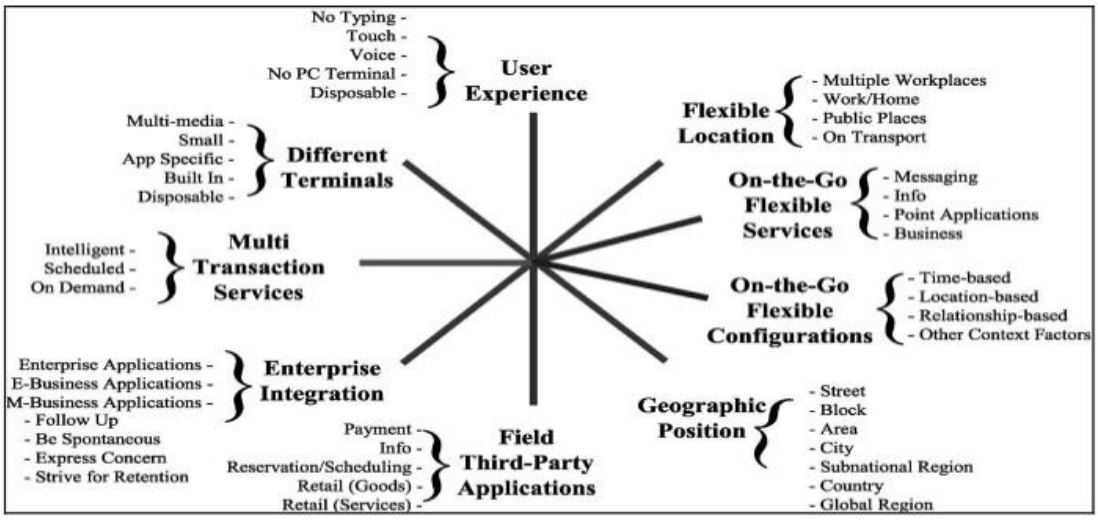



Figure 2.3
*Mobile Commerce Characteristics*
Source: Adopted from Samuelsson and Dholakia (2003)

According to Varshney and Vetter (2002), mobile commerce also has several classes of wireless application in various industries.Table 2.4 below shows the class of wireless applications with examples.

Table 2.4
*Class of Wireless Applications*

| Class of Wireless Applications | Examples |
|---|---|
| Mobile inventory management | Tracking the location of goods and services such as boxes |
| Product location | Locating certain items such as cars |
| Proactive service management | Transmitting information about aging components such as automobile parts to vendors |
| Wireless reengineering | Improving business services such as insurance |
| Mobile auction and reverse auction | Offering, selling and bidding |
| Mobile entertainment services | Providing services such as video |
| Mobile offices | Providing services for business people such as vacation reservations |
| Mobile distance education | Offering classes using streaming audio and video |
| Wireless data centre | Providing downloadable information from data warehouses |
| Mobile music and music on demand | Allowing downloading and storing of music from the Internet |

Source: Adopted from Varshney and Vetter (2002)



In addition, the Internet has facilitated rapid growth by applying business-to-business (B2B), business-to-employee (B2E) and business-to-government (B2G) transactions, which allow firms to deal directly with consumers online (Nemat, 2011). M-commerce services, on the other hand, provides business-to-consumer (B2C), consumer-to-consumer (C2C) and business-to-business (B2B) facilities (Panis *et al*., 2002). According to Seong *et al*. (2004), mobile business is a part of the business ecosystem whereby mobile business models are divided into B2C (business to customer) and

B2B/B2E (business to business; business to employee). Figure 2.4 and Table 2.5 below shows the mobile business model classification and descriptions on mobile business model classification scheme.

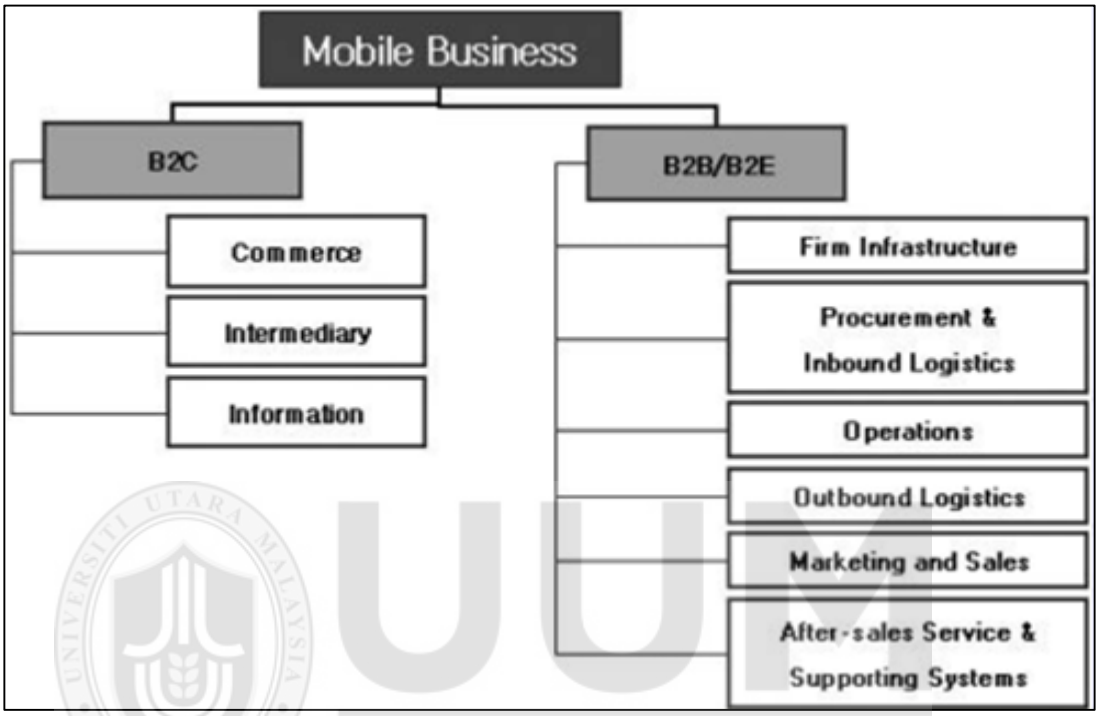



Figure 2.4
*Mobile Business Model Classification*
Source: Adopted from Seong *et al*. (2004)



Table 2.5
*Descriptions on Mobile Business Model Classification Scheme*

| Business Model | Classification Perspective | Main Purpose of Business Model | Value Proposition |
|---|---|---|---|
| B2C | Characteristics and type of supplied value | Service level enhancement, value proposition for various interests of individuals | Product (digital, physical) information and service, information/entertainment, digital/physical |
| B2B/B2E | Use scope in enterprise value chain | Enterprise business process enhancement, cost reduction | Information exchange in intra/extra net, process redesign |

Source: Adopted from Seong *et al*. (2004)

Majority of the researchers define mobile commerce as wireless B2B and B2C exchanges of product, service and information at different stages of the life cycle of a business relationship (Panis *et al*., 2002; Elliott & Philips, 2004). According to Seong *et al*. (2004), B2C business model is subdivided into three categories which are commerce, intermediary and information. Figure 2.5 shows mobile B2C business model and Table 2.5 shows mobile B2C business model, examples and descriptions.

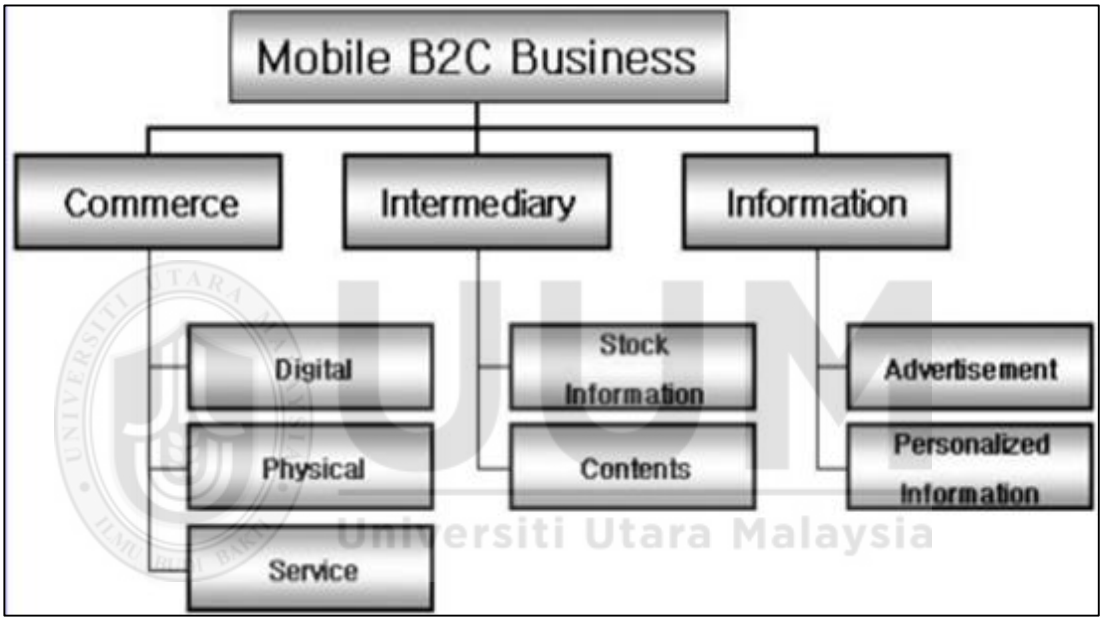



Figure 2.5
*Mobile B2C business model*
Source: Adopted from Seong *et al*. (2004)

Table 2.6
*Mobile B2C Business Model, Examples and Descriptions*

| Category | Examples | Descriptions |
|---|---|---|
| **Commerce** | | A commerce model provides mobile contents or/and services for direct commercial transactions. |
| Digital | Game,MP3,ebook | |
| Physical | Electronic appliance, books | |
| Services | E-mail, banking, ticketing, download, music, reservation, community | |

Table 2.6 (Continued)

| Category | Examples | Descriptions |
|---|---|---|
| **Intermediary** | | An intermediary model delivers mobile contents and/or services from other sources to customers. |
| Stock information | Stock-related sites | |
| **Contents** | News, weather, entertainment, information | |
| **Information** | | An information model provides personalized information to customers' mobile terminals generally on a push basis. |

Source: Adopted from Seong *et al*. (2004)

This study focuses on the mobile commerce usage among university students by applying B2C business model. According to the Internet user survey in Malaysia, only 36.2% of Internet users used e-banking facilities. However, 62.1% of users does not performed online transactions, 1.7% Internet users had stopped. This happened because users are concern on security issues in internet banking and they feel more comfortable using conventional banking compared to online transaction MCMC (2016).

Exemplifying a similar circumstance is Hong Kong, whereby security becomes a major barrier for the m-commerce extensive use in Hong Kong; people are afraid to deal with any transactions over the wireless networks and on the Internet (Leung *et al*., 2003). Therefore, this study applies business-to-consumer (B2C) transaction and attempts to identify the individual behaviour in adopting m-commerce in terms of the digital, physical and service in smart phone applications. The examples of B2C m-commerce include mobile financial services (m-banking, m-payment, and m-brokering), mobile shopping (m-retailing, m-ticketing, and m-auctions) and mobile entertainment (m-gaming, m-music, m-video, and m-betting) (Khalifa & Shen, 2008).

### 2.2.5 The Advantages and Challenges In Implementing Mobile Commerce

Thus far, there are several aspects being debated in the literature pertaining to the mobile commerce. Across the continent, the most debatable issues are the advantages and challenges of m-commerce as a wireless network. Speaking of advantages, it profoundly has many beneficial applications for creating opportunities to the merchandisers and shoppers to deal with transactions in the online market (Chaffey, 2009). First, is ubiquity, which allows consumers to access the information that they desire from any locations at any time. Next is reachability where mobile commerce users can reach the Internet access everywhere whether in their homes or at other locations. Thirdly is convenience for the users to access the information without the use of power supply when wireless handheld device is applied. Lastly, security, an important element that users are concerned with while using mobile commerce.

In addition, Leung *et al*. (2003) highlighted the expanding mobile commerce applications can acquire advantage from the useful functions. For instance, users can easily receive audio and video information through multimedia messaging service (MMS) from their social networking. This argument is supported by Khalifa and Shen (2008) who pointed out that mobile commerce is able to provide higher levels of customization anytime and anywhere to the users. Moreover, mobile commerce also provides greater function such as faster access connection, more operative and completely easy to be accessible at anytime and anywhere for its mobile users (Gitau & Nzuki, 2014).

However, Priyambodo *et al*. (2012) found other factors that may affect the acceptance of m-commerce in Indonesia such as perceived ease of use, perceived usefulness,

perceived trust, perceived security, perceived benefits, convenience, personal innovativeness and the willingness of an individual to try out any new technologies. Furthermore, the location and physical space are also the main barriers that affect the signals of mobile communications in certain places. Therefore, this study will identify the factors that will impact the m-commerce adoption in Malaysia. Hence, the subsequent sections will discuss the underlying theories in the area of technology adoption.

## 2.3 Underlying Theories in The Area of Technology Adoption

### 2.3.1 Diffusions of Innovations (DOI)

According to Kotler (2003), adoption is defined as the individual decision to use products or services. This is supported by Rogers (1983) who states that innovation diffusion process is an idea coming from creation to the ultimate users or adopters. Rogers (1983) categorised adopters to five groups of which are innovators, early adopters, early majority, late majority and laggards. Figures 2.6 shows the five categories of adopters, shown in a bell-shaped frequency curve (Rogers, 2003).

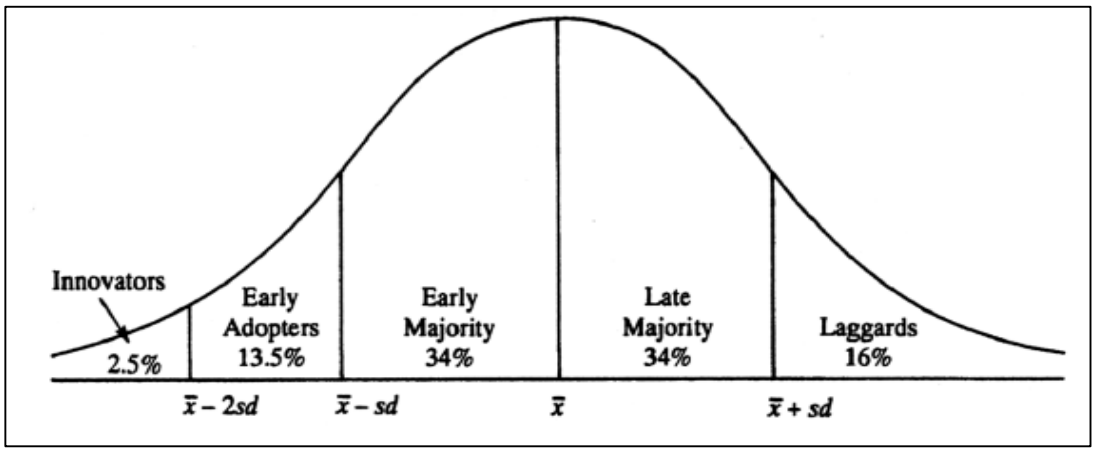



Figure 2.6
*Adopter Categorization on The Basis of Innovativeness*
Source: Adopted from Rogers, 2003

First stages in innovators refer to the group who introduce the new technology to public known as “global visionaries” and they are first testers to the innovations, products or services (Rogers, 1983). Early adopters are not specialist in technology, but they are interested in the benefits of new technology. Usually, early adopters will get the information through broadcast channels and they will apply technology innovation to fulfil their needs (Rogers, 1983).

Early majority adopters usually wait and perceive how someone else adopts to innovation. They will not adopt technology program information unless they get good feedback from their reference, which is the previous early majority. Meanwhile, late majority group are less easy in action with technology goods and only purchase products from well-known companies. Finally, laggards refer to person who moves slowly in technology development and late accepters of technology and mobile devices. They have little attention to other people opinions and when they decide to adopt, it is already late because innovators have introduced new technology (Rogers, 1983).

Nevertheless, diffusion of innovation has several weaknesses. In this theory, the category of a set of adopters is omitted in the adopter categorization on the basis of innovativeness. In the context of changes in technology, there are several adopters who are innovators or early adopter, but they are not quickly adopting the innovation (Downs & Mohr, 1976).

Rogers (2003) found four criticisms of diffusion research which are pro-innovation bias, individual-blame bias, recall problem, and issues of equality. Besides that another weakness of this theory is the one-way information flow which is from sender to

receiver. When the sender wants to persuade the receiver, there is little or no reverse flow between them. Thus, one-way model is inconsistent and needs other multiple communication flows when the adopter receives information from many sources (Robert *et al*., 1996). The next section will discuss the Theory of Reasoned Action (TRA) in order to explain individual's usage behaviour towards technology adoption.

### 2.3.2 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action was developed by Fishbein and Ajzen (1975) in order to explain individual's usage behaviour based on subjective norms, attitude and behavioural intention. According to Ajzen (1991), TRA is the backbone for some models in technology acceptance that has been used to explain the behavioural intention in various fields such as e-banking (Rouibah *et al*., 2009; Shih & Fang, 2004) and word processing (Davis, 1989). Moreover, Davis (1989) have employed TRA to explore the relationship among perception and technology usage.



There are two main factors namely attitude towards behaviour and subjective norms which determined behavioural intention in TRA. The attitude towards behaviour is the individual belief, whether positive or negative, in order to perform their particular task (Fishbein & Ajzen, 1975). If an individual believes the results are negative, he or she will have negative attitudes and will not perform that behaviour. However, if an individual perceives the outcome is positive, they will perform that behaviour with positive attitude.

Subjective norm captures the individual's perceptions and influence others' behaviour (Fishbein & Ajzen, 1975). Besides that, subjective norm is the determinant of

behavioural intention in the theory of reasoned action and in that of planned behaviour theory (Ajzen, 1991; Venkatesh & Davis, 2000). The different influencers involved in the subjective norms may be of any group such as family, friends and others. For instance, if the group members think positively about m-commerce application, then he or she will not have any objection and will make the same decision like others.

TRA comes with several weaknesses. Firstly, the behaviour in TRA must be voluntary whereby attitude and subjective norm depends on the individual's decision. However, this theory is not suitable in an organizational context. TRA does not explain other behaviours such as those that are spontaneous, impulsive and habitual. This behaviour is excluded because their performance might not be voluntary (Bentler & Speckart, 1979). For instance, spontaneous behaviour needs special skills, unique opportunities and the cooperation in the organization. An individual may not perform a behaviour, probably because he/she is lacking of certain skills, opportunity and cooperation from others, not because he/she voluntarily decided not to engage in the behaviour (Liska, 1984).

Secondly, previous studies showed that only 40% of the variance of behaviour could be explained using TRA (Ajzen, 1991). Intention factors are not limited for attitude and subjective norm only, because other factors will also influence attitude. Moreover, TRA is a more general model compared to other technology acceptance theories, which is more complex such as technology acceptance model, the theory of planned behaviour and others. TRA is a "predictive" model that predicts individual behaviour based on certain aspects (Ho *et al*., 2009). Unfortunately, person action is not the same as the prediction in TRA. Thus, to overcome this issue, the theory of planned behaviour

(TPB) was developed by adding perceived behavioural control to be applicable for non-voluntary users (Ajzen, 1991).

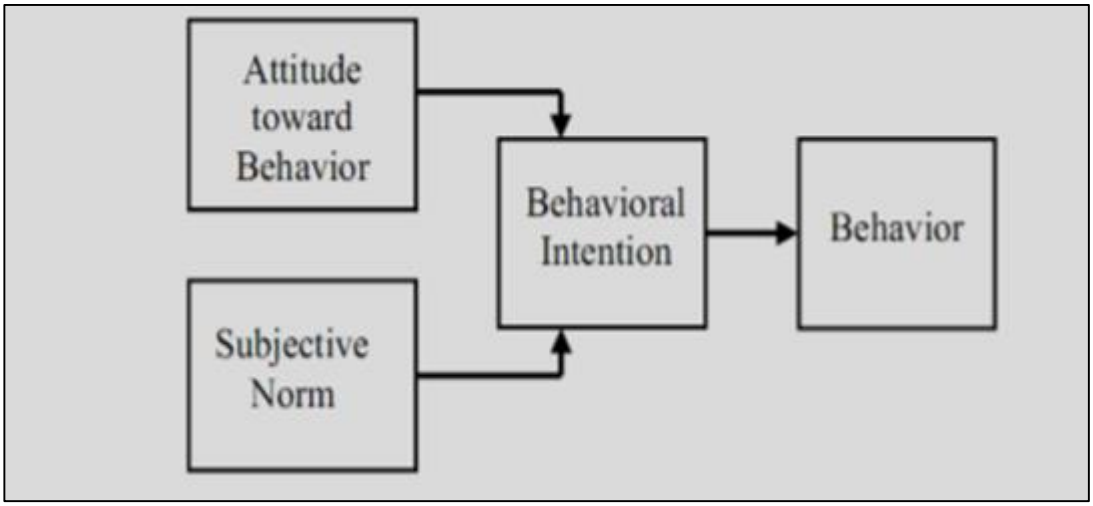



Figure 2.7
*Theory of Reasoned Action*
Source: Adopted from Fishbein and Ajzen (1975)

### 2.3.3 Theory of Planned Behavior (TPB)

Ajzen (1991) introduced the Theory of planned behaviour (TPB) which is an extension of the TRA (Ajzen, 1991; Fishbein & Ajzen, 1975). This new theory is to overcome the issues in TRA. One of the limitations of TRA is the concept of individual working under voluntary behaviour, but in reality, human behaviour is not voluntary all of the time. Thus, this theory uses new factor namely 'perceived behavioural control' which is relevant for non-voluntary users. In TPB, behavioural intention is determined by the attitude towards behaviour, subjective norm and perceived behavioural control. Several studies applied this theory such as online consumer behaviour (Hansen *et al*., 2004) and online shopping behaviour (Hsu *et al*., 2006). These studies found that TPB provided better explanation to online consumer behaviour compared to TRA. It shows that perceived behavioural control in TPB influence non-voluntary users towards online shopping behaviour. Besides that, Ajzen (1991) stated that perceived

behavioural control is an individual assumption to face the obstacles and to determine the individual reaction in certain situation. Therefore, his theory explained that perceived behavioural control can influence individual decision.

Although Ajzen (1991) has introduced new variable which is perceived behavioural control in TPB, the limitations of TPB still exists. There are several studies that used TPB such as Marcoux and Shope (1997) which predicts the potential of TPB in regards to use, frequency of use and misuse of alcohol among eighth-graders, while Hanson (2005) used TPB to compare the predictors of cigarette smoking among African-American, Puerto Rican and non-Hispanic white teenagers. From the findings, TPB has been criticized because it cannot explain behaviour change and this theory also did not provide detailed information (Hanson, 2005).

Another limitation in TPB is that it does not consider other external factors such as personality-related factors, cultural factors, and demographic variables which are important for shaping the individual behaviour. In addition, based on literature review findings, Jane Ogden (2003) criticized that the variables in TPB such as subjective norm, attitude and perceived behavioural control were not adequately operationalized and show low variance among the variables. Taylor Todd (1995a) support this by criticizing that perceived behavioural control was not identified as the specific belief and may not consistently occur as predicted. Thus, to overcome this issue, Decomposed Theory of planned behaviour (TPB) was developed by adding several determinants that have higher explanatory power to explain the variables (Taylor & Todd, 1995b).

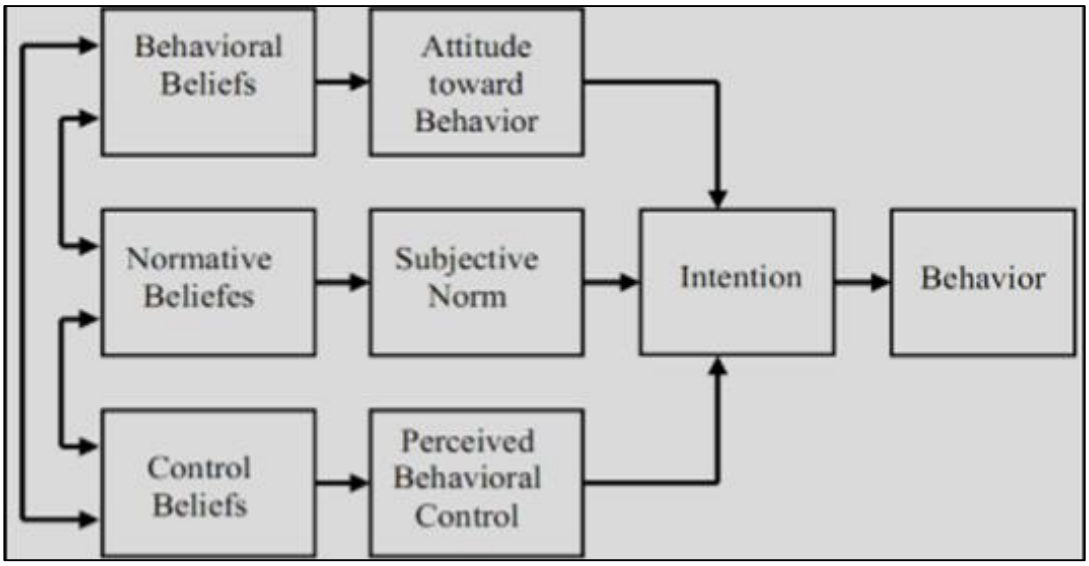



Figure 2.8
*The Theory of Planned Behaviour*
Source: Adopted from Ajzen, 1991

**2.3.4 Innovation Diffusion Theory (IDT)**

Rogers (1983) developed Diffusion of Innovations Theory to have a better understanding on individual reaction whether to accept or reject the innovation especially the innovation in technology. Moreover, Rogers stated that there are five stages in diffusion process which are knowledge, persuasion, decision, implementation and confirmation. These stages are important to measure the potential adoption on innovation technology. At an early stage, individual should have knowledge on the innovation, and then they will form an attitude towards the value of innovation. After that, he or she has to decide whether to adopt or reject the innovation. If the individual choose to accept, he or she will implement the innovation. Finally, the individual will make confirmation of their decision.

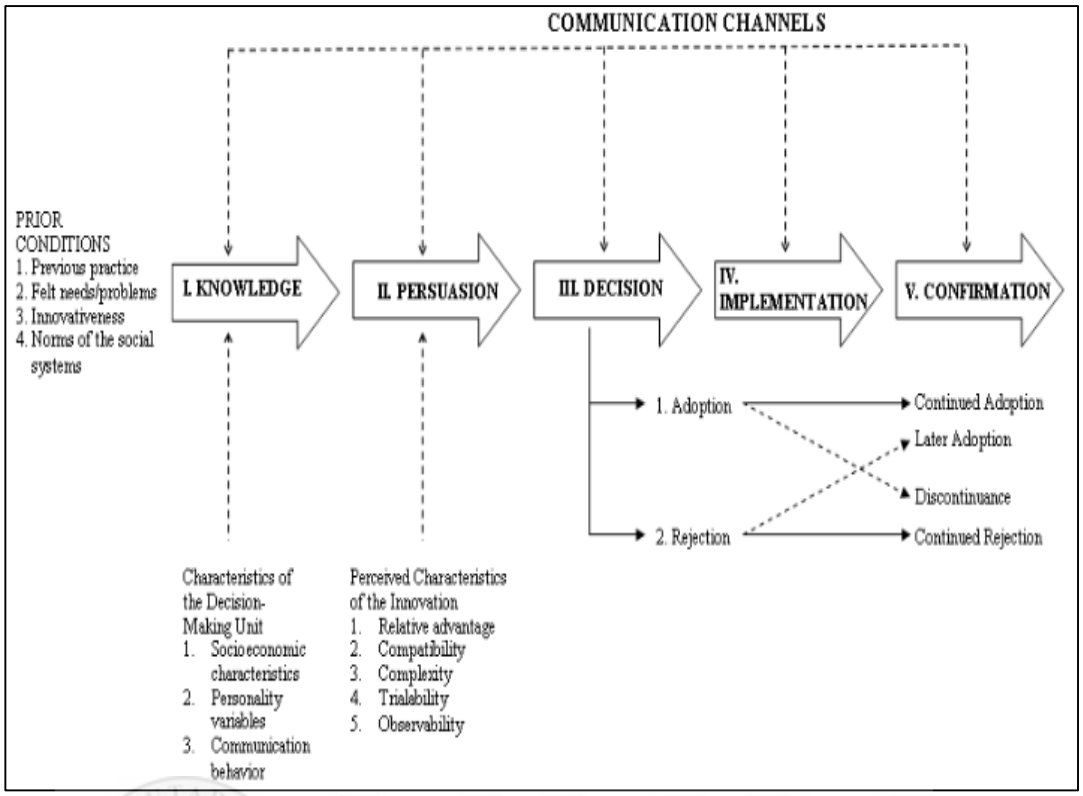



Figure 2.9
*A Model of Five Stages in The Innovation-Decision Process*
Source: Adopted from Rogers, 2003

At the knowledge stage, there are three characteristics for decision making which are socio economic, personality variables and communication behaviour. At the persuasion stage, there are five factors of a technology that could determine its adoption and individual can decide to reject or adopt the innovation (Rogers, 2003). The first factor which is relative advantage refers to the benefits of the innovations. Meanwhile, compatibility refers to consistency of the innovation during the past values, past experience and demands by the potential adopters. The third stage is complexity to measure the level of difficulties of the innovation. Trialability is to measure whether the innovation can be used for the limited basis experiment. Finally, observability is the degree to whether results of innovations can be seen by others.

Empirical research found innovation decision process has several limitations. This theory does not consider the possibilities that individual behaviour whether or adopt or reject the innovation technology and indicate insufficient consideration for innovative characteristics and how these change over time (Wolfe, 1994). In addition Charters and Pellegrin (1972) argued that nature of the utilisation of knowledge in diffusion of innovations is complicated by opposing direct adoption (replication) versus reinvention (adaptation).

### 2.3.5 Technology Acceptance Model (TAM)

According to Davis (1989), TAM is constructed based from Theory of Reasoned Action (TRA). TRA explores the relationship between perception and technology usage (Fishbein & Ajzen, 1975). However, Davis *et al*., (1989) developed TAM to predict individual adoption and use of new technology. The model claims that an innovative information system is dependent on two determinants, which are, perceived ease of use and perceived usefulness. The following diagram depicts the Technology Acceptance Model (TAM):

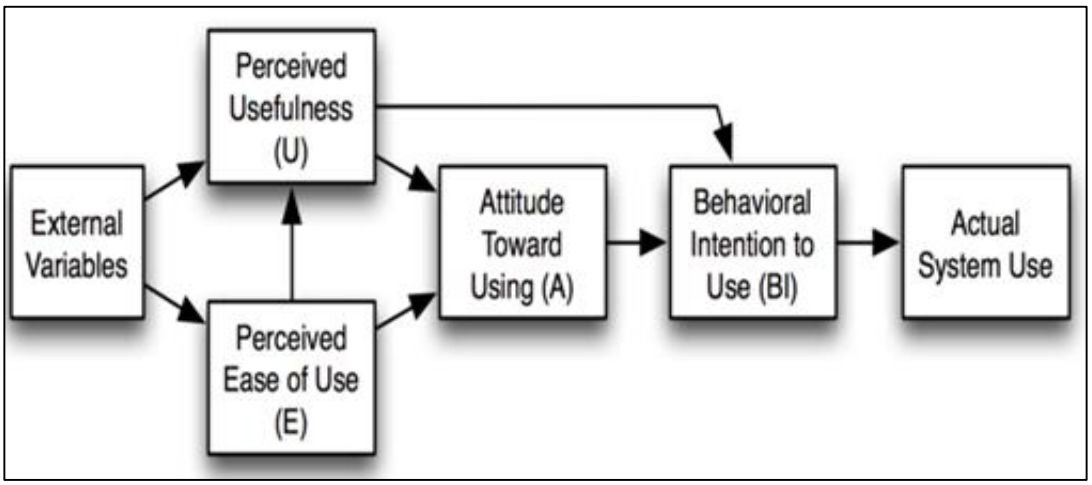



Figure 2.10
*Model of Technology Acceptance Model (TAM)*
Source: Adopted from Davis, 1989

In TRA, behavioural intention comprised two constructs, namely, attitude towards behaviour and subjective norm. While in TAM, there are two additional constructs, namely, perceived usefulness and perceived ease of use, apart from other constructs, including attitude toward using and behavioural intention to use. Perceived usefulness is the degree to which individual believe the system or technology is useful, therefore he/she will be more positive towards using the technology or system. On the other hand, perceived ease of use refers to the individual perception whether this technology can enhance their performance and is easy to use (Davis, 1989).

The other construct that composited the model is, attitude, which refers to the individual attitude towards a new technology influenced by perceived usefulness and perceived ease of use. Meanwhile, another construct, i.e, behavioural intention to use, is a construct that depends on the user's attitude that influences his/her use of a new technology (Davis, 1989). Throughout the decades, due to the robustness of the model, TAM has become well-established and have been adopted in numerous studies and documented in extensive literature pertaining to mobile banking (Chitungo & Munongo, 2013), mobile commerce (Wei *et al*., 2009), and electronic banking (Jahangir & Begum, 2008).

Both TRA and TAM models claim that attitude has the capacity to influence behavioural intention. However, Davis (1989) argued that the effect of subjective norms on behavioural intention to use is only usable in TRA instead of TAM. On the other hand, Venkatesh and Davis (2000) claimed that subjective norms should be included in TAM2 because it may influence individual intention to use, perceived usefulness of a technology and perceived ease of use in TAM. Therefore, Venkatesh

and Davis (2000) developed TAM2 on the basis of TAM to determine the relationship among the variables. This extended version of TAM integrated two processes into this model, which are social influence processes (subjective norm, voluntariness, and image) and the cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived usefulness). The two processes were significant with regards to investigating user acceptance in technology and system. Thereafter, a number of studies which applied extended TAM model in e-commerce and m-commerce, has risen, as shown in Table 2.7.

Table 2.7
*Past Studies Applied Extended TAM Model in E-Commerce And M-Commerce*

| Studies | Subjects | Technologies | Theory/ Model | Proposed Antecedents |
|---|---|---|---|---|
| Fong and Wong (2015) | Hong Kong consumer (390) | Mobile commerce | Extended TAM | User attitude, subjective norms, perceived ease of use, perceived usefulness, compatibility, mobility of users, personalization, localization, gender and marital status |
| Amin, Rezaei and Abolghasemi (2014) | Mobile phone users in Malaysia (302) | Mobile website | Extended TAM | perceived usefulness (PU), perceived ease of use (PEOU) and trust |
| Chitungo and Munongo (2013) | rural communities Zimbabwe's (275) | Mobile banking | Extended TAM | perceived usefulness, perceived ease of use, relative advantages, personal innovativeness and social norms, perceived risks and costs |

Table 2.7(Continued)

| Studies | Subjects | Technologies | Theory/ Model | Proposed Antecedents |
|---|---|---|---|---|
| Rammile and Nel (2012) | South Africa of non-users cell phones banking services (288) | Cell phone banking | Extended TAM | Perceived ease of use, perceived usefulness, usage barrier, value barrier, risk barrier, tradition barrier, image barrier, information barrier |
| Sadi and Nordin (2011) | Malaysian college and university student (34) | Mobile commerce | Extended TAM | Perceived usefulness, perceived ease of use, personal innovativeness, perceived trust, perceived cost, subjective norms,, perceived behavioural control, facilitating condition, self-efficacy |
| Puschel *et al*.,(2010) | Mobile banking user (333) and mobile banking non user (333) | Mobile banking | Extended TAM | Perceived ease of use, subjective norm, compatibility, relative advantage, visibility, result demonstrability, image, trialability, self-efficacy, resource facilitating conditions, technology facilitating condition |
| Wei *et al*., 2009) | Malaysian consumer (222) | Mobile commerce | Extended TAM | Perceived usefulness, perceived ease of use, social influence, perceived cost and trust |
| Jahangir and Begum, (2008) | Customers of private commercial bank in Bangladesh (227) | Electronic commerce | Extended TAM | Perceived usefulness, ease of use, security, attitude and privacy |

The table above shows that there are studies which applied extended TAM model in e-commerce and m-commerce environment. However, there is still scant research that applies TAM3 model in determining mobile adoption particularly in the context of Malaysia. Since, TAM3 has been upgraded through the integration of various elements, therefore this model seems suitable to be adapted in this study.

#### 2.3.5.1 Technology Acceptance Model (TAM2)

Ventakesh and Davis (2000) theorize that TAM affects external variables on intention to use and was mediated by perceived usefulness and perceived ease of use. Until the last two decades, studies have found that TAM has become a powerful model in predicting user acceptance. However, at that time, little was known about the determinants of this construct and how they drove the changes in behaviour over time, to increase the technology usage (Ventakesh & Davis, 1996). Therefore, an extended version of TAM, namely TAM2, which includes other related determinants to gauge perceived usefulness and usage intention constructs, was introduced (Ventakesh & Davis, 2000).

The TAM2 model includes the theoretical constructs pertaining to social influence processes, namely subjective norm, voluntariness and image, and how they are interrelated. The TAM2 model posited the relationship among these constructs as the important factor that affects individual decision to use technology. Subjective norm is the determinant of behavioural intention in TRA (Fishbein & Ajzen, 1975) and the subsequent TPB (Ajzen, 1991). TAM2 suggested that subjective norm is the medium of social influence process (Fishbein & Ajzen, 1975). Besides that, Ventakesh and Davis (2000) theorize that in a computer usage context, subjective norms usages of

innovative systems will occur in mandatory, not voluntary. Hence, in TAM2, voluntariness is set as a moderating variable and has two distinguishes usage contexts into mandatory and voluntary settings (Moore & Benbasat, 1991).

In addition, image is one of the constructs in social influence processes and refers to the level of individual usage to improve their status in social system (Moore & Benbasat, 1991). Furthermore, previous research found subjective norm would positively influence image if the social group at work believe individual should perform and implement this behaviour (Kiesler & Kisler, 1969). Next, the cognitive instrumental processes in TAM2 are job relevance, output quality and result demonstrability. Job relevance refers to the individual judges on the degree to which the system is capable of supporting (Ventakesh & Davis, 2000). On the other hand, output quality refers to the individual perception on the effects on a new system (Ventakesh & Davis, 2000). Furthermore, output quality and job relevance will have moderating effect on perceived usefulness, if the output quality and job relevance are higher and stronger on perceived usefulness.

Finally, result demonstrability defined as "tangibility of the results of using the innovation" (Moore & Benbasat, 1991). Individual can expect to form positive perceptions of the usefulness if the result is positive. However if the result shows that the system is low, users will focus on their accomplishment to work behaviour rather than usage of the system (Ventakesh & Davis, 2000). In previous research, TAM2 has explored the additional factors that influence perceived usefulness. However, for perceived ease of use, individual will form their perceptions on a system based on few factors related to individual beliefs when using the computer Ventakesh (2000).

Hence, Ventakesh and Bala (2008) developed a model of TAM3, consist with the anchoring and adjustment variables which relates to the PEOU determinants to determine human decision making. This model is able to present the determinants of individual usage in technology.

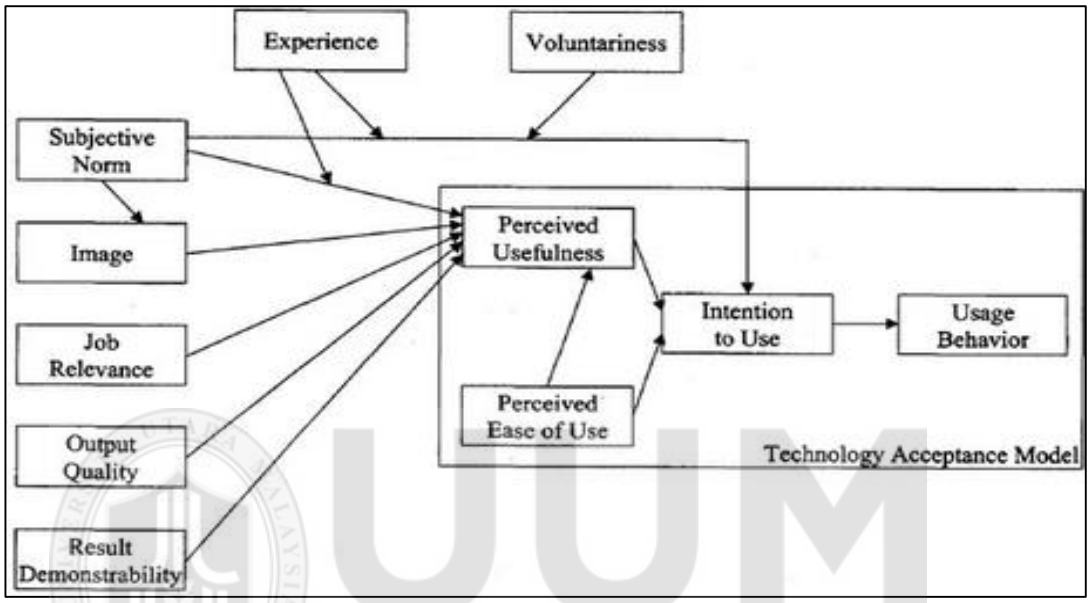



Figure 2.11
*Technology Acceptance Model (TAM2)*
Source: Adopted from Ventakesh and Davis, 2002



### 2.3.5.2 Technology Acceptance Model (TAM3)

According to Ventakesh and Bala (2008), the integrated model of technology acceptance (TAM3) is developed from the combination of TAM2 (Venkatesh & Davis, 2000) and the model of the determinants of perceived ease of use (Venkatesh, 2000). In addition, TAM3 does not posit any cross-over effects between perceived ease of use and perceived usefulness determinants (Venkatesh & Bala, 2008).

In TAM2, the processes explained the relationships between PU with social influence and cognitive instrumental processes. Furthermore, TAM3 is a nomological network

and the integration is rational to determine the individual adoption and use of technology. Besides, previous studies found perceived ease of use has a relationship with individuals' self-efficacy beliefs and with procedural knowledge (Davis *et al*., 1989; Venkatesh, 2000; Davis & Venkatesh, 2004). The determinants of perceived ease of use are primarily individual differences variables and general beliefs about computers (Venkatesh, 2000).

In addition, Venkatesh (2000) recommended that individuals formed perceived ease of use to different general computer beliefs (computer self-efficacy, perception of internal control, computer anxiety and computer playfulness) and adjusting their perceptions of ease (perceived enjoyment and objective usability). In TAM3, anchors are the general beliefs about technology, which an individual is difficult to change even when they are confronted with the new technology (Ventakesh, 2000). Meanwhile, adjustments refer to the beliefs by an individual that change with the new experience and information of technology (Ventakesh, 2000). Computer self-efficacy refers to the individual belief whether they have the ability to perform their task using the computer (Compeau & Higgins, 1995b). If the individual has a limited knowledge in using a new technology, the perceived ease of use will be negatively affected.

On the other hand, perception of external control is individual believes that organization supports the system (Ventakesh *et al*., 2003). According to Ventakesh (2000), perceived enjoyment is when the individual enjoys involvement in the activity using a specific system, while objective usability refers to the comparison of systems based on the actual level and the ability to complete the specific task. As an individual becomes familiar with the system, their level of knowledge will change either

positively or negatively. Finally, computer anxiety is an individual fear while using the computers, and computer playfulness is the degree of cognitive spontaneity in computer interaction (Ventakesh, 2000; Webster & Martocchio, 1992).

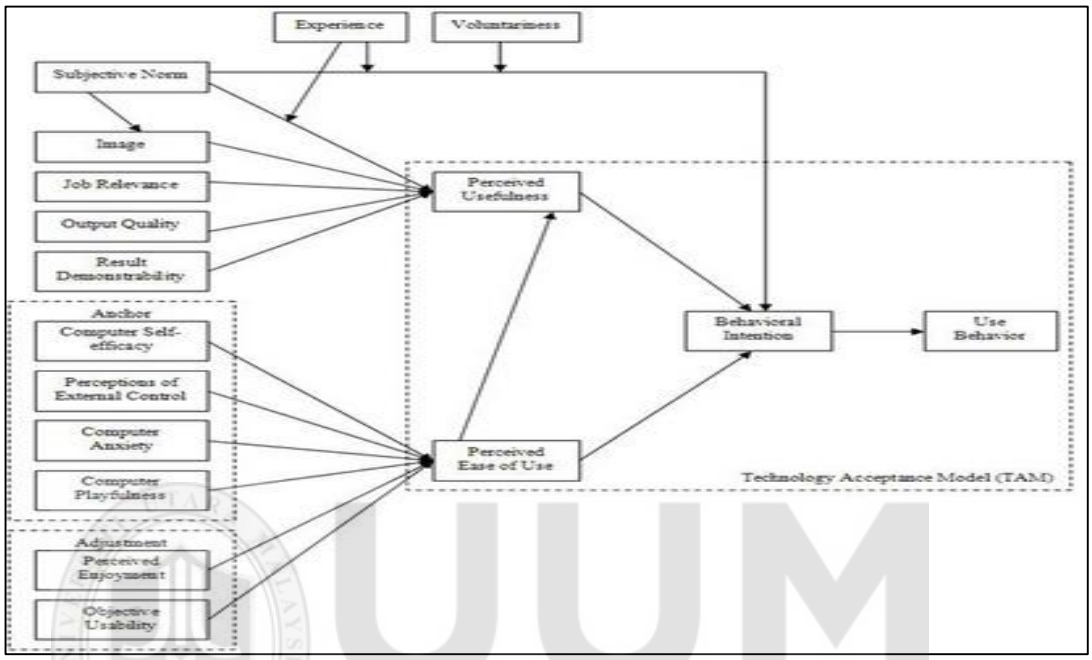



Figure 2.12
*Technology Acceptance Model (TAM3)*
Source: Adopted from Ventakesh and Bala, 2008

In this study, TAM3 underpins the research navigation because this model integrates several elements such as context, content, process, and individual differences. This model able to explain the complexity of technology adoption such as m-commerce. Based on TAM3 theory, three constructs, namely subjective norm, image and voluntariness are captured in the social influence processes, known as perceived usefulness. Meanwhile, the influence of cognitive instrumental process on perceived usefulness is captured by three constructs (output quality, result demonstrability and perceived ease of use). Besides that, TAM3 suggested four anchors and adjustment framing of human decision making which are self-efficacy, anxiety, perception of external control and playfulness.

However, in the present study, two factors, categorised under adjustment, namely, perceived enjoyment and objective usability in determining perceived ease of use were dropped. It is because these variable will play a role in determining perceived ease of use after the individuals use the new system and gain experience (Ventakesh, 2000). Meanwhile, this study is for early adoption, thus the perceived enjoyment and objective usability were deleted. Similarly, job relevance construct was also dropped, since this study uses undergraduate students, as respondents of whom have no working experience. Hence, job relevance construct basically has no influence on the sample. This modification model is in line with previous study by Faqih and Jaradat (2015).

Besides that, experience and voluntariness were also dropped because the moderating effect of these variables does not play an important role in the technology adoption (Huang *et al*., 2012; Faqih & Jaradat, 2015; Chen *et al*., 2016). This study has made some modifications from the previous study in order to identify applicable factors that could impact the m-commerce adoption in Malaysia. Apart from that, another variable is also added in the model to serve the purpose of the study, namely, the individual versus collectivism dimension. The next section will present a discussion on culture concept and its application in previous studies.

## 2.4 Cultural Concept

Hofstede (1980) defines culture as "the collective programming of the mind which distinguishes the members of one human group from another". The cultural theory developed by Hofstede (1980) is based on four different scopes which are power distance, uncertainty avoidance, individualism or collectivism and masculinity or femininity.

In the 1980s, Hofstede and Bond (1988) proposed a fifth dimension 'long term or short term' and finally in the 2000s, Hofstede and Minkov (2010) developed the sixth dimension namely indulgence or restraint. Table 2.8 below shows the description of the dimensions.

Table 2.8
*Sixth Dimensions of National Culture*

| Dimensions | Descriptions |
|---|---|
| Power Distance | The different solutions to the basic problem of human inequality. |
| Uncertainty Avoidance | The level of stress in a society in the face of an unknown future. |
| Individualism versus Collectivism | The integration of individuals into primary groups |
| Masculinity versus Femininity | The division of emotional roles between women and men. |
| Long Term versus Short Term Orientation | The choice of focus for people's efforts: the future or the present and past. |
| Indulgence versus Restraint | The gratification versus control of basic human desires related to enjoying life. |

Source: Adopted from Hofstede, 2011

Moreover, this model have been applied in a wide variety of studies because these variations show the important effect on individual's behaviour in the adoption process of innovation (Faqih & Jaradat, 2015; Zendehdel & Paim, 2015; Zhang *et al*., 2012; Hung *et al*., 2010; Srite & Karahanna, 2006). Individualism refers to the individual who emphasizes his or her own needs and act as individual rather than as a member of a group. Collectivism, on the other hand, is the degree to which people in a society are integrated into groups (Srite & Karahanna, 2006). The individual level cultural value orientation should be explored to have better understanding on the significant variations within cultures on behavioural aspects of technology adoption (Fang, 2012). Table 2.9 shows ten differences between collectivist and individualist societies.

Table 2.9
*Ten Differences Between Collectivist and Individualist Societies*

| Individualism | Collectivism |
|---|---|
| Everyone is supposed to take care of him or herself and his or her immediate family only | People are born into extended families or clans which protect them in exchange for loyalty |
| "I" -consciousness | "We" -consciousness |
| Right of privacy | Stress on belonging |
| Others classified as individuals | Others classified as in-group or out-group |
| Personal opinion expected: one person one vote | Opinions and votes predetermined by in-group |
| Transgression of norms leads to guilt feelings | Transgression of norms leads to shame feelings |
| Languages in which the word "I" is indispensable | Languages in which the word "I" is avoided |
| Purpose of education is learning how to learn | Purpose of education is learning how to do |
| Task prevails over relationship | Relationship prevails over task |

Source: Adopted from Hofstede, 2011



As such, the findings by Faqih and Jaradat (2015) have found the moderating effects of individual versus collectivism culture on the TAM3 variables at the individual level in m-commerce adoption. Similar findings are also found in previous studies by Zendehdel and Paim (2015), Zhang *et al*., (2012) and Hung *et al*., (2010). Hence, this findings shows that there are relationship between Hofstede's dimensions and individual level even though there are disagreements among scholars with regards to the extent to which this model can be used to conduct individual-level analysis since they were designed for national-level analysis. The list of past studies that used culture in e-commerce and m-commerce are shown in Table 2.10.

Table 2.10
*Past Studies Used Culture in E-Commerce and M-Commerce*

| Studies | Subjects | Technologies | Findings |
|---|---|---|---|
| Faqih and Jaradat (2015) | Students in Jordanian universities | Mobile commerce | This study shows that ICAIL negatively moderates the relationship between perceived ease of use and perceived usefulness, positive moderation of ICAIL on the relationship between perceived usefulness and behavioural intention, ICAIL has no moderation effect on the relationship between perceived ease of use and behavioural intention, ICAIL does not moderate the relationship between subjective norm and behavioural intention. |
| Zendehdel and Paim (2015) | Students in public and private universities in Selangor, Malaysia | Mobile Internet usage in Malaysia | The collectivism positively and significantly moderates the effects of social influence on the intention toward mobile internet services, the moderation effect of culture does not fit the factors of effort expectancy and performance expectancy |
| Zhang *et al*.(2012) | Meta -analysis | Mobile commerce | For the effect of culture, the correlation of subjective norm and behavioural intention show no significant, while the correlation for subjective norm to perceive usefulness and correlation of perceived usefulness and the perceived ease of use is significant |
| Hung *et al*. (*2010*) | Mobile commerce user from the cases of Taiwan and Malaysia | Mobile commerce | Reported that the IC cultural values play a key role in moderating the relationship between perceived usefulness and the perceived ease of use. |

Table 2.10 (Continued)

| Studies | Subjects | Technologies | Findings |
|---|---|---|---|
| Srite and Karahanna (2006) | Students in U.S university | acceptance of information technology | There are no moderating effect of IC values on the relationship between the subjective norm and intended behaviour |

There are numerous adoption studies which have discovered the cultural variations of individualism-collectivism among relationship between TAM, subjective norm and behavioural intention (Srite & Karahanna, 2006; Hung *et al*., 2010; Zhang *et al*., 2012; Faqih & Jaradat, 2015). However, only few studies applied integrated TAM3 and individualism-collectivism at individual-level as new moderating variable. As the result, the researcher will investigate the moderating role of individualism-collectivism at individual-level in the context of mobile commerce adoption in Malaysia. This study will applied the individual collectivism at individual level for collectivism than for individualism (ICAIL) because past studies had confirmed that individual who espouse collectivism cultures are more influence with the opinion of their referent group in the technology adoption studies (Srite & Karahanna, 2006; Faqih & Jaradat, 2015; Zendehdel & Paim 2015).

Due to the above review, it seems appropriate for this study to choose TAM3 model among other models based on three reasons. The comprehensiveness and its potential for actionable guidance to practitioners in developing new mechanism can encourage user to have positive behaviour towards adoption of the technology are vivid. Second, its unique process related to perceived ease of use and perceived usefulness by which the determinants of perceived ease of use will not influence perceived usefulness and vice versa. Last but not least, this study applies Hofstede's theory which focuses on

individualism-collectivism at individual-level as new moderating variable in mobile commerce adoption. Afterward, the next section will discussed on the constructs of the original TAM, the determinants for technology adoption and moderating variable that are used in this study.

## 2.5 The Constructs of The Original TAM

The perceived usefulness and perceived ease of use are important determinants of technology adoption in TAM model (Davis *et al*., 1989). Davis defines perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" whereas perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort". Generally, an individual is concern on how useful the technology and how easy it is to be used before they are motivated to try a new technology (Davis *et al*., 1989).



The individual will prefer to involve in the m-commerce operation if the process is easy to use (Wei *et al*., 2009). Further, studies by Davis *et al*., (1989) indicated that perceived ease of use influences perceived usefulness and intention to use influences actual system. Moreover, previous studies revealed that perceived ease of use and perceived usefulness have a significant impact on behavioural intention to adopt m-commerce (Venkatesh & Davis 2000; Huang *et al*., 2012; Al-Gahtani, 2016; Faqih & Jaradat. 2015). Additionally, perceived usefulness is significantly influences behavioural intention (Davis, *et al*., 1989; Mathieson, 1991; Mathieson *et al*., 2001; Venkatesh & Davis, 2000; Faqih & Jaradat, 2015, Chen *et al*., 2016).

In the context of mobile commerce, previous empirical studies showed that perceived ease of use has a positive influence in the adoption of mobile commerce (Khalifa & Shen, 2008; Kim & Garrison, 2009; Wei *et al*., 2009; Faqih & Jaradat, 2015; Chen *et al*., 2016). However, other researchers found perceived ease of use has indirect effect on perceived usefulness (Ventakesh & Davis, 2000; Wu & Wang, 2005). Findings from the previous studies show inconsistent results between perceived ease of use, perceived usefulness and behavioural intention. Therefore, this study attempts to examine these relationships with m-commerce in Malaysian context. The next section discusses the determinants for perceived usefulness, determinants for perceived ease of use, and the moderating variable: individualism- collectivism at the individual level (ICAIL).

## 2.6 Determinants for Perceived Usefulness

There are five determinants of perceived usefulness namely subjective norm, image, and output quality and result demonstrability.

### 2.6.1 Subjective Norm

Subjective norm shows direct determinants of behavioural intention in TRA (Fishbein & Ajzen, 1975) and TPB (Ajzen, 1991). In addition, subjective norm is a key theoretical underpinning of extensions to TAM such as TAM2 (Venkatesh & Davis 2000) and UTAUT (Venkatesh *et al*., 2003). TAM2 suggested that subjective norm is the medium of social individual process and defined as a "person's perception that most people who are important to him think he should or should not perform the behaviour" (Fishbein & Ajzen, 1975).

Previous study found that the relationship between subjective norm directly affects consumer's tendency of using tourist websites (Lin, 2005). Moreover, if the consumers believe their referents think they should use or adopt, hence they are motivated by the referent. In addition, studies relating to m-commerce reported that subjective norm also has a significant relationship with behavioural intention (Taylor & Todd, 1995; Kim *et al*., 2009; Wei *et al*., 2009, Jaradat & Rababaa, 2013, Jaradat & Faqih, 2015).

Nevertheless, Davis *et al*., (1989) and Mathieson (1991) found that subjective norm had no significant on intention over and above perceived ease of use and perceived usefulness in their empirical comparison of TAM and TRA. In certain fields of study, subjective norm might have a significant and insignificant effects in the use of technology. Furthermore, Davis *et al*., (1989) suggested additional research should be conducted to examine the relationship subjective norm with usage behaviour (Davis *et al*., 1989). Therefore, the rationale of incorporating subjective norm into the revised model is to examine the relationship between subjective norm and perceived usefulness in mobile commerce adoption.

### 2.6.2 Image

According to Moore and Benbasat (2008), image is "the degree to which an individual perceives that use of an innovation will enhance his or her status in a social system". TAM2 theorizes that, through processes of internalization and identification, image will influence perceived usefulness (Ventakesh & Bala, 2008). TAM2 also proposes that subjective norm will positively influence image because if an individual responds

to social normative influences to perform the behaviour, it will enhance one's image in the social group (Ventakesh & Davis, 2000).

Previous empirical research found image positively influences the perception of information technologies adoption (Teo & Pok, 2003; Chan and Lu, 2004). Moreover, image has influences on the perceived usefulness to use m-commerce and subjective norm has influences affects image to use m-commerce (Faqih & Jaradat, 2015).

Ventakesh and Davis (2000) suggested that if the individual performing behavioursare consistent with group norms, this can gain support of entire group and enhance the group performance. Hence, productivity and job performance can be improved by using a system. Therefore, the researcher wants to examine the relationship between images and perceived usefulness and between subjective norm and image in mobile commerce adoption.



### 2.6.3 Output Quality

Output quality is part of the cognitive instrumental determinants of perceived usefulness in TAM2. User will judge how well the new system is capable of performing and completing their job goals (Ventakesh & Davis, 2000). As such, Ventakesh and Davis (2000) conducted a study on theoretical extension of Technology Acceptance Model (TAM) and usage intentions in social influence and cognitive instrumental process. The results revealed that the effects of cognitive instrumental process are consistent with TAM2. Moreover, the judgments about the system usefulness are affected by output quality which have greater importance to a system

job relevance. The perceptions of output quality are positive if the system delivers the highest output quality and gives high profitability in their tasks.

Previous studies found that the relationship between perceived output quality directly affects perceived usefulness (Davis *et al*., 1992; Ventakesh & Bala, 2008; Wu *et al*., 2011). Moreover, when users think through a system able contribute to the execution of tasks, thus they will be aware of an improvement in their work efficiency. Users will feel confident and satisfied using the system, leading them to perceive the system as useful (Lin, 2005). In this study, user will determine how well the system in mobile commerce is sufficient for their completion of daily tasks. Therefore, this study attempts to examine the relationship between output qualities and perceived usefulness in mobile commerce adoption.

### 2.6.4 Result Demonstrability

Result demonstrability refers to the tangibility of the results of using the innovation and it was found consistent with perceived usefulness (Venkatesh & Davis, 2000; Venkatesh & Bala, 2008). The technology will be readily adopted and accepted by the user if the system has high result demonstrability, more communicable, tangible, and observable (Moore & Benbasat, 1991). Nevertheless, an individual of the system will ignore the system usage if the result demonstrability of the system is low (Ventakesh & Davis, 2000).

Empirically, in some studies, the relationship between result demonstrability and perceived usefulness is consistent with the job characteristics model (Hackman & Oldham, 1976; Loher *et al*., 1985; Ventakesh & Bala, 2008; Wu *et al*., 2011; Al-

Gahtani, 2016). Furthermore, a study also found that the result demonstrability has a significant relationship with behavioural intention to use e-banking technology (Njuguna *et al*., 2012).

Nevertheless, previous research found the relationship between result demonstrability on determining the perceptions of usefulness in technology acceptance show mixed findings in various information technology studies (Moore & Benbasat, 1991; Chong & Chan, 2012). In certain fields of study, result demonstrability is important to capturing the individual's perception on technology because the result might or might not have influence on the users' perceptions of usefulness. Therefore, this study tries to examine the relationship between result demonstrability and perceived usefulness in mobile commerce adoption. The next section will explain the determinants of perceived ease of use such as self-efficacy, anxiety, perception of external control and playfulness.



## 2.7 Determinants of Perceives Ease of Use

Ventakesh (2000) indicated that individual will form early expectations of perceived ease of use based on four anchors in TAM3 which are computer self-efficacy, computer anxiety, perception of external variables and computer playfulness. Nowadays, information technology is important in business processes in terms of creating new needs and new products to fulfil the demands from customer. In this research, mobile technology excellence refers to the self-efficacy, anxiety, perception of external variables and playfulness towards mobile commerce adoption.

### 2.7.1 Self-efficacy

Computer self-efficacy is usually defined as "an individual's perceptions of his or her ability to use computers in the accomplishment of a task" (Compeau & Higgins, 1995). On the other hand, Wood and Bandura (1989) defined self-efficacy as the ability of individual to shape the motivation and perform courses of action that are needed in any situations. Several previous studies have examined the relationship between self-efficacy using varieties of computers behaviour (Burkhardt & Brass, 1990; Webster, & Martocchio, 1992). Furthermore, past studies found evidence of a relationship between adoption of high technology products (Hill *et al*., 1986) and innovation (Burkhardt & Brass, 1990). However, for those who have lack of confidence in their ability to use computer, they might have obstacles to execute computer-based task (Barbeite & Weiss, 2004).

As such, there are three distinct constructs of self-efficacy, namely, magnitude, strength and generalizability (Compeau & Higgins, 1995). The magnitude refers to the capability level of individual to complete the difficult computing task than those with lower perception of self-efficacy. Meanwhile, strength is the confidence level of individual regarding their ability to perform the particular task successfully. Finally, generalizability is for those who have high computer self-efficacy and have the expertise to use a variety of different software packages, but those with low computer self-efficacy have limited capabilities to use different computer systems.

To illuminate the relationship between self-efficacy and confidence level, a study by Karsten and Roth (1998) among students in introductory Information System courses suggest that computer self-efficacy measure provided better understanding into

course-related factors of practical concern to Information System educators. They concluded that computer self-efficacy measures is practical in gauging the students' performance in the introductory Information System course. Another study that was conducted to investigate the impact of perceived usefulness, perceived ease of use and computer self-efficacy towards continuous intention to use e-Government websites by using the TAM model. The findings revealed that perceived usefulness, perceived ease of use and computer self-efficacy has significant relationship with continuance intention to use e-Government websites (Wangpipatwong *et al*., 2008).

Nevertheless, computer self-efficacy does not have significant influence on learning outcomes (Hayashi *et al*., 2004) .Thus, the study further recommends more work to be done on self-efficacy in different scope. Therefore, in this study, the researcher wants to examine the relationship between self-efficacy and perceive ease of use in mobile commerce adoption.



### 2.7.2 Anxiety

There are many definition with regards to anxiety in the context of technology. Most of the scholars agree on the definition of anxiety as an individual who lacks confidence and fearful to use the technology or computer (Ventakesh, 2000). Bandura (1997) indicate that there are four foundations of information in self-efficacy belief namely previous experiences, observation of other's experiences, verbal persuasion, and affective arousal. Based from self-efficacy framework, computer anxiety directly affects computer self-efficacy. In addition, individual having high computer anxiety will affect their performance in using computers (Barbeite & Weiss, 2004).

Many researchers found a direct relationship between computer anxiety and computer self-efficacy towards performance. Among them are Woodrow (1991), Ying and Kinzie (2000), Sam *et al*., (2005). Their findings suggest that anxiety have direct relationship on self-efficacy beliefs. For instance, Woodrow (1991) points out that students' attitudes towards computers in computer courses is critical issues, and it should be improved by monitoring them and developing continuous process in learning and teaching to these students.

In the same context, Sam *et al*., (2005) who examined undergraduates' computer anxiety, computer self-efficacy and attitudes toward the Internet found that the respondents have moderate computer anxiety, high computer self-efficacy and medium attitude towards the Internet especially for educational task such as e-mail communications. Most consumers subscribe the Internet in their mobile phone and this makes information easy to learn and access anywhere and anytime. Therefore, in this study, the researcher wants to examine the relationship between anxiety and perceived ease of use in mobile commerce adoption.

### 2.7.3 Playfulness

Webster and Martocchio (1992) defines computer playfulness as spontaneous action in executing task through computer. This view is consistent with previous literature that argue the system-specific traits in playfulness might change due to the individual experience using technology and that the individual level of playfulness is also different from others (Hackbarth *et al*., 2003; Yager *et al*., 1997). The level of playfulness is low especially for the first time users because they do not feel comfortable to use computer hence, face obstacle to operate the system.

The degree of computer experience is important to increase the level of playfulness with the computer system among the students (Webster & Martocchio, 1992). Consumer prefers entertainment such as downloading online games which give them satisfaction and create the imagination when using the computer system. With the advancement of entertainment accessible through the mobile devices, mobile phones are more attractive to users because they can use it regardless of the location and time. Therefore, in this study, the researcher wants to examine the relationship between playfulness and perceived ease of use in mobile commerce adoption.

### 2.7.4 Perception of External Control

External control relates to the resources that are needed to use a specific system such as downloading and implementing software on the smartphone, and support staff from mobile operators to help users overcome any technological barriers (Venkatesh, 2000). Perception of external control is the "degree to which an individual believes that organizational and technical resources exist to support the use of the system" (Ventakesh *et al*., 2003). This definition covers construct of perceived behavioural control (planned behaviour theory and decomposed planned behaviour theory), facilitating conditions and innovation diffusion theory (Davis *et al*., 1989; Ventakesh & Davis, 2000; Ventakesh *et al*., 2003). Moreover, theory planned behaviour proposes a direct effect of behavioural control on people's intention to display a specific behaviour to use a new technology, like a smartphone or advanced mobile service (Ajzen, 1991).

Previous empirical research found perceptions of external control significantly influenced perceived ease of use (Ventakesh & Bala, 2008; Al-Gahtani, 2016). In

addition, Ghalandari (2012) suggested that perceptions of external control have significant and positive effect of social influence on user's behavioural intention to use e-banking services. Furthermore, with the existence of resources such as the Internet widely available, this motivates user to apply the new technology. This research assumes that external resources are needed by the users to overcome their difficulties in using the system in mobile commerce. Therefore, in this study, the researcher wants to examine the relationship between perceptions of external control and perceived ease of use in mobile commerce adoption. The last section explains the moderating variable namely, individualism- collectivism at the individual level (ICAIL).

## 2.8 Moderating Variable: Individualism-collectivism at Individual Level (ICAIL)

This section discusses previous literature relating to individualism- collectivism at the individual level (ICAIL). Individualism-collectivism refers to the individual needs that are different to the group by which an individual prefers to act as an individual rather than as a member of a group (Srite & Karahanna, 2006). Prior studies indicate that Hofstede's theory is used in various journals and there exist substantial variations in cultural value at individual level (Faqih & Jaradat, 2015; Zhang *et al*., 2012; Hung *et al*., 2010; Srite & Karahanna, 2006. In the context of m-commerce, ICAIL is an important factor to influence the consumers' perceptions and intentions (Van Slyke *et al*., 2005; Sun & Zhang, 2006; Van Slyke *et al*., 2010).

Previous study by Faqih and Jaradat (2015), reported ICAIL moderates the relationship between perceived ease of use and perceived usefulness and also the relationship between perceived usefulness and behavioural intention. However, ICAIL has no

moderation effect on the two relationship which are (perceived ease of use and behavioural intention), and (subjective norm and behavioural intention). In contrast, findings from study in Malaysia indicate that the collectivism positively and significantly moderates the effects of social influence on the intention toward mobile internet services. Nevertheless, there are no moderation effect of culture on the effort expectancy and performance expectancy (Zendehdel & Paim, 2015). Based on the above discussion, there are inconsistent findings and additional study need to be done to confirming the results in context of m-commerce.

## 2.9 Chapter Summary

This chapter has provided an overview of the previous studies focusing on the development of m-commerce, comparison between m-commerce and e-commerce and underlying theories in the area of technology adoption. It presents the study's intention to determine the effect of perceived usefulness determinants (subjective norm, image, output quality, result demonstrability) and perceived ease of use determinants (self-efficacy, anxiety, playfulness and perception of external control) on the mobile commerce adoption using TAM3 model.

Besides that, this study will use individualism- collectivism at individual level (ICAIL) as a moderating variable to determine the relationship with other determinants. This variable has been extensively examined in studies conducted in the western cultures. However, in the developing country such as Malaysia, there are less attention has been paid to investigate the (ICAIL) as a moderating variable on the adoption of m-commerce.

In the light of the arguments presented in this chapter, the research is highly timely in Malaysia in order to understand the moderating impact of culture values on m-commerce adoption among university students. This young generation are more exposed to technology than other users and they have dissimilar level in terms of their purchasing power because of differences in locations and background. In fact, this study fills a knowledge on how cultural values at individual-level can influence individual behaviours toward adoption of m-commerce.

This research is hoped to contribute to the advancement of knowledge for marketers of mobile commerce companies. It has some potentials in shedding some light in the various key factors that might affect the behaviour intention of mobile commerce users and make improvement on the application of m-commerce in Malaysia. Lastly, the suggestion from the current research will also help financial services to attract customers to adopt m-commerce technology and have better understanding to cater the challenges in m-commerce adoption among youth in Malaysia. The next section discusses the research model, development of the hypotheses derived from the theoretical framework and the research methodology.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

The objective of this chapter is to present the theoretical framework, research model, and the hypotheses development. In particular, it tries to illuminate the potential relationships between the key elements in this study by drawing upon the theoretical framework and model discussed in the previous chapter. This chapter also describes the research design and the procedures adopted to navigate the research process. This includes the explanation about the instrument development, population and sampling, methods of data collection and data analysis. Then, to provide a bigger picture of the analysis employed, this chapter discusses the Structural Equation Modelling (SEM) before justifying its use.



Table 3.1
*Relationship Among Key Elements in The Study*

| | Research Question | Research Objective | Validation |
|---|---|---|---|
| 1 | To what extent does the perceived usefulness and perceived ease of use determines mobile commerce adoption among university students in Malaysia? | To measure the effect of perceived usefulness and perceived ease of use towards mobile commerce adoption among university students in Malaysia. | Path Coefficient |
| 2 | Does the Individual-Collectivism at Individual Level (ICAIL) moderate the relationship between these variables among university students in Malaysia?<br>a) perceived usefulness and behavioural intention | To examine the moderating role of the Individual-Collectivism at Individual Level (ICAIL) on the relationship between these variables among university students in Malaysia.<br>a) perceived usefulness and behavioural intention | Path coefficient |

Table 3.1 (Continued)

| Research Question | Research Objective | Validation |
|---|---|---|
| b) perceived ease of use and behavioural intention<br>c) perceived usefulness and perceived ease of use<br>d) subjective norm and behavioural intention | b) perceived ease of use and behavioural intention<br>c) perceived usefulness and perceived ease of use<br>d) subjective norm and behavioural intention | Path coefficient |

## 3.2 Research Theoretical Framework

Theoretical framework is defined as "beliefs on how certain variables or concepts are related to each model and the relationship between variables" (Sekaran & Bougie, 2009). There are three important aspects of a good theoretical framework, which are, a clearly-defined phenomena (or variables), a clearly-explained relationships between the variables and clear explanations on why the expected relationships exist (Sekaran & Bougie, 2009).



The research theoretical framework for this study is based on TAM. Generally, TAM is suitable to explain behavioural intention in various information technology and information system studies. In addition, TAM has been applied in numerous fields in technology acceptance and has strong support with other variables. Nevertheless, although TAM is practical in explaining intention, extensions are needed to further examine behavioural intention towards m-commerce usage. The two constructs, perceived usefulness and perceived ease of use are insufficient to explain behavioural intention. Therefore, after conducting a comprehensive literature review as presented in chapter two, TAM needs to be integrated with other determinants as to shed lights on the relationship between variables in questions of this study. Thus, the proposed theoretical framework is shown in Figure 3.1.

In the theoretical framework (Figure 3.1), the research model in this study is adapted from TAM3 model. This study uses an integrated model of TAM3 which combined TAM and TAM2. Subjective norm and image represent the social influence process in TAM2. In the extended model of TAM3, the determinants of perceived usefulness are output quality and result demonstrability. On the other hand, the determinants of perceived ease of use are self-efficacy, anxiety, playfulness and perception of external control.

### 3.3 Research Model

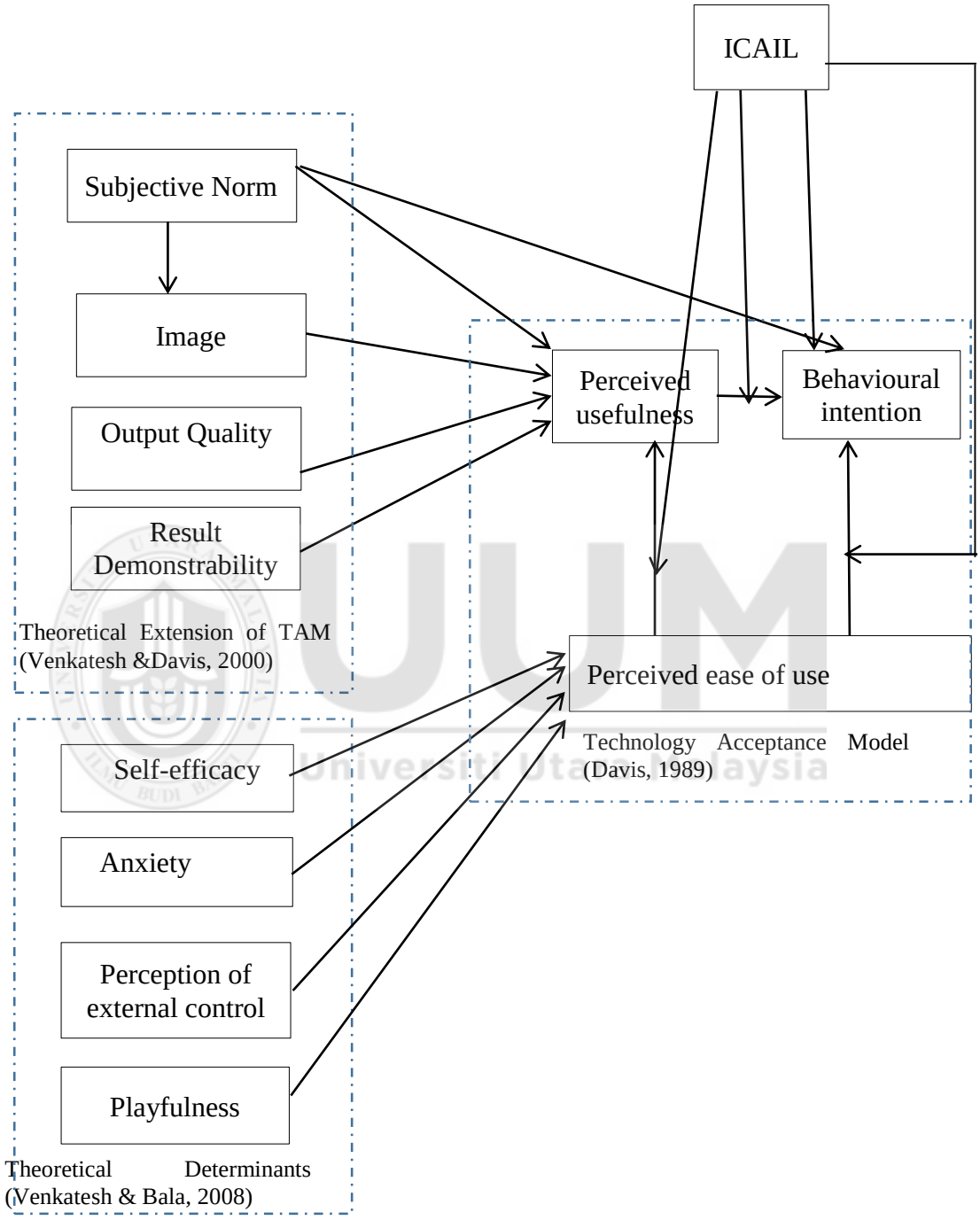



Figure 3.1
*Theoretical Framework*

Nevertheless, in this study, two factors under adjustment in TAM3 namely perceived enjoyment and objective usability were dropped because this study focuses on early adoption among university students in Malaysia. On the other hand, job relevance construct was dropped since this study focuses on undergraduate students as it has basically no influence on the background of the study sample. In addition, experience and voluntariness were dropped because they have no role in moderating with the hypothesized relationship in this model. In this study, the researcher adds new moderating variable namely individualism-collectivism at individual-level (ICAIL) in the research model. The ICAIL variable will moderate three relationships between perceived ease of use and perceived usefulness, perceived usefulness and behavioural intention, perceived ease of use and behavioural intention, and subjective norm and behavioural intention.

Furthermore, the theoretical framework uses the structural equation modelling approach by which the variables will be categorized into exogenous and endogenous (Baron & Kenny, 1986). Hence, Figure 3.2, illustrated the relationships pertaining to the independent and dependent variables and also the moderating effects. According to Muhamad (2008), endogenous variables can influence by other variables, while exogenous variables are not influenced by other variables. In this study, behavioural intention, perceived usefulness, perceived ease of use and image are considered as endogenous variables while others variable considered as exogenous variables.

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### 3.4 Research Hypothesis

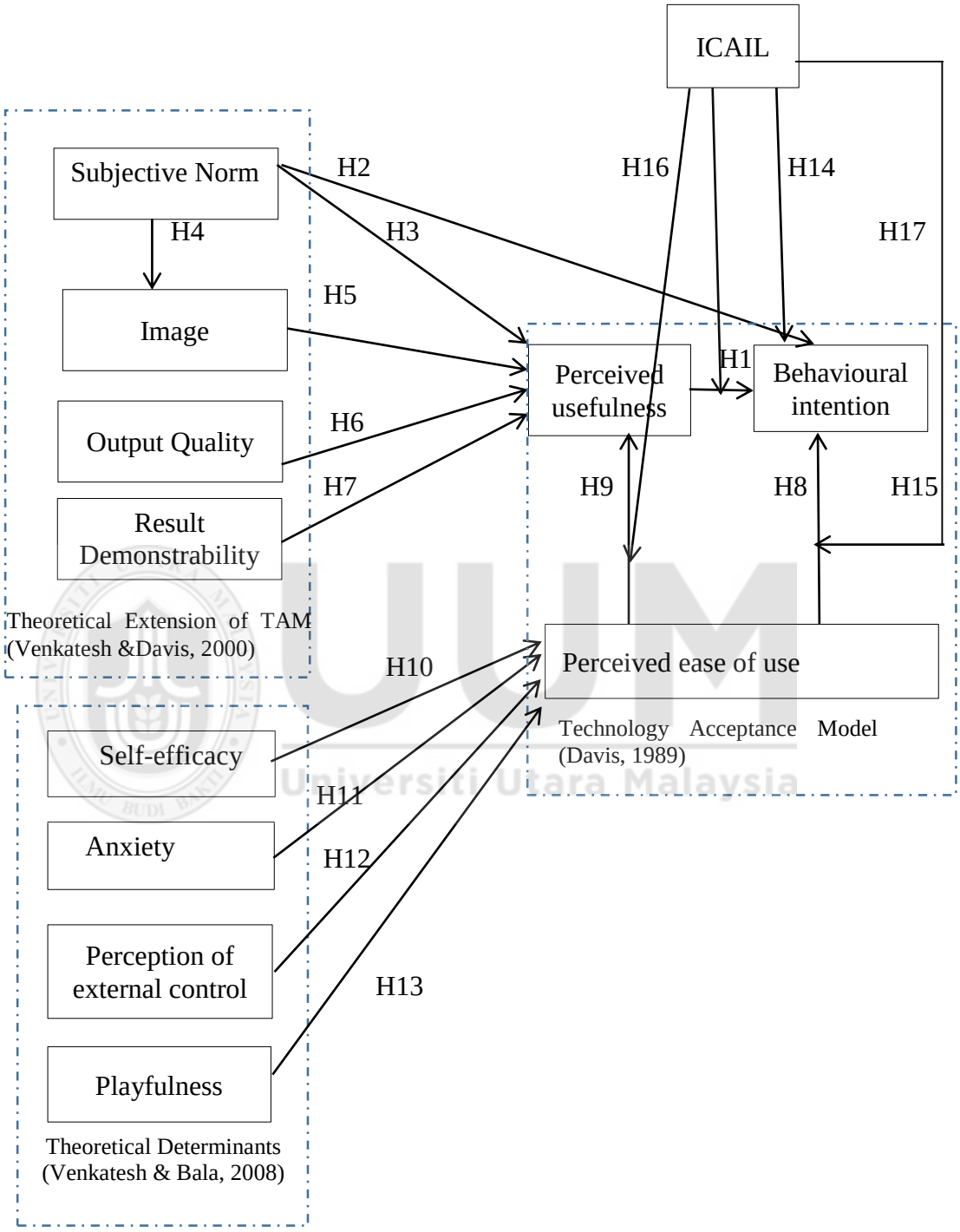


Figure 3.2
*Model of the study*

The hypothesis is defined as a "logical conjectured relationship between two or more variables expressed in the form of a testable statement" (Sekaran, 2003). Hypothesis testing can explain the nature of the relationship between two variables or comparing two groups' terms such as positive and negative. In this section, formulation of the main hypotheses for this research is presented. The following sections discuss in detail the hypotheses developed for the present study.

### 3.4.1 Constructs of The Original TAM

Previous studies indicated that perceived usefulness influence the intention of potential Internet shoppers (Davis *et al*., 1989; Mathieson, 1991; Venkatesh & Davis 2000; Mathieson *et al*., 2001; Horton *et al*., 2001; Koufaris, 2002; Faqih & Jaradat, 2015). For example, Horton *et al*., (2001) asserted the existence of a positive influence of perceived usefulness, on intention to use the Intranet media. Additionally, perceived usefulness has significant positive influence on behavioural intention (Davis *et al*., 1989; Mathieson, 1991; Mathieson *et al*., 2001; Venkatesh & Davis 2000; Faqih & Jaradat. 2015).

In the context of mobile commerce, previous empirical studies revealed that perceived ease of use has a positive influence on the adoption of mobile commerce (Khalifa & Shen, 2008; Kim & Garrison, 2009; Wei *et al*., 2009; Faqih & Jaradat. 2015). On the other hand, researchers found that perceived ease of use has an indirect effect on perceived usefulness (Ventakesh & Davis, 2000; Wu & Wang, 2004). However, other researchers found that the direct positive effect of ease of use on usefulness is consistent with effects found in other studies related to mobile marketing and mobile

payment (Kim *et al*., 2010; Gao *et al*., 2012). Therefore, this research proposes the following hypotheses:

H1**:** Perceived usefulness has a positive effect on the behavioural Intention to use M-commerce among university students in Malaysia.

H8: Perceived ease of use has a positive influence on the behavioural intention to use M-commerce among university students in Malaysia.

H9: Perceived ease of use has a positive influence on the perceived usefulness to use M-commerce among university students in Malaysia.

### 3.4.2 The Influence of Subjective Norm

Subjective norm can be defined as an individual perception that people who are close to him think he should or should not perform the behaviour (Fishbein & Ajzen, 1975). Subjective norm is an important factor that shows direct determinants of behavioural intention for TRA (Fishbein & Ajzen, 1975), TPB (Ajzen, 1991), TAM2 (Venkatesh & Davis 2000) and UTAUT (Venkatesh *et al*. 2003). Besides that, previous studies reported that subjective norm also has a significant relationship with the behavioural intention (Taylor & Todd, 1995; Kim *et al*., 2009; Wei *et al*., 2009, Al-Louzi & Iss, 2011; Jaradat & Rababaa, 2013, Jaradat & Faqih, 2015).

Nevertheless, in their empirical comparison between TAM and TRA, Davis *et al*., (1989) and Mathieson (1991) found that subjective norm has no significant influence on intention and perceived usefulness. Empirical studies also indicate that subjective norm has a positive influence on the image to use technology (Ventakesh & Davis, 2000; Faqih & Jaradat, 2015). Thus, in the present study, the researcher argues that

subjective norm influences others to execute the same behaviour. Therefore, this research proposes the following hypotheses:

H2: Subjective norm positively influences the behavioural intention to use M-commerce among university students in Malaysia.

H3: Subjective norm positively influences the perceived usefulness to use M-commerce among university students in Malaysia.

H4: Subjective norm positively influences the image to use M-commerce among university students in Malaysia.

### 3.4.3 The Influence of Image

In TAM2, Ventakesh and Bala (2008) theorize theorize that through processes of internalization and identification, image will positively influence perceived usefulness. The image is the level of individual using the technology innovation which improves his or her status in a social group (Moore & Benbasat, 1991). Empirical research consistently reported that image positively affects the perceived usefulness of information technologies adoption (Teo & Pok, 2003; Chan & Lu, 2004; Faqih & Jaradat, 2015).

Venkatesh and Davis (2000), however, found that social constructs such as subjective norm, social factors and image are not significant when the systems used is optional. Therefore, further study is needed to clarify the effects of image on mobile commerce. In this study, the researcher argues that if the individual's performed behaviours are consistent with the group norms, thus the group will give support to the individual to

enhance the group performance. Therefore, this research proposes the following hypothesis:

H5: Image has a positive influence on the perceived usefulness to use M-commerce among university students in Malaysia.

### 3.4.4 The Influence of Output Quality

Usually, an individual will judge how well the new system is capable of performing and completing their job goals (Ventakesh & Davis, 2000). Output quality will explain significant variance in perceived usefulness over and above job relevance because a different underlying judgmental process is involved (Ventakesh & Davis, 2000). Previous studies found that the perceived output quality directly affects perceived usefulness (Davis *et al*., 1992; Ventakesh & Bala, 2008; Faqih & Jaradat, 2015).

Meanwhile, study by Namahoot and Laohavichien (2015) demonstrated that system quality and service quality play a central role in influencing the degree of trust that the consumers have in using internet banking. However, they suggested that information quality shows negative influence on the use of online banking service. Hence, if the multiple relevant systems are given, an individual would chose a system that delivers the highest output quality. Therefore, this research proposes the following hypothesis:
H6: Output quality positively influences the perceived usefulness of M-commerce among university students in Malaysia.

### 3.4.5 The Influence of Result Demonstrability

TAM2 defines the result demonstrability as the 'tangibility of the results of using the innovation' and will directly influence perceived usefulness (Moore & Benbasat, 1991). This indicates that if positive results are readily discernable, thus individual will show positive perceptions of the usefulness of a system. However, if the result demonstrability shows that the system performance is low, individual of the system will ignore the system usage (Ventakesh & Davis, 2000).

Empirically, the relationship between result demonstrability and perceived usefulness is consistent with the job characteristics model. The relationship is found to have enhanced the knowledge through the actual results of work activities (Hackman & Oldham, 1976; Loher *et al*., 1985; Ventakesh & Bala, 2008; Al-Gahtani, 2016). However, recent study found that although result demonstrability does not support perceived usefulness, it has a positive relationship with behavioural intentions to use m-payment (Faqih & Jaradat, 2015). Therefore, this research argues that if the result demonstrability is positive, it will motivate the user of the system to produce effective jobs. Therefore, this research proposes the following hypothesis:

H7: Result demonstrability positively influences the perceived usefulness of M-commerce among university students in Malaysia.

### 3.4.6 The Influence of Self-Efficacy

Computer self-efficacy refers to the level of individual believes whether he or she has the capability to perform a particular function using the computer (Compeau & Higgins, 1995a, b). In TAM3, Venkatesh and Davis (2000) found that individual

computer self-efficacy is a strong determinant of perceived ease of use. In the context of mobile commerce, self-efficacy is the judgment of one's ability, knowledge, or skills to use mobile commerce. Previous studies found that self-efficacy has a positive influence on perceived ease of use of a technology (Venkatesh & Davis, 1996; Venkatesh, 2000; Agarwal *et al*., 2000; Faqih & Jaradat. 2015), and mobile services (Luarn & Lin, 2005; Wang *et al*., 2006).

High self-efficacy individuals work harder and longer than low self-efficacy individuals (Wood & Bandura, 1989). However, in the context of e-learning system, a study done by Hayashi *et al*., (2004) found that computer self-efficacy does not have a significant influence on learning outcomes in the continuing usage of the system. Thus, further studies need to look at self-efficacy from a different perspective to determine individual's ability in performing any actions that are necessary in any situations (Wood & Bandura, 1989). Therefore, this research proposes the following hypothesis:



H10: Self-efficacy positively influences perceived ease of use of M-commerce among university students in Malaysia.

### 3.4.7 The Influence of Anxiety

Venkatesh (2000) defines computer anxiety as "an individual's apprehension, or even fear when she/he is faced with the possibility of using computers". Individuals with low computer self-efficacy will likely have a higher level of computer anxiety than individuals with higher computer self-efficacy. Previous studies consistently reported

that computer anxiety is negatively significant to perceived ease of use (Brown, 2002; Ventakesh, 2008; Saadé & Kira, 2009; Al-Gahtani, 2016).

On the other hand, Faqih and Jaradat (2015) who studied respondents' interaction with the mobile phones, found that anxiety is negative when users are comfortable using the mobile phones, thus is not significant to perceived ease of use. Sam *et al*., (2005) also observed that the undergraduate students have moderate computer anxiety, high computer self-efficacy and medium attitude towards the Internet especially for educational tasks such as e-mail communications. Their study found that although individuals used the Internet frequently, they continued to be uncomfortable and the levels of computer anxiety among the undergraduates remain unchanged. Thus, in the present study, the researcher argues that users who have less prior experience with computers or mobile phone will consider computer anxiety as significant. Therefore, this research proposes the following hypothesis:



H11: Anxiety negatively influences perceived ease of use of M-commerce among university students in Malaysia.

### 3.4.8 The Influence of Perceptions of External Control

Perceptions of external control relate to the resources that are needed by users to enable the use of a specific system. These are downloading and implementing software on the smartphone, and availability of the support staff from mobile operators to help users overcome any technological barriers (Venkatesh, 2000; Teo & Pok, 2003). Previous empirical research reported that perceptions of external control have a relationship with perceived ease of use (Monzavi *et al*., 2013; Faqih & Jaradat, 2015). For example,

Monzavi *et al*., (2013) have examined the perception of external factors on beliefs about perceived ease of use and perceived usefulness by categorising the external factor into four categories which are organizational, social, individual and technological factors. They, nevertheless, found that individual factors were significant predictors of perceived ease of use, while the organizational, social, technological factors show an indirect effect in user beliefs on the easiness of using the system. Hence, further research needs to be done to examine the effect of other predictors on users' beliefs toward IT adoption. Therefore, this research proposes the following hypothesis:

H12: Perceptions of external Control positively influences perceived ease of use of M-commerce among university students in Malaysia.

### 3.4.9 The Influence of Playfulness

The final anchor that affects an individual's perceived ease of use is computer playfulness. Ventakesh (2000) suggests that computer playfulness is independent of the system and differs for each individual. Previous studies consistently reported that system-specific traits in playfulness changes depending on the individual's level of playfulness (Yager *et al*., 1997; Hackbarth *et al*., 2003). The more playful an individual towards computers, the more likely they will experiment with new systems, hence, have more positive perceived ease of use (Ventakesh, 2000; Ventakesh, 2008; Al-Gahtani, 2016).

In contrast, the empirical study draws an opposite conclusion in which it reported a weaker relationship between perceived playfulness and actual use; and also perceived

playfulness and perceived ease of use (Atkinson & Kydd, 1997; Faqih & Jaradat, 2015). Hence, more empirical studies are needed to validate this argument.Therefore, this research proposes the following hypothesis:

H13: Playfulness positively influences perceived ease of use of M-commerce among university students in Malaysia.

### 3.4.10 The Influence of ICAIL

Srite and Karahanna (2006) define individualism-collectivism as individual who prefers to act as an individual rather than as a member of a group. In the context of M-commerce, ICAIL is an important factor to influence the consumers' perceptions and intentions (Van Slyke *et al*., 2005; Sun & Zhang, 2006; Van Slyke *et al*., 2010).

In Faqih and Jaradat's study (2015), they reported that ICAIL shows positive moderation between perceived usefulness and behavioural intention, while it negatively moderates the relationship between perceived ease of use and perceived usefulness. They also found that ICAIL does not moderate the relationship between subjective norm and behaviour intention, and, of that between perceived ease of use and behavioural intention. While Yoon (2009) in his study on the e-commerce in China, argues that the individual collectivism have no significant effect on the original TAM relationships on intention to use. Therefore, this research proposes the following hypothesis:

H14: The relationship between perceived usefulness and behavioural intention to use M-commerce among university students in Malaysia is positively moderated by individualism-collectivism at individual-level for collectivism than for individualism.

H15: The relationship between perceived ease of use and behavioural intention to use M-commerce among university students in Malaysia is positively moderated by individualism-collectivism at individual-level for collectivism than for individualism.

H16: The relationship between perceived ease of use and perceived usefulness to use M-commerce among university students in Malaysia is positively moderated by the individualism-collectivism at individual-level for collectivism than for individualism.

H17: The relationship between subjective norm and behavioural intention to use M-commerce among university students in Malaysia is positively moderated by individualism-collectivism at individual-level for collectivism than for individualism.

### 3.5 Summary of Hypotheses

The hypotheses have been developed based on the research model derived from literature review. The following is a list of hypotheses that were tested empirically to validate the proposed research model as presented in Table 3.2.

Table 3.2
*Research Hypotheses List*

| No | Hypotheses |
|---|---|
| H1 | Perceived usefulness has a positive effect on the behavioural Intention to use M-commerce among university students in Malaysia. |
| H2 | Subjective norm positively influences the behavioural intention to use M-commerce among university students in Malaysia. |
| H3 | Subjective norm positively influences the perceived usefulness to use M-commerce among university students in Malaysia. |
| H4 | Subjective norm positively influences the image to use M-commerce among university students in Malaysia. |
| H5 | Image has a positive influence on the perceived usefulness to use M-commerce among university students in Malaysia. |
| H6 | Output quality positively influences the perceived usefulness of M-commerce among university students in Malaysia. |
| H7 | Result demonstrability positively influences the perceived usefulness of M-commerce among university students in Malaysia. |
| H8 | Perceived ease of use has a positive influence on the behavioural intention to use M-commerce among university students in Malaysia. |
| H9 | Perceived ease of use has a positive influence on the perceived usefulness to use M-commerce among university students in Malaysia. |
| H10 | Self-efficacy positively influences perceived ease of use of M-commerce among university students in Malaysia. |
| H11 | Anxiety negatively influences perceived ease of use of M-commerce among university students in Malaysia. |
| H12 | Perceptions of external Control positively influences perceived ease of use of M-commerce among university students in Malaysia. |
| H13 | Playfulness positively influences perceived ease of use of M-commerce among university students in Malaysia. |
| H14 | The relationship between perceived usefulness and behavioural intention to use M-commerce among university students in Malaysia is positively moderated by individualism-collectivism at individual-level for collectivism than for individualism. |
| H15 | The relationship between perceived ease of use and behavioural intention to use M-commerce among university students in Malaysia is positively moderated by individualism-collectivism at individual-level for collectivism than for individualism. |

Table 3.2 (Continued)

| No | Hypotheses |
|---|---|
| H16 | The relationship between perceived ease of use and perceived usefulness to use M-commerce among university students in Malaysia is positively moderated by the individualism-collectivism at individual-level for collectivism than for individualism. |
| H17 | The relationship between subjective norm and behavioural intention to use M-commerce among university students in Malaysia is positively moderated by individualism-collectivism at individual-level for collectivism than for individualism. |

## 3.6 Research Design and Procedures

Research design refers to a series of strategic choices to address the research problem and achieve the research objectives. These choices explain the design of the questionnaire, data collection methods, scaling procedures, choice of the sample size and the data analysis. Due to the nature of the study that intends to collect large data at a point of time, a quantitative research using cross-sectional data collection, is appropriate as it is economical, efficient and can easily be administered to a reasonably large sample (Sekaran, 2003). This kind of approach purports on using a survey as an inexpensive and efficient method of gathering information from the large targeted population. Hence, quantitative approach was adopted in gaining deeper understanding of m-commerce adoption.

To reach a group of participants at a given time, a survey using self-administered questionnaires was adopted. This intention entails the need for a cross-sectional data collection method as mentioned above. The rationale of using cross-sectional research lies behind the following factors. First, this study focuses on the measurement of the variables based on individuals' perceptions of M-commerce. Secondly, this research is to measure the perceptions on user behavioural intention to use M-commerce. As

causal relationship becomes the major intention of the investigation, survey is the most appropriate method in this study whereby perceptions from large number of respondents can be gathered to enable the generalisation of findings (Sekaran, 2003). In the word of Isaac and Micheal (1990), they state that the purpose of a correlational study is to investigate the relationships to which, variations in one factor correspond with variations in one or more factors, based on the correlation coefficient. Thus a correlational study via survey fits the purpose of testing the hypotheses and the relationship between independent variables and dependent variable and to understand the phenomena of relationships among these existing variables.

### 3.7 Population of The Study

Population is defined by Sekaran (2000) as the entire group of people, events, or things that contain information a researcher needs to investigate. In this study, the targeted population is undergraduate university students in Malaysia. There are two reasons for choosing the university students as the sample. First, the younger generation use their mobile phone more frequently than the older generation (Sohn & Kim, 2008; Faqih & Jaradat, 2015). This age is easily influenced by technology changes and friends, compared to non-student or older people (Schepers & Wetzels, 2007). Second, these students have dissimilar level in terms of their purchasing power because of differences in locations and background (Faqih & Jaradat, 2015). Due to these reasons, university students' demography fulfils the representativeness image of this study.

In determining the selection of the universities, public universities were chosen because the number of students' enrolment is higher compared to private universities. Malaysia are divided by regions, namely Northern, Central, Southern and Eastern

regions in Peninsular Malaysia and Sabah & Sarawak in East Malaysia (Chee *et al.*, 1997). Accordingly, this study chose four selected regions namely Northern (Pulau Pinang), Central (Selangor), Southern (Johor) and Eastern (Terengganu). Students from these regions were chosen because they have similar characteristics and representative of the mobile commerce users from all major ethnicities. The population of students was proportionate according to the four universities in Peninsular Malaysia. The sample by zone in Peninsular Malaysia is presented in Table 4.2.

Table 3.3
*Sample by Zone in Peninsular Malaysia*

| Zone | Regions |
|---|---|
| Northern Region | Kedah, Perlis, Pulau Pinang, Perak |
| East Coast Region | Kelantan, Terengganu, Pahang |
| Central Region | Negeri Sembilan, Selangor Kuala Lumpur |
| Southern Region | Melaka, Johor |



## 3.8 Sample Size and Sampling Design

Sample is referred as a subset of a population (VanderStoep & Johnson, 2009). According to Krejcie and Morgan (1970), one of the statistical rules of thumb is that the sample size must represent the given population size. In addition, the sample size is determined by the target population.

In this study, the researcher chose four universities which are 'Universiti Sains Malaysia' (USM), 'Universiti Malaysia Terengganu' (UMT), 'Universiti Putra Malaysia' (UPM) and 'Universiti Teknologi Malaysia' (UTM). The highest number of students' enrolment in 2014 is taken in each zone. Noteworthy, Sabah and Sarawak States were not included. The regional factor of these two states implies careful consideration on time and budget of the study. As aforementioned, regardless of the

region in Malaysia, students' population in Public Higher Education Institutions (HEIs) of Sabah and Sarawak have similar characteristics usage on mobile commerce in terms of age, gender and level of education and level of income. Hence, the findings of the study can represent the mobile commerce users in Malaysia. The selected Universities for this study is presented in Table 4.3.

Table 3.4
*Selected Universities for This Study*

| Zone | University Name | Location | Number of Student Enrolment in 2014 |
|---|---|---|---|
| Northern Region | 'Universiti Sains Malaysia' | Penang | 30,847 |
| East Coast Region | 'Universiti Malaysia Terengganu' | Terengganu | 9,756 |
| Central Region | 'Universiti Kebangsaan Malaysia' | Selangor | 31,692 |
| Southern Region | 'Universiti Teknologi Malaysia' | Johor | 33,033 |
| Total | | | 105,328 |

Source: Ministry of Higher Education and Scientific Research, MOHE (2014)

According to Krejcie and Morgan (1970), if the total population is more than 100 000, the sample size should be 384 as shown in Table 3.5. Therefore, the targeted sample size for this study is 384 students as the sampling size (Krejcie & Morgan, 1970).

Table 3.5
*Sample Size Determined for Given Population Size*

| N= Population | S= Sample Size |
|---|---|
| 10 000 | 370 |
| 15 000 | 375 |
| 20 000 | 377 |
| 30 000 | 379 |
| 40 000 | 380 |
| 50 000 | 381 |
| 100 000 | 383 |
| 100 000> | 384 |

Source: Krejcie and Morgan, 1970

Based on the above discussion, 384 is a minimum number for the acceptable sample size to be technically completed and returned. However, previous studies recorded response rate for the students was between 80-90% (Faqih & Jaradat, 2015; Zendehdel & Paim, 2015). Generally, the large sample size is important to provide the researcher with necessary confidence with the collected data (Krejcie & Morgan, 1970; Sekaran & Bougie, 2009; Saunders *et al*., 2009). Furthermore, results derived from a large sample could be generalized to the whole population (Hair *et al*., 2006).

The number of questionnaires is presented in Table 3.6. In this sample, the probability sampling was calculated using the following formula: probability sampling of students = *NSP*NS/T* (*NSP* = Number of students in each University (USM, UMT, UKM, and UTM); *NS* = Number of questionnaires to be distributed; *T* = the total of the students in all universities)

Table 3.6
*The probability sampling of students for each faculty*

| University Name | Calculation | Number of Respondents in Each Faculty | Proportionate questionnaires to be distributed |
|---|---|---|---|
| 'Universiti Sains Malaysia' | (30,847/105 328)*800 | 234/5 | 46.8 rounded off to 47 |
| 'Universiti Malaysia Terengganu' | (9,756/105 328)*800 | 74/8 | 9.2 rounded off to 9 |
| 'Universiti Kebangsaan Malaysia' | (31,692/105 328)*800 | 241/12 | 20 |
| 'Universiti Teknologi Malaysia' | (33,033/105 328)*800 | 251/12 | 20.9 rounded off to 21 |

Source: (USM, UMT, UKM, UTM, 2014)

During the data collection phase, 799 questionnaires were distributed to students at the four universities. Based on the above discussion, 'Universiti Sains Malaysia' (USM) has 30,847 students or 29.29% out of the number of students in five Faculties and 47 questionnaires were distributed to each faculty. Meanwhile, 'Universiti Malaysia Terengganu' (UMT) has 9,756 students or 9.26% out of the number of students in 8 Faculties and 9 questionnaires were distributed to each faculty. For the 'Universiti Kebangsaan Malaysia' (UKM), 31,692 students or 30.09% out of the number of students in 12 Faculties and 20 questionnaires were distributed to each faculty. Finally, University of Technology Malaysia (UTM) has 33,033 students or 31.36% out of the number of students in 12 Faculties and 21 questionnaires were distributed to each faculty.

## 3.9 Unit of Analysis

Unit of analysis can be individual, groups, or organization (Sekaran, 2003). In this study, problem statement focuses on determinants towards the adoption of mobile

commerce among university students in Malaysia. Therefore, the unit of analysis used in this study is the individual.

### 3.10 Operationalization and Measurement of Variables Attempts

The dependent, independent and moderating variables under study were operationalized to look for appropriate validation. Moreover, measurements items and measurement scales can be obtained from analysis from past literature. Additionally, all variables were estimated through reflective measures which were adopted/adapted from Table 3.7.

Table 3.7
*Total of Scale Items Used in This Study*

| Variable | Number of items | Sources |
|---|---|---|
| Behavioural Intention | 4 items | Faqih & Jaradat (2015); Davis *et al*. (1989) |
| Subjective Norm | 4 items | Faqih & Jaradat (2015) |
| Image | 5 items | Faqih & Jaradat (2015); Teo , & Pok (2003) |
| Output Quality | 5 items | Faqih & Jaradat (2015); Hsu *et al*., (2012) |
| Result Demonstrability | 4 items | Faqih & Jaradat (2015) |
| Self-efficacy | 4 items | Faqih & Jaradat (2015) |
| Anxiety | 4 items | Faqih & Jaradat (2015) |
| Perception of external control | 4 items | Faqih & Jaradat (2015) |
| Playfulness | 4 items | Faqih & Jaradat (2015) |
| Perceived usefulness | 4 items | Faqih & Jaradat (2015) |
| Perceived ease of use | 4 items | Faqih & Jaradat (2015) |
| Individualism-collectivism at individual-level | 5 items | Faqih & Jaradat (2015) |

### 3.10.1 Behavioural Intention

The behavioural intention in this study is defined as the motivation of the sample to use mobile commerce transaction by intention or not, in their daily life. To measure behavioural intention variable, four items were adopted from Faqih and Jaradat (2015) and one item from Davis *et al*., (1989). The Cronbach's alpha value was 0.84 respectively. The items are measured by using a 7-point Likert scale. Table 4.6 shows the items that were used to measure the reliability. As such, Table 3.8 shows behavioural intention measured by the following items in this study.

Table 3.8
*Behavioural Intention Measures*

| Variable | Adopted/adapted Items |
|---|---|
| Behavioural Intention | 1. Assuming I had access to M-commerce, I intend to use it.<br>2. Given that I had access to M-commerce, I predict I would use it.<br>3. I plan to use the M-commerce in the next few months.<br>4. I believe my interest towards mobile commerce will increase in the future |



### 3.10.2 Subjective Norm

In this study, subjective norm refers to the external factors such as a friend, family that influences students in using mobile commerce. Additionally, subjective norm shows direct determinants of behavioural intention for TRA, TPB, TAM2, and UTAUT (Venkatesh *et al*., 2003). Subjective norm was measured with four items derived from Faqih and Jaradat (2015) with Cronbach's alpha values was 0.68 respectively. The items are measured by using a 7-point Likert scale. As such, Table 3.9 shows subjective norm measured by the following items in this study.

Table 3.9
*Subjective Norm Measures*

| Variable | Adopted/adapted Items |
|---|---|
| Subjective Norm | 1. People who influence my behaviour think that I should use M-commerce.<br>2. People who are important to me think that I should use M-commerce.<br>3. I think that university senior management will support the use of M-commerce.<br>4. In general, the university has supported the use of M-commerce. |

### 3.10.3 Image

In this study, image refers to the degree to which students perceived mobile commerce as a means to improve their status in university. In this study, image is measured by five items from Faqih and Jaradat (2015) and two items from Teo and Pok (2003). The Cronbach's alpha values are 0.83 and 0.82 respectively for the image. The items are measured by using a 7-point Likert scale (Table 3.10):



Table 3.10
*Image Measures*

| Variable | Adopted/adapted Items |
|---|---|
| Image | 1. Students in my university who use M-commerce have more prestige than those who do not.<br>2. Students in my university who use M-commerce have a high profile.<br>3. Using M-commerce makes me distinctive from others at the university.<br>4. Students in my university who use mobile commerce are IT savvy<br>5. Students in my university who use are trendy |

### 3.10.4 Output Quality

Meanwhile, output quality refers to the students' perceptions of how well the system in mobile commerce is capable of completing their tasks. In this study, output quality is measured by using five items from Faqih and Jaradat (2015) and two items from Hsu *et al*. (2012) with Cronbach's alpha values are 0.77 and 0.88 respectively. The items are measured by using the 7-point Likert scale. Table 3.11 shows output quality measured by the following items in this study.

Table 3.11
*Output quality Measures*

| Variable | Adopted/adapted Items |
|---|---|
| Output Quality | 1. The quality of the output I get from the M-commerce is high.<br>2. I have no problem with the quality of the M-commerce output.<br>3. I rate the results from M-commerce to be excellent.<br>4. Using m-commerce enables me to get on to it quickly.<br>5. M-commerce can be adapted to meet a variety of needs |



### 3.10.5 Result Demonstrability

It is hypothesized that students will have more positive feelings of the usefulness of mobile commerce if the system can demonstrate high favourable results. In this study, result demonstrability is measured using four items adapted from Faqih and Jaradat (2015) and with reported reliability at 0.77 on a 7-point Likert scale. Table 3.12 illustrates the result demonstrability measured by the following items:

Table 3.12
*Result Demonstrability Measures*

| Variable | Adopted/adapted Items |
|---|---|
| Result Demonstrability | 1. I have no difficulty telling others about the results of using the M-commerce.<br>2. I believe I could communicate to others the consequences of using the M-commerce.<br>3. The results of using the M-commerce are apparent to me.<br>4. I would have difficulty explaining why using the M-commerce may or may not be beneficial. |

### 3.10.6 Self-efficacy

In this study, self-efficacy refers to the student perceptions of their capabilities to use and deal with mobile commerce transactions. Self-efficacy is measured using four items adapted from Faqih and Jaradat (2015) a 7-point Likert scale. The Cronbach's alpha values were 0.81 respectively. The items are illustrated in Table 3.13.



Table 3.13
*Self-efficacy Measures*

| Variable | Adopted/adapted Items |
|---|---|
| Self-efficacy | 1. I would complete the job using M-commerce if there was no one around to tell me what to do as I go.<br>2. I would complete the job using M-commerce if I had just the built-in-help facility for assistance.<br>3. I would complete the job using M-commerce if someone showed me how to do it first.<br>4. I would complete the job using M-commerce if I had used similar application before this once to do the same job. |

### 3.10.7 Anxiety

Anxiety is defined as an act of fearful, lack of confident facing difficulties, and uncomfortable feeling using mobile commerce transactions. In this study, anxiety is

measured using four items adapted from Faqih and Jaradat (2015) on a 7-point Likert scale. The Cronbach's alpha values is 0.60. Table 3.14 shows items for anxiety.

Table 3.14
*Anxiety Measures*

| Variable | Adopted/adapted Items |
|---|---|
| Anxiety | 1. Using M-commerce does not scare me at all.<br>2. Working with M-commerce makes me nervous.<br>3. Using M-commerce makes me feel uncomfortable.<br>4. M-commerce makes me feel uneasy. |

### 3.10.8 Perception of External Control

External control relates to the specific system that students need in order to download the software such as 'Maybank MY' on their smartphones. Such system is used as a platform to do mobile commerce transaction. In this study, the perception of external control refers to the student's beliefs that the software is able to support the use of the system. Perception of external control is measured using four items adapted from Faqih and Jaradat (2015) on a 7-point Likert scale. The Cronbach's alpha value is 0.74. Table 3.15 depicts the items for perception of external control.



Table 3.15
*Perception of External Control Measures*

| Variable | Adopted/adapted Items |
|---|---|
| Perception of external control | 1. I have control over using the M-commerce.<br>2. I have resources necessary to use the M-commerce.<br>3. Given the resources, opportunities and knowledge it takes to use the system, it would be easy for me to use the M-commerce.<br>4. The M-commerce is not compatible with other systems I use. |

### 3.10.9 Playfulness

Presumably, the level of playfulness in mobile commerce is low for the first time users due to familiarization issue to using the system. However, if a user uses the system frequently, he/she would have the ability to be creative, hence able to create a higher level of imagination. Playfulness is measured using four items adapted from Faqih and Jaradat (2015) on a 7-point Likert scale. The Cronbach's alpha values is 0.60. Table 3.16 shows subjective norm measured by the following items in this study.

Table 3.16
*Playfulness Measures*

| Variable | Adopted/adapted Items |
|---|---|
| Playfulness | 1. I am spontaneous when using the M-commerce.<br>2. I am creative when using the M-commerce.<br>3. I am playful when using the M-commerce.<br>4. I am unoriginal when using the M-commerce. |



### 3.10.10 Perceived Usefulness

Perceived usefulness refers to the degree to which the student believes that using the mobile commerce would improve their job performance and productivity. In this study, perceived usefulness is operationalized under four items adapted from Faqih and Jaradat (2015) and measured on a 7-point Likert scale. The Cronbach's alpha values is 0.85. Table 3.17 illustrates the subjective norm items.

Table 3.17
*Perceived Usefulness Measures*

| Variable | Adopted/adapted Items |
|---|---|
| Perceived usefulness | 1. Using the M-commerce improves my performance in my job.<br>2. Using the M-commerce in my job increases my productivity.<br>3. Using the M-commerce enhances my effectiveness in my job.<br>4. Using M-commerce is useful to make my purchasing quickly. |

### 3.10.11 Perceived Ease of Use

The student believes that using mobile commerce would be free form effort hence, dealing with any transactions would be easy. Hence, perceived ease of use is measured by four items derived from Faqih and Jaradat (2015) by using a 7-point Likert scale, with Cronbach's alpha value is 0.84. Table 3.18 depicts the subjective norm items.

Table 3.18
*Perceived ease of use Measures*

| Variable | Adopted/adapted Items |
|---|---|
| Perceived ease of use | 1. My interaction with the M-commerce is clear and understandable.<br>2. Interacting with the M-commerce does not require a lot of my mental effort.<br>3. I find the M-commerce easy to use.<br>4. I find it easy to get the M-commerce in dealing any transactions. |

### 3.10.12 Individualism-collectivism at Individual-level (ICAIL)

Individualism-collectivism refers to an individual's need which is different from the needs of a group. An individual may prefer to act as an individual, or as a member of a group (Srite & Karahanna, 2006). However, for individuals with low characteristic, they will face difficulties in dealing with mobile commerce transactions. In this study, individualism-collectivism at the individual-level is measured with four items from Faqih and Jaradat (2015) on a 7-point Likert scale. The Cronbach's alpha value is above 0.70. Table 3.19 shows the items for measuring subjective norm in the study.

Table 3.19
*Individualism-collectivism at Individual-level Measures*

| Variable | Adopted/adapted Items |
|---|---|
| Individualism-collectivism at individual-level | 1. Individual rewards are not as important as group welfare.<br>2. Group success is more important than individual success.<br>3. Being accepted as a member of a group is more important than having autonomy and independence on the job.<br>4. It is more important for a group to encourage loyalty and a sense of duty as member than it is to encourage individual initiative.<br>5. Being loyal to a group is more important than individual gain. |

### 3.10.13 Demography

The demographic section consists of several questions regarding student background information, such as gender, ethnicity, age, experience using mobile commerce, type mobile devices, social influence, and categories of mobile commerce engaged and level of usage. All variables in demography are measured using items from Huang *et al*. (2012); Faqih and Jaradat (2015), and Chen *et al*. (2016).



## 3.11 Measurement Instrument Scale

In this study, a Likert scale is used in getting respondent's opinion relating to the measurement statement (Sudha & Baboo, 2011). Generally, most research from different fields use a 5-point likert scale. However, this study chooses 7-point Likert scale because presumably, respondents have a broader range of options, thus allowing for more rigorous analysis than 5-point Likert scale (Hussey & Hussey, 1997). All variables are measured by 7-point interval scale, except for the demography variables, which was categorical. In marketing research, interval scale is capable to execute statistical calculations such as standard deviation and variance when the scale used for an instrument is interval (Zikmund & Babin, 2010). Besides that, a 7-point Likert scale is the most commonly used in Information technology and Information system

research (Davis, *et al*., 1989; Ramayah, *et al*., 2009; Sekaran & Bougie, 2009; Huang *et al*., 2012, Faqih & Jaradat, 2015). Table 3.20 depicts the 7-point Likert scale used in this research.

Table 3.20
*Survey Instrument Scale*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | Disagree | Slightly Disagree | Neither Agree or Disagree | Slightly Agree | Agree | Strongly Agree |

Source: Adopted from Malhotra and Galletta, 1999

### 3.12 Instrument Design

In this study, the instrument consists of three parts (see Appendix A). Part one consists of the title of the study, a brief introduction about M-commerce with a few examples, and confidentiality statement. The second section consists of student background information and the section contains a list of items related to determinants for M-commerce adoption among university students in Malaysia. An example of the questionnaire is attached in Appendix A.

### 3.13 Instrument Translation

Past studies were originally done in the English language. Due to the Malay language as the common language of the respondents, the translation of the questionnaire into the Malay language was appropriate. The translation was done by a translator in Pusat Bahasa UUM, via a back to back translation. Both translations were compared for accuracy (Brislin, 1970). Appendix A represents the questionnaire with items in both English and Malay.

### 3.14 Data Collection Procedure

The questionnaire was personally distributed and administered by the researcher with the enumerators from the chosen universities. The enumerators were undergraduate students who previously had experience in survey administration. The method is chosen to obtain good feedback during the administration of the questionnaire. Previous studies have documented problems in getting participants' particulars (home phone numbers, mailing addresses) with the intention of posting the questionnaire to the respondents. Besides, past study also reveal that online questionnaires normally yield very low response rates. There is a tendency that people might not be interested to complete the survey (Faqih & Jaradat 2015). The survey at the chosen universities was conducted by the researcher and the enumerators from the first week of October of 2016 to the first week of December of 2016.

The data collection was carried out with careful procedures. The researcher had first requested an approval letter for research work from the administrators at the Othman Yeop Abdullah Graduate School of Business at University Utara Malaysia (UUM OYA GSB). This is an important step in ensuring that the gatekeepers of the chosen research premises will allow researchers to use their organisation. Once the official letter from the university was obtained, the researcher then contacted the Dean of Student Affairs of the selected universities to arrange a date for the survey administration. The researcher and the enumerators distributed the questionnaires before the beginning of the lesson by going to the selected classroom. These questionnaires took roughly about 10-15 minutes to complete. Students were given time to complete the survey and it was returned by hand after they finished the class. Personal distribution of questionnaire helped the researcher to gather completed

survey within a short period of time, establishing a good communication channel with the participants and obtained good feedback.

In terms of the sampling procedure, the researcher applied simple random sampling which offers high generalizability and treats each element as having equal chance to be chosen as the subject (Sekaran, 2000). Additionally, this sampling is applicable to determine different sample frame sizes according to the universities. Through this sampling technique, the population of students will be proportionate in accordance with the university' population of the four universities in Peninsular Malaysia. To ensure distribution of the sample, the researcher chose respondents from each faculty at the university that could present the mobile savvy attribute of using various applications.

### 3.15 Reliability Analysis

As validity and reliability are the anchors for any quantitative approach, a pilot study was conducted to test the consistency of the instruments before the full-scale survey was accomplished. To measure the reliability of the instrument, Cronbach's alpha is used for all the dependent and independents variables. The Cronbach's alpha assumes that all indicators are equally reliable. In this study, PLS–SEM was used to analyze the collected data and the results describe the standardization of items through composite reliability (CR) and the individual indicators reliability.

Composite reliability is aimed to measure the internal consistency reliability, while individual indicators reliability refers to an indicator according to their individual reliability in PLS-SEM. Moreover, the internal consistency reliability can be used to

determine the reliability of a summated scale and each item should be consistent to be used as a measurement for some aspect of the construct. High correlations between the results indicated a higher degree of internal consistency (Zikmund & Babin, 2007). Generally, composite reliability value should be more than 0.60 to be acceptable (Sekaran & Bougie, 2009; Hair *et al*., 2014). The composite reliability varies from 0 to 1 and higher values show higher degrees of internal consistency. Additionally, in an exploratory research, the values between 0.60-0.70 are acceptable, while the values between 0.70-0.90 are considered satisfactory (Nunally & Bernstein, 1994). However, the value above 0.90 is not desirable because it shows that all indicators are measuring the same phenomena (Hair *et al*., 2014).

### 3.16 Validity Analysis

Validity analysis is to test whether we measure the right concept and this analysis is conducted before reliability analysis. In quantitative research, there are several types to test validity: face validity, construct validity and content validity. In social sciences study, content and construct validity is important for item measurement (Davidshofer & Murphy, 2005). Hence, this study used the content validity and construct validity to measure the validity of the questionnaire.

Content validity is greater if more scale items represent the domains of the concept being measured (Sekaran & Bougie, 2014). To check the content validity of each item, the researcher chose 2 experts from language field, 4 experts in the field of study and distributed questionnaires to 100 respondents who have characteristics similar to actual respondents. Additionally, in construct validity, convergent and discriminant validity are used for evaluation of the measurement model in PLS-SEM. The

convergent validity refers to the degree a construct correlates positively with alternative measures of the same construct (Hair *et al*., 2010). The researcher used outer loadings and average variance extracted (AVE) to establish convergent validity. Meanwhile, the discriminant validity is to confirm the construct validity of the model. Two analysis for assessing discriminant validity were used, namely, the cross loadings and Fornell-Larcker criterion.

### 3.17 Data Analysis Procedure

After empirical data are collected, data were analysed to ensure the data was complete, correct and appropriate for further analysis (Sekaran & Bougie, 2009). In this study, the researcher used several steps in analyzing the data. First is the data screening process that aims at checking for wrongly entered data, missing values and outliers. The completed data was analysed using IBM-SPSS version 22. Second, exploratory factor analysis which was used to analyse the data to search for relationships between variables (Hair *et al*. 2014). Exploratory factor analysis has been performed through SPSS using the Principle Component Method and Varimax rotation. Finally, the structural Equation Modeling (PLS-SEM) which is used to analyze the constructs via SMART PLS *version* 3.0. The data was analyzed using Partial Least Square (SmartPLS) to assess the reliability and validity of the constructs and to test the hypotheses of the model. The following section will discuss in detail the analysis of data used in this study.

### 3.18 Structural Equation Modelling (SEM)

There are two methods to examine the relationships in a structural equation modelling (SEM) which are covariance-based technique (CB-SEM) and PLS-based structured

equation modelling (PLS-SEM). These days, PLS-SEM is one of the well-known methods as an alternative to CB-SEM because of their uniqueness (Hair *et al*., 2014). PLS is more suitable to analyse highly complex causal models with low theoretical substantiation for the purpose of maximizing the determinant's predictive power towards the dependent construct (Al-Ghatani, 2016). Therefore, the researcher decided to apply PLS-SEM as the technique of data analysis in determining the TAM3 model and other determinants.

### 3.19 Exploratory Factor Analysis (EFA)

As defined by Hair *et al*., (2010), EFA is the extent to which a measure represents the concept of the study. This technique is used to find and to analyse common underlying factors within the data (Field, 2009). Therefore, all the variables in this study such as perceived usefulness, perceived ease of use, behavioural intention, result demonstrability, output quality, subjective norm, image, self-efficacy, playfulness, anxiety, the perception of external control and individualism-collectivism at individual-level were examined using EFA.

### 3.20 Descriptive Statistics

Descriptive statistics are the most common method that provides brief descriptive information of the respondents. In this study, the respondents were asked a certain question concerning their use of m-commerce transactions and several categories of questions are given to be chosen by the respondents. Additionally, descriptive statistics is also able to calculate statistic of mean, standard deviation, percentage and frequencies (Sekaran & Bougie, 2014).

## 3.21 PLS Path Modelling

Data analysis in this study was carried out through PLS path modelling. Commonly, path models are developed based on a theory which is related to hypotheses in clarifying and predict outcomes between the dependent variable (endogenous) and independent variables (exogenous). Additionally, there are two elements in PLS path modelling. First is the structural model or known as the inner model that represents the constructs and shows the relationships between the construct to other constructs. While second is the measurement models or identified as the outer model in the context of PLS-SEM. This model displays the linking between manifest variable (MVs) to the latent variables (LVs).

## 3.22 Reflective and Formative Measurement Model

The selection of measurement perspective such as reflective and formative must be based on conceptual reasoning. Reflective measurement is known as mode A, while formative measurement referred as Mode B in PLS-SEM. The framework for assessing reflective and deductive measurement is shown in Table 3.21.

Table 3.21
*The Framework for Assessing Reflective and Deductive Measurement*

| **Considerations** | **Reflective measurement** | **Formative measurement** |
|---|---|---|
| Nature of construct | 1. Latent construct is existing.<br>2. Latent construct exists independent of the measure used. | 1. Latent construct is formed.<br>2. Latent construct is determined as a combination of its indicators. |

Table 3.21 (Continued)

| Considerations | Reflective measurement | Formative measurement |
|---|---|---|
| Direction of causality between items and latent construct | 1. Causality from latent construct to manifest variables.<br>2. Variation in the construct causes variation in the items measures.<br>3. Variation in items measure does not causes variation in the construct. | 1. Causality from manifest variables latent construct.<br>2. Variation in the construct does not causes variation in the items measures.<br>3. Variation in items measure causes variation in the construct. |
| Characteristics of items used to measure the construct | 1. Items are manifested by the construct.<br>2. Items share a common theme.<br>3. Items are interchangeable.<br>4. Adding or dropping an items does not change the conceptual domain of the construct. | 1. Items define the construct.<br>2. Items need not share a common theme.<br>3. Items are not interchangeable.<br>4. Adding or dropping an items may change the conceptual domain of the construct. |

Source: Rossiter, 2002



In this study, the measurement for all variable is reflective because the items share a common theme and are interchangeable. Moreover, the internal consistency and other statistical method should be calculated for these constructs to ensure that all constructs have consistency and measure the same phenomenon. At the data analysis stage, this mode of measurement was used differently.

### 3.23 Pre-Test Study

A pre-test is important to gauge possible difficulties faced by respondents when filling the questionnaires before the actual survey. Additionally, content validity is to estimate

how much a measure represents every single element of a construct. In this study, the researcher chose four lecturers from Othman Yeop Abdullah Graduate School of Business at Universiti Utara Malaysia (UUM OYA GSB) and Faculty of Management at Universiti Teknologi Mara (UTM) to check the content validity of each item. These lecturers had provided several suggestions.

Firstly, demography section in Part A, they suggested to use closed-ended question for age and level of semester. They also suggested to remove unnecessary question such as name of university and courses in the questionnaire. Last but not least, they suggested to check the translation of the questionnaire into Malay language and choose a suitable word to make student understand the questionnaire. Improvements were made based from their suggestions.

### 3.24 Pilot Study

A pilot study can also be the pre-testing stage for a research instrument with a number of individuals that are related to the sample to identify potential practical problems in following the research procedure (Somekh &Lewin, 2005). Moreover, a pilot study is important to assess the reliability and establish content validity for the research questionnaire before accomplishing the full-scale survey (Saunders *et al*., 2009). Besides that, respondent are able to give comments and suggestions in order to help the researcher to improve the instrument of the final questionnaire. In addition, for the pilot study, 25-100 respondents are suitable as suggested by Cooper and Schindler (2008). Therefore, a pilot study was conducted among 100 students of Universiti Utara Malaysia (UUM) and the questionnaires were randomly distributed to respondents.

The result showed only 85 out of 100 questionnaires were returned representing 85% response rate. This survey used Statistical Package for Social Science (SPSS) 22 software to examine the internal consistency (reliability) of the instrument items by using Cronbach's Alpha Coefficient (α). Table 3.22 shows reliability test results of the instrument used.

Table 3.22
*Reliability Analysis of Pilot Study (85 respondents)*

| Constructs | No. of Items | Pilot Study Cronbach's Alpha Values | Item Deleted | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Behavioural Intention | 4 | 0.744 | Nil | 0.744 |
| Subjective Norm | 4 | 0.858 | Nil | 0.858 |
| Image | 5 | 0.883 | Nil | 0.883 |
| Result Demonstrability | 4 | 0.731 | Nil | 0.731 |
| Output Quality | 5 | 0.808 | Nil | 0.808 |
| Self-efficacy | 4 | 0.832 | Nil | 0.832 |
| Playfulness | 4 | 0.500 | Nil | 0.500 |
| Anxiety | 4 | 0.699 | Nil | 0.699 |
| Perception of external control | 4 | 0.710 | Nil | 0.710 |
| Perceived Usefulness | 4 | 0.888 | Nil | 0.888 |
| Perceived ease of use | 4 | 0.816 | Nil | 0.816 |
| Individualism-Collectivism at individual level | 5 | 0.868 | Nil | 0.868 |

The previous study has proved that Cronbach's alpha ranging from 0.50-0.60 are sufficient, 0.70 is acceptable and 0.80 is good ((Nunnally & Bernstein, 1994; Sekaran, 2003). Moreover, the internal consistency and reliability are higher, if the Cronbach's alpha value is closer to 1. The reliability analysis of the pilot study is shown in Table 3.22 above. Based on the results, there are 51 items in the survey instruments. The

reliability value for all variables ranged from 0.50-0.90 and no items were deleted in this study.

### 3.25 Factor Analysis

Several statistical factor analysis should be reported such as the adequacy of the sampling size Kaiser-Meyer Olkin (KMO) and Bartlett's test of Sphericity. According to Kaiser (1974), the KMO value of around 0.90 is regarded as marvelous, 0.80 as meritorious, 0.60 and 0.70 as mediocre, 0.50 as miserable, and the value less than 0.50 is unacceptable. Moreover, he claims that KMO index is important to make a comparison between magnitudes of observed correlation coefficient and partial correlation coefficient. Besides that, Bartlett's test of Sphericity examine whether the correlation matrix for all items refers to the identity matrix (Hair *et al*., 2010).

In this study, factor analysis was conducted to determine the suitability of the scale used in each item in the questionnaire and to examine whether the items explains the same construct or not. This study examining the factor analysis on each construct separately because the sample size in pilot study is small (Black & Porter, 1996). This can be illustrated in Table 3.23 which shows factor analysis and reliability of the final instrument (pilot study).

Table 3.23
*Factor Analysis and Reliability of the Final Instrument (Pilot Study)*

| Construct | Factor loading | | KMO | Eigen-value | % of Variance | Bartlett's test for Sphericity |
|---|---|---|---|---|---|---|
| Behavioural | BI1 | 0.731 | 0.648 | 2.280 | 56.994 | 86.365*** |
| Intention | BI2 | 0.749 | | | | |
| | BI3 | 0.825 | | | | |
| | BI4 | 0.711 | | | | |
| Image | I1 | 0.858 | 0.883 | 3.414 | 68.289 | 241.058*** |
| | I2 | 0.853 | | | | |
| | I3 | 0.848 | | | | |
| | I4 | 0.713 | | | | |
| | I5 | 0.850 | | | | |
| Output | OUT1 | 0.806 | 0.704 | 2.859 | 57.190 | 144.801*** |
| Quality | OUT2 | 0.777 | | | | |
| | OUT3 | 0.782 | | | | |
| | OUT4 | 0.702 | | | | |
| | OUT5 | 0.708 | | | | |

Note *** p < .000, the percentage of variance explained by each factor



As shown in Table 3.23 above, the KMO for three variables were ranged from 0.648 to 0.883 which is more than 0.06 are acceptable of factor analysis in the pilot study. Furthermore, the factor loadings for all values are more than 0.50. Additionally, the Bartlett test for each variable is significant at $\alpha = 0.000$ and Eigen values are more than 1.00. Finally, the results also show that the percentage of the variance can be explained by each factor is above 50%. Hence, the constructs reasonably explain the model under study and the results of the factor analysis can be used to collect data for the main study.

### 3.26 Chapter Summary

This chapter discussed the overall research design and procedures of the research instruments in this study encompassing the criteria for selection of respondents, data collection procedures, and the validity tests. The interpretation of the data is important to ensure that the objectives of the study are achieved. The following chapter discusses the results of data analysis.

# CHAPTER FOUR

# DATA ANALYSIS AND RESULTS

## 4.1 Introduction

This chapter covers presentation of data analysis and results of the study obtained from the quantitative analysis. The purpose of this chapter is to synthesize the various analyses and findings and examines the implication of the results. In the first section, it discusses the response rate and data screening. Apart from that, assessment of linearity, normality and multicollinearity were also explained. The next section provides information on the analysis of the respondents' distribution, before explanation on the reliability test, exploratory factor analysis and SEM analysis is presented. In sum, this chapter presents the empirical evidence with regards to the relationships that exist among the chosen variables in the study.



## 4.2 Data Coding and Entering

The purpose of coding is to clarify and interpret the information gathered from the respondents. Each of the variables is coded based on the questionnaire items with one or two letters and a particular number data. For example, behavioural intention subscale has four items and the first item is keyed-in as BI1, BI2 for the second and so on and so forth. Data coding is an important stage to ensure that the items can be easily referred to. Upon completion of the data screening process, the items are ready to be keyed in into SPSS version 22.

## 4.3 Data Screening and Missing Data

After entering the raw data in the SPSS 22, data screening should be done to ensure the data have been correctly entered. According to Sekaran and Bougie (2010), missing data occurred when the respondents did not understand the question, decline to answer one or more question, and were not willing to answer the questionnaires. These errors take the form of missing data or out of range data which values fall outside the range of possible values for a scale. According to the Hair *et al* (2010), the missing data can be replaced with the mean value if it is below 5% of the total data which is more reliable than case-wise deletion. This is because, case-wise deletion will throw away a lot of useful information and lead to lower efficiency and thus is not recommended (Temme *et al*., 2006). Therefore, it is highly essential to detect for missing data because PLS cannot run the analysis effectively if there is any missing data hence, must treat it by replacement.



### 4.3.1 Outlier

Generally, errors in data entry are common and there are several ways in dealing with out-of-range values. Thus, the normality was conducted by using boxplot to identify the median and extreme scores in the distributions. For instance, the researcher analysed playfulness variable (PLAY) and found two extreme scores (the 9$^{th}$ and 10$^{th}$ respondent in the series) as illustrated in Figure 4.1. There are two options in dealing with outliers data either by replacing with mean values or removing the unusual respondent from the data set (Hair *et al*., 2010). Moreover, if the data missing is below 5% of the total required data, the missing data can be replaced with the mean value. Therefore, this study had chosen the former, that is, by replacing the cases with mean values. Figure 4.2 shows the final dataset for further analysis.

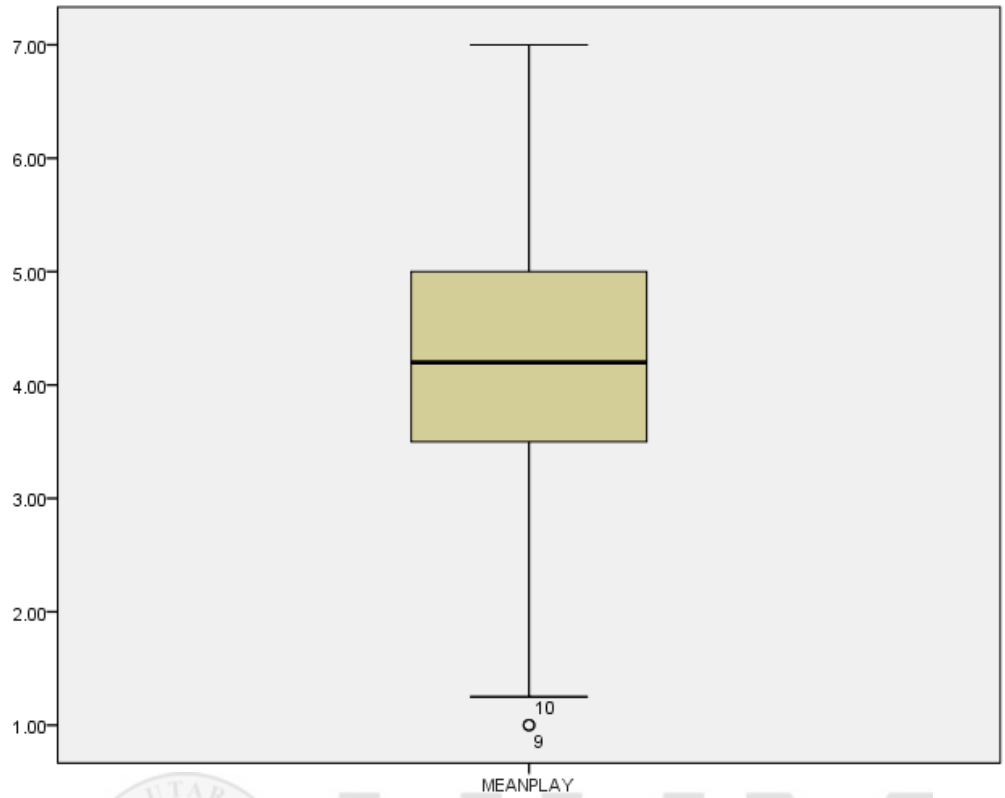


Figure 4.1
*Boxplot Before Replacing Mean*



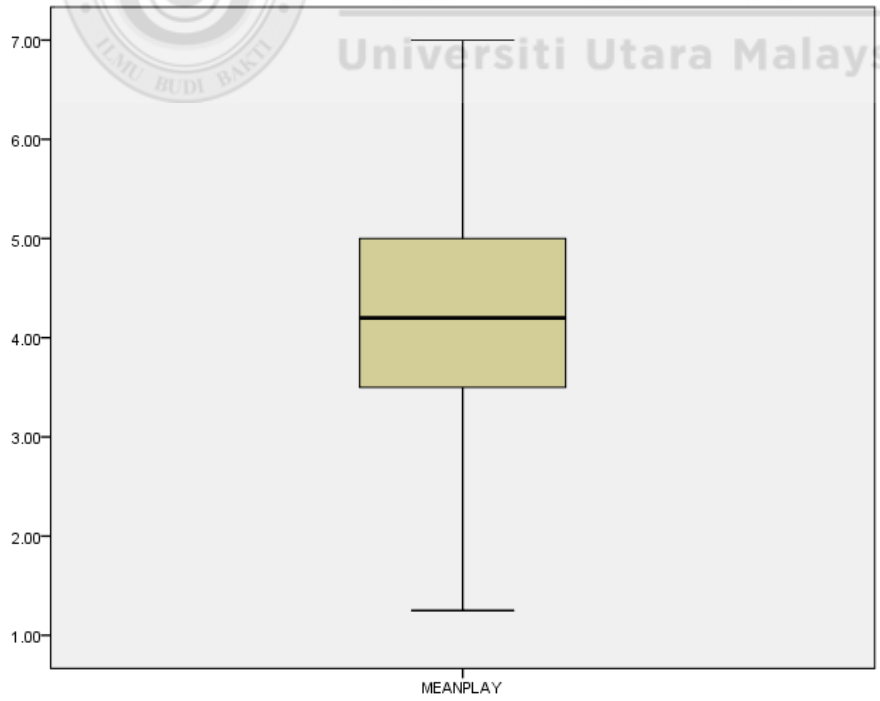


Figure 4.2
*Boxplot After Replacing Value*

## 4.4 Response Rate

Response rate refers to the number of respondents who responded to the questionnaire survey which is divided into the number of respondents in the sample size (Hamilton, 2009). From 799 distributed questionnaires, a total of 750 were returned. Out of these, the researcher observed that 200 respondents did not use mobile commerce due to several reasons. Firstly, they were sceptical that an unintentional mistake could cause loss of money due to lack of Internet skills. Secondly, in term of m-banking , they prefer conventional banking rather than m-banking. Last but not least, they feel this facility had frequently been vulnerable to fraudulent act.

Therefore, only 550 of the questionnaires were used for futher analysis and this implies a renspose rate of 68.84%. According to Babbie (2007) suggest that 50% response rate is acceptable for social science research survey. Hence, the rate of response rate for the study is accepateble and adequate to run the PLS statistical analysis (Hair *et al.,* 2010). Table 4.1 shows the summary of distribution of respondents by each University.

Table 4.1
*Distribution of Respondents by Each University*

| University Name | Total Distributed Survey | Total Returned Survey | Total Unreturned Survey | Total Completed Survey (use mobile commerce transactions) | Total Incomplete survey (not use mobile commerce transactions) |
|---|---|---|---|---|---|
| 'Universiti Sains Malaysia' | 235 | 222 | 13 | 178 | 44 |
| 'Universiti Malaysia Terengganu' | 240 | 226 | 14 | 162 | 64 |
| 'Universiti Kebangsaan Malaysia' | 252 | 241 | 11 | 158 | 83 |
| 'Universiti Teknologi Malaysia' | 72 | 61 | 11 | 52 | 9 |
| TOTAL | 799 | 750 | 49 | 550 | 200 |

## 4.5 Respondents' Profile

In the demographic section, the respondents were asked several questions regarding their personal background and their behaviour in adopting m-commerce. It is important to have a clear understanding of the respondent's profile before proceeding to the discussion of the results and findings. Table 4.2 below shows the descriptive statistics for the frequency distribution of respondents.

Table 4.2
*Profile of Respondents*

| Construct | Category | Count | Percentage |
|---|---|---|---|
| **Gender** | Male | 191 | 34.7 |
| | Female | 359 | 65.3 |
| Total | | **550** | **100.0** |
| **Ethnicity** | Malay | 458 | 83.3 |
| | Chinese | 49 | 8.9 |
| | Indian | 21 | 3.8 |
| | Others | 22 | 4.0 |
| Total | | **550** | **100.0** |
| **Age** | 17-18 | 2 | 4 |
| | 19-20 | 148 | 26.9 |
| | 21-22 | 302 | 54.9 |
| | 23-24 | 90 | 16.4 |
| | 25-26 | 7 | 1.3 |
| | 27-28 | 1 | 0.2 |
| Total | | **550** | **100.0** |
| **Level of semester** | 1-2 | 115 | 20.9 |
| | 3-4 | 150 | 27.3 |
| | 5-6 | 183 | 33.3 |
| | 7-8 | 102 | 18.5 |
| Total | | **550** | **100.0** |
| **What types of mobile devices do you currently use? (You may tick more than one answer.)** | Smartphones | 480 | 87.3 |
| | Tablets | 70 | 12.7 |
| Total | | **550** | **100.0** |

Table 4.2 (Continued)

| Construct | Category | Count | Percentage |
|---|---|---|---|
| **Who influenced you in using mobile commerce? (You may tick more than one answer.)** | Family | 35 | 6.4 |
| | Friends | 376 | 68.4 |
| | Lecturers | 32 | 5.8 |
| | Spouse | 39 | 7.1 |
| | Others | 68 | 12.4 |
| Total | | **550** | **100.0** |
| **Which type of mobile commerce transaction(s) are you currently engaged in?** | Mobile financial services (m-banking, m-payment, and m-brokering) | 160 | 29.1 |
| | Mobile shopping (m-retailing, m-ticketing, and m-auction) | 256 | 46.5 |
| | Mobile entertainment (m-gaming, m-music, m-video, and m-betting) | 134 | 24.4 |
| Total | | **550** | **100.0** |
| **How frequent are you engaged in mobile commerce transactions?** | Rarely (1-2 times/weeks) | 400 | 72.7 |
| | Occasionally (3-4 times/we | 101 | 18.4 |
| | Frequently (5-6 times/week | 23 | 4.2 |
| | Very frequently (every day/ | 26 | 4.7 |
| Total | | **550** | **100.0** |



Table 4.2 shows the background information of 550 respondents. The majority of the respondents are female (65.3%), with male comprises 34.7%. This indicates that the largest segment of respondents who use mobile commerce are female. In terms of ethnicity, the Malays are the majority (83.3%), followed by Chinese (8.9%), Indian (3.8%) and others (4.0%). The category 'others' included respondents from Sabah and Sarawak ethnics. These respondents varied considerably in terms of their diverse background and culture residing in the four Universities in Malaysia.

In terms of age distribution, the highest distribution of age category falls between 21-22 years (54.9%) and the age category between 27-28 years (0.2%) is the lowest. For

the semester category, the majority of them falls in the category of $5^{th}$-$6^{th}$ (33.3%), followed by semester $3^{rd}$- $4^{th}$ (27.3%). This analysis indicates that respondents who are in between 21-22 years old and in their $5^{th}$-$6^{th}$ semester have more awareness in using mobile commerce transactions. In addition, the table shows that the respondents prefer using smartphones (87.3%) compared to tablets (12.7%) because repondents uses their phone for texting, making calls and smartphones have constant Internet connections.

Besides, the table also reveals that friends (68.4%) are the most influencing factor causing them to use m-commerce reported by the respondents, and followed by others (12.4%). The category ‘others' refers to their willingness to use m-commerce without influenced by other factors. This is an indication that most of the respondents are more influenced by their friends compared to others. For other attributes, the majority of the respondents (46.5%) prefers to engage with mobile shopping (m-retailing, m-ticketing, and m-auction), followed by 29.1% prefers mobile financial services (m-banking, m-payment, and m-brokering) and the lowest percentage of respondents (24.4%) engaged in mobile entertainment (m-gaming, m-music, m-video, and m-betting). This data, therefore, indicates that majority of the respondents prefer to shop online compared to physical store locations to save their time and cost. In the final analysis, the respondents rarely (1-2 times/weeks) (72.7%) engaged in mobile commerce transactions which showed that students always use a smart phone to search for product information, compare product pricing and purchase music/video for their entertainment.

### 4.5.1 Descriptive Analysis

A descriptive analysis was conducted to describe the main features of every variable from the perspectives of the respondents in the study. According to Sekaran and Bougie (2010), a descriptive analysis can be explained through mean and standard deviation. In Table 4.3, the mean, standard deviation, maximum and minimum values of the constructs are reported.

Table 4.3
*Description Statistics of the Dimensions (n = 550)*

| Dimensions | N | Min | Max | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Behavioural Intention | 550 | 2.00 | 7.00 | 4.971 | 1.052 |
| Subjective Norm | 550 | 2.50 | 7.00 | 4.869 | 0.928 |
| Image | 550 | 2.20 | 7.00 | 4.602 | 1.012 |
| Result Demonstrability | 550 | 2.75 | 6.75 | 4.798 | 0.764 |
| Output Quality | 550 | 2.80 | 7.00 | 5.041 | 0.881 |
| Self-efficacy | 550 | 2.75 | 7.00 | 5.051 | 0.913 |
| Playfulness | 550 | 1.25 | 7.00 | 4.239 | 1.041 |
| Anxiety | 550 | 1.00 | 7.00 | 4.019 | 1.116 |
| Perception of external control | 550 | 2.75 | 6.75 | 4.787 | 0.743 |
| Perceived Usefulness | 550 | 2.00 | 7.00 | 4.930 | 0.962 |
| Perceived ease of use | 550 | 2.50 | 7.00 | 4.965 | 0.919 |
| Individualism-Collectivism at individual level | 550 | 3.00 | 7.00 | 5.007 | 0.927 |

**Seven-point scale: 1 = strongly disagree; 7 = strongly agree*

The results show the means of all variables which is above the average ranging from 4.019 to 5.051 while the standard deviation ranged from 0.743 to 1.116 which is also considered acceptable. In addition, this study used 7 Likert scale with 1.00 as the minimum value and 7.00 as the maximum value.

### 4.5.2 Normality Assumptions

Normality refers to the bell shape curve of the distribution for an individual metric variable (Hair *et al*., 2010). The sample data is consistent with a normality assumption if the sample size is more than 200 cases. It is highly essential to check for normality distribution before analysing the sample data. There are several statistical and graphical methods to observe the normality distribution. In this study, skewness and kurtosis are used to test the values for normality. The sample data is considered to be normal if the test of skewness values are between $\pm 1.96$ at 0.05 significant level and test of Kurtosis values are between $\pm 2.58$ at 0.01 significant level (Hair *et al*., 2010). Table 4.4 shows the assessment of the normality assumptions.

Table 4.4
*Assessment of the Normality Assumptions*

| **Variables** | **Skewness** | | **Kurtosis** | |
|---|---|---|---|---|
| | Statistic | Std.Error | Statistic | Std.Error |
| Behavioural Intention | -0.062 | 0.104 | -0.130 | 0.208 |
| Subjective Norm | 0.251 | 0.104 | -0.073 | 0.208 |
| Image | 0.191 | 0.104 | -0.148 | 0.208 |
| Result Demonstrability | -0.014 | 0.104 | -0.159 | 0.208 |
| Output Quality | 0.046 | 0.104 | -0.215 | 0.208 |
| Self-efficacy | 0.152 | 0.104 | -0.160 | 0.208 |
| Playfulness | 0.075 | 0.104 | 0.240 | 0.208 |
| Anxiety | 0.054 | 0.104 | 0.260 | 0.208 |
| Perception of external control | -0.108 | 0.104 | 0.184 | 0.208 |
| Perceived Usefulness | 0.198 | 0.104 | -0.169 | 0.208 |
| Perceived ease of use | 0.119 | 0.104 | -0.210 | 0.208 |
| Individualism-Collectivism at individual level | 0.312 | 0.104 | -0.296 | 0.208 |

Table 4.4 shows the assessment of the normality assumption. The result shows that skewness is in the range of 1.96 to-1.96, while none of the variable items has kurtosis values greater than 0.260. Therefore, it indicates that the sample data is consistent with a normality assumption. The next section elaborates the use of Partial Lest Square approach to structural equation modelling used in this study.

## 4.6 Partial Least Square (PLS) Structural Equation Modelling Approach

In this study, SEM was used to test the proposed hypothesis. Generally, there are two approaches to estimate the relationships in a structural equation model. These are covariance based SEM (CBSEM) and variance based SEM (VBSEM). The selection of these approaches depends on the objectives and characteristics of the study. The CBSEM has been used to test theories while PLS-VBSEM is considered as prediction oriented in facilitating the development of the theory.

Generally, the past studies applied CB-SEM approach to test the theories. However, researchers nowadays tend to use the VB-SEM approach because of its advantages over other techniques. PLS is focused on theory development and prediction. There are several advantages of PLS, such as, able to handle constructs measured with single and multi-item measures, can be easily incorporated into reflective and formative measurement models, and has no issues with small sample size (Hair at al., 2010). Moreover, PLS also can analyse complex models with low theoretical substantiation with the purpose to maximize the determinant predictive power towards the dependent constructs (Al-Ghatani, 2016). Numerous studies in various fields of studies have been found using PLS-SEM, naming a few, information management, marketing, accounting (Ventakesh and Bala, 2008; Ringle *et al*., 2012; Faqih & Jaradat, 2015, Al-

Ghatani, 2016). Relating to this study, the model used is complex encompassing several independent, dependent variables, and also moderating variables. Moreover, this research is exploratory in nature, thus, the objective is to focus on the theory development and prediction.

The data analysis was performed through two processes. Firstly, the measurement model or known as an outer model in PLS which shows the link between the latent variable and manifest variable. The objective of measurement model is to examine the content validity, convergent validity and discriminant validity. Secondly, the structural model which is called the inner model. This model explains the relationship between the latent or unobserved variables and also to test the hypothesis. The next section explains the results of PLS modelling.

## 4.7 Measurement Model Evaluation

In this section, the measurement model or outer model is examined before the hypotheses was tested. In Smart PLS, the purpose of the outer model is to identify the relationship between observable and underlying constructs. Moreover, it is important to evaluate the outer model to confirm the reliability and validity of the instrument. Churchill (1979) claimed that the measurement model evaluation is important to trace suitable indicators for a proper operationalization of a certain construct. Therefore, this study uses three types of analysis to examine the construct validity, namely content validity, convergent validity, and discriminant validity (Hair *et al*., 2010).

### 4.7.1 Content Validity

Content validity refers to the ability of the items generated for a construct and its suitability to measure the concept (Hair *et al*., 2010). Moreover, Smart PLS is based on Principal Component Analysis (PCA) which is used to assess the underlying factors (Bohrnstedt, 1970). It is important to ensure that all the items show the highest loading on their respective constructs than their loadings on other constructs, to establish that they belong to the respective constructs. There are two ways to confirm the content validity. Firstly, the loadings of indicators are highest on their respective constructs as compared to their loadings on other constructs. Secondly, the items loadings were significantly loading on their respective construct. In this study, the results fulfil the two ways as mentioned above and lead to the confirmation of content validity.

Besides that, for the mutual relationships, the item loading should be over 0.30 (Andresen, 2000). Additionally, Chan (2003) also has categorised the item loading as poor (<0.30), fair (range of 0.31 – 0.50), moderate (0.51 – 0.60) and moderate strong (0.61- 0.80). The results show the loadings of all items pertaining to each of the constructs taken which are behavioural intention, image, individualism-collectivism at the individual level, output quality, perceived ease of use, playfulness, perceived usefulness,, self-efficacy and subjective norm. It is found that each of the loadings in this study is greater than 0.51 which shows either moderately or moderately strong loading. However, a total of 3 indicators namely (PEC4, RES4, ANX4) were deleted because of poor loadings.

### 4.7.2 Convergent Validity

Convergent validity refers to the degree to which a set of items correlates with alternative measures of the same construct (Hair *et al*., 2010). To establish convergent validity, certain conditions must be fulfilled such as factor loadings, composite reliability (CR), and average variance extracted (AVE) (Hair *et al*., (2010). To achieve this, all of the item loadings were examined. Based on literature of multivariate analysis, loading value of 0.50 or more is acceptable for analysis and items below 0.40 should be eliminated (Fornell & Larcker, 1981; Hair *et al*., 2010). However, Hair *et al*. (2010) suggest that the outer loading between 0.40 and 0.70 should be considered for removal from the scale only when deleting the indicator leads to an increase in the composite reliability or average variance extracted. In addition, the composite reliability must be above 0.70 and the average variance extracted should exceed 0.50 to explain half of the variance indicator (Hair *et al*., 2014).

In this study, the loading factor for the constructs is between 0.444-0.948, which is depicted in Table 4.5. The loading factor lesser than 0.70 is maintained and not considered for removal because it has no significant impact on the increase in the average variance extracted and reliability of the composite. Besides that, the composite reliability of each construct is in the range of 0.735 to 0.944 which is well above the prescribed values and the values of average variance extracted (AVE) ranged between 0.500 and 0.814. Therefore, the results fully meet all the conditions hence, there exists convergent validity.

Table 4.5
*Convergent Validity Analysis*

| Constructs | Item | Loading | Cronbach alpha | Composite Reliability (CR)[2] | AVE |
|---|---|---|---|---|---|
| Anxiety | ANX1 | 0.948 | 0.700 | 0.735 | 0.500 |
| | ANX2 | 0.555 | | | |
| | ANX3 | 0.539 | | | |
| Behavioural Intention | BI1 | 0.810 | 0.877 | 0.916 | 0.731 |
| | BI2 | 0.838 | | | |
| | BI3 | 0.886 | | | |
| | BI4 | 0.883 | | | |
| Image | I1 | 0.875 | 0.916 | 0.937 | 0.748 |
| | I2 | 0.893 | | | |
| | I3 | 0.887 | | | |
| | I4 | 0.836 | | | |
| | I5 | 0.832 | | | |
| Individualism-Collectivism at individual level | ICAIL1 | 0.696 | 0.862 | 0.901 | 0.647 |
| | ICAIL2 | 0.826 | | | |
| | ICAIL3 | 0.850 | | | |
| | ICAIL4 | 0.816 | | | |
| | ICAIL5 | 0.824 | | | |
| Output Quality | OUT1 | 0.844 | 0.864 | 0.902 | 0.648 |
| | OUT2 | 0.845 | | | |
| | OUT3 | 0.824 | | | |
| | OUT4 | 0.773 | | | |
| | OUT5 | 0.733 | | | |
| Perception of external control | PEC1 | 0.766 | 0.809 | 0.887 | 0.725 |
| | PEC2 | 0.893 | | | |
| | PEC3 | 0.889 | | | |
| Perceived ease of use | PEOU1 | 0.874 | 0.847 | 0.898 | 0.691 |
| | PEOU2 | 0.674 | | | |
| | PEOU3 | 0.891 | | | |
| | PEOU4 | 0.867 | | | |
| Playfulness | PLAY1 | 0.896 | 0.769 | 0.791 | 0.510 |
| | PLAY2 | 0.890 | | | |
| | PLAY3 | 0.444 | | | |
| | PLAY4 | 0.495 | | | |

Table 4.5 (Continued)

| Constructs | Item | Loading | Cronbach Alpha | Composite Reliability (CR)[2] | AVE |
|---|---|---|---|---|---|
| Perceived | PU1 | 0.891 | 0.922 | 0.944 | 0.810 |
| Usefulness | PU2 | 0.905 | | | |
| | PU3 | 0.914 | | | |
| | PU4 | 0.889 | | | |
| Result | RES1 | 0.906 | 0.886 | 0.929 | 0.814 |
| Demonstrability | RES2 | 0.929 | | | |
| | RES3 | 0.871 | | | |
| Self-efficacy | SE1 | 0.795 | 0.855 | 0.902 | 0.697 |
| | SE2 | 0.872 | | | |
| | SE3 | 0.816 | | | |
| | SE4 | 0.855 | | | |
| Subjective | SN1 | 0.798 | 0.836 | 0.890 | 0.670 |
| Norm | SN2 | 0.828 | | | |
| | SN3 | 0.832 | | | |
| | SN4 | 0.814 | | | |

a: Composite Reliability: CR = (∑ factor loading) 2 /{(∑ factor loading)2) + ∑ (variance of error)} b: Average Variance Extracted: AVE = (∑ factor loading)2 / {∑(factor loading)2 + ∑ variance of error)}



### 4.7.3 Discriminant Validity

Discriminate validity is aimed at confirming the construct validity of the outer model. Moreover, it is important to ensure the items used are not related and differentiated with respect to the construct. If the diagonal elements are being considered higher than the elements in their related columns and rows then we can confirm the discriminant validity of the model. There are three methods to examine discriminant validity which are cross loadings, Fornell-Larcker and Heterotrait Monotrait Ratio (HTMT). Additionally, this study used the square roots of average variance extracted (AVE) to examine the discriminant validity in line with suggestions made by Fornell and Lacker (1981) and Hair *et al*. (2010). Besides that, the square root of AVE should

be more than 0.50. The results in the correlation matrix illustrated in Table 4.6 shows that the square roots of average variance extracted (AVE) are higher than other values of the row and column in which they are situated. In this study, the construct validity of the outer model was established after confirming the content validity, convergent validity, and discriminant validity. Therefore, it is assumed that the subsequent results of the related hypothesis should be valid and reliable.

Table 4.6
*Discriminant Validity Analysis*

| Variable | ANX | BI | I | ICAIL | OUT | PEC | PEOU | PLAY | PU | RES | SE | SN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ANX** | **0.706** | | | | | | | | | | | |
| **BI** | 0.231 | **0.855** | | | | | | | | | | |
| **I** | 0.308 | 0.388 | **0.865** | | | | | | | | | |
| **ICAIL** | 0.282 | 0.489 | 0.361 | **0.804** | | | | | | | | |
| **OUT** | 0.314 | 0.621 | 0.435 | 0.488 | **0.805** | | | | | | | |
| **PEC** | 0.281 | 0.575 | 0.314 | 0.544 | 0.545 | **0.851** | | | | | | |
| **PEOU** | 0.348 | 0.628 | 0.426 | 0.610 | 0.647 | 0.704 | **0.831** | | | | | |
| **PLAY** | 0.453 | 0.310 | 0.307 | 0.275 | 0.423 | 0.377 | 0.411 | **0.714** | | | | |
| **PU** | 0.378 | 0.568 | 0.488 | 0.528 | 0.594 | 0.557 | 0.710 | 0.430 | **0.900** | | | |
| **RES** | 0.249 | 0.613 | 0.383 | 0.447 | 0.650 | 0.567 | 0.636 | 0.429 | 0.562 | **0.902** | | |
| **SE** | 0.282 | 0.573 | 0.429 | 0.529 | 0.588 | 0.608 | 0.609 | 0.378 | 0.597 | 0.593 | **0.835** | |
| **SN** | 0.291 | 0.706 | 0.456 | 0.413 | 0.575 | 0.470 | 0.546 | 0.320 | 0.526 | 0.557 | 0.511 | **0.818** |

## 4.8 Predictive Relevance of The Model ($Q^2$)

In this study, the technique of sample re-use in the PLS modelling approach was used to predict the model validity in order to determine further that the analysis is in line with the suggestion made by Stone (1974). Additionally, a model predictive quality can be evaluated by cross-validated redundancy measure, which is known as $Q^2$ (Stone, 1974). Besides that, all redundant communality must be bigger than zero for all endogenous variable to ensure the model have predictive validity (Hair *et al*., 2014). Furthermore, the cross-validated redundancies can be examined by using the blindfolding technique in Smart PLS. The blindfolding technique is to estimate parameters by eliminating some of the data and handling them as missing values. Afterward, the estimated parameter is processed and used to reconstruct the raw data which are previously assumed as missing. Therefore, the blindfolding technique generates general cross-validating metrics $Q^2$.



Table 4.7
*Predictive Quality Indicators of the Model*

| Constructs | Variable Type | $R^2$ | Cross-Validated Redundancy |
|---|---|---|---|
| Behavioural intention | Endogenous | 0.595 | 0.407 |
| Image | Endogenous | 0.208 | 0.145 |
| Perceived ease of use | Endogenous | 0.568 | 0.365 |
| Perceived usefulness | Endogenous | 0.577 | 0.436 |

As illustrated in Table 4.7, the result shows the prediction quality of the model in this study. Additionally, there are two different forms of $Q^2$ which are the cross-validated commonality and cross-validated redundancy which researcher is able to gather depending on the form of the desired prediction. For instance, when the underlying latent variables are used to predict data point, a cross-validated commonality is

obtained. However, if the latent variables predict the block in question and the data point is achieved, thereafter the output is cross-validated redundancy. The results of the study, indicate that there are four cross-validated redundancies which are the Behavioural intention (0.407), Image (0.145), Perceived ease of use (0.365) and Perceived usefulness (0.436). These values are larger than zero, hence the value reflects an adequate predictive validity of the model which in line with suggestions made by Fornell and Lacker (1981).

## 4.9 Goodness of Fit of the Overall Model

After the predictive relevance model has been confirmed, the next following step is to test the goodness of fit (GoF). In variance based SEM, there is only one measurement of goodness of fit (GoF), unlike covariance based SEM. Besides that, Tenenhaus *et al*. (2005) defines GoF as the geometric mean of the average commonality and average $R^2$ for the endogenous constructs. Additionally, in order to estimate GoF in PLS model, Wetzeals *et al*., (2009) suggest the following formula:

$$\text{GoF} = \sqrt{(R2 * AVE)}$$

Table 4.8
*Goodness of Fit*

| **Constructs** | **$R^2$** | **AVE** |
|---|---|---|
| Behavioural intention | 0.595 | 0.731 |
| Image | 0.208 | 0.748 |
| Perceived ease of use | 0.568 | 0.691 |
| Perceived usefulness | 0.577 | 0.810 |
| Geometric Mean | 0.487 | 0.745 |
| Goodness of Fit | | 0.520 |

In this study, Table 4.8 presents the GoF value which is found to be 0.520. It is considered large compared to the baseline values proposed by Wetzels *et al*., (2009) who suggest that the values of GoF can be: small=0.1, medium=0.25, and large=0.36. Therefore, the results show that the model goodness of fit based on the average variance explained is large which indicates an adequate level of global PLS model validity.

### 4.10 Effect Size

Generally, in the multivariate data analysis literature reported that $R^2$ of the endogenous variable is to explain how much variability of a particular variable can be caused or explained by its relationship to another variable. Furthermore, past literature in marketing studies indicated that $R^2$ values of 0.25 are considered to be weak, 0.50 moderate and 0.75 large. However, Hair *et al*., (2011) claimed that $R^2$ values of 0.20 are assumed large in consumer behaviour studies. In this study, the $R^2$ values for these four endogenous (behavioural intention image, perceived ease of use and perceived usefulness) ranged from 0.208 to 0.595. These results are in line with the consumer behaviour studies. Besides that, the effect size was estimated by running the model by eliminating the exogenous ($R^2$excluded) and once by retaining the exogenous ($R^2$included) in this study. Moreover, Hair *et al*., (2014) suggested the guidelines for assessing effect size; 0.02 (small), 0.15 (medium), 0.35 (large) obtained from the following:

$$f^2 = \frac{R^2\text{included} - R^2\text{excluded}}{1 - R^2\text{included}}$$

The effect size for behavioural intention, perceived usefulness and perceived ease of use are presented in Table 4.9, 4.10 and Table 4.11.

Table 4.9
*Effect size on Behavioural Intention (Endogenous Construct)*

| Exogenous Construct | $R^2$incl | $R^2$excl | Total Effect |
|---|---|---|---|
| ICAIL | 0.595 | 0.587 | 0.020 |
| SN | | 0.436 | 0.393 |
| PU | | 0.590 | 0.012 |
| PEOU | | 0.571 | 0.059 |

Table 4.10
*Effect size on Perceived usefulness (Endogenous Construct)*

| Exogenous Construct | $R^2$incl | $R^2$excl | Total Effect |
|---|---|---|---|
| ICAIL | 0.577 | 0.572 | 0.012 |
| SN | | 0.574 | 0.007 |
| I | | 0.558 | 0.045 |
| OUT | | 0.571 | 0.014 |
| RES | | 0.574 | 0.007 |
| PEOU | | 0.504 | 0.173 |

Table 4.11
*Effect size on Perceived ease of use (Endogenous Construct)*

| Exogenous Construct | $R^2$incl | $R^2$excl | Total Effect |
|---|---|---|---|
| SE | 0.568 | 0.531 | 0.086 |
| PEC | | 0.422 | 0.338 |
| ANX | | 0.559 | 0.021 |
| PLAY | | 0.563 | 0.012 |

As shown in Table 4.9 above, the effect size of the endogenous construct 'behavioural intention' explained by four exogenous constructs (individualism-

collectivism at the individual level, subjective norm, perceived usefulness, perceived ease of use) is from 0.012 to 0.393. Thereafter, the effect size of the endogenous construct ‘perceived usefulness’ is between 0.007 and 0.173 for six exogenous constructs as depicted in Table 4.10. Finally, the endogenous construct ‘perceived ease of use' is explained by self-efficacy, the perception of external control, anxiety, and playfulness which effect size between 0.012 and 0.338. In sum, the effect size of all exogenous variable shows effect size from small to large size.

## 4.11 The Assessment of the Model and Hypothesis Testing Procedures

After the measurement model is determined, the structural model is then assessed. Generally, the structural model explains the relationship between the latent or unobserved variables and to test the hypotheses. Moreover, there are several types of assessment in structural model encompassing assessing the significance of path coefficient, evaluating the level of R-square, determining the effect size, ascertaining predictive relevance and examining the moderating effect (Hair *et al*., 2014). This study uses Smart PLS software to test the hypotheses. Bootstrapping techniques are used for generating test results, which are significant, or not from the statistical point of view. Therefore, PLS algorithm was run to generate path coefficients and this study applied the bootstrapping procedure with a number of 5000 bootstrap samples and 550 cases to generate the t-values. Hence, Figure 4.3 presents the path model result yielding *B*-values, while the path model significance results yielding t-values as shown in Figure 4.4. On the other hand, the estimates for the full structural model, which includes a moderating variable which is individualism-collectivism at the individual level (ICAIL) are shown below.

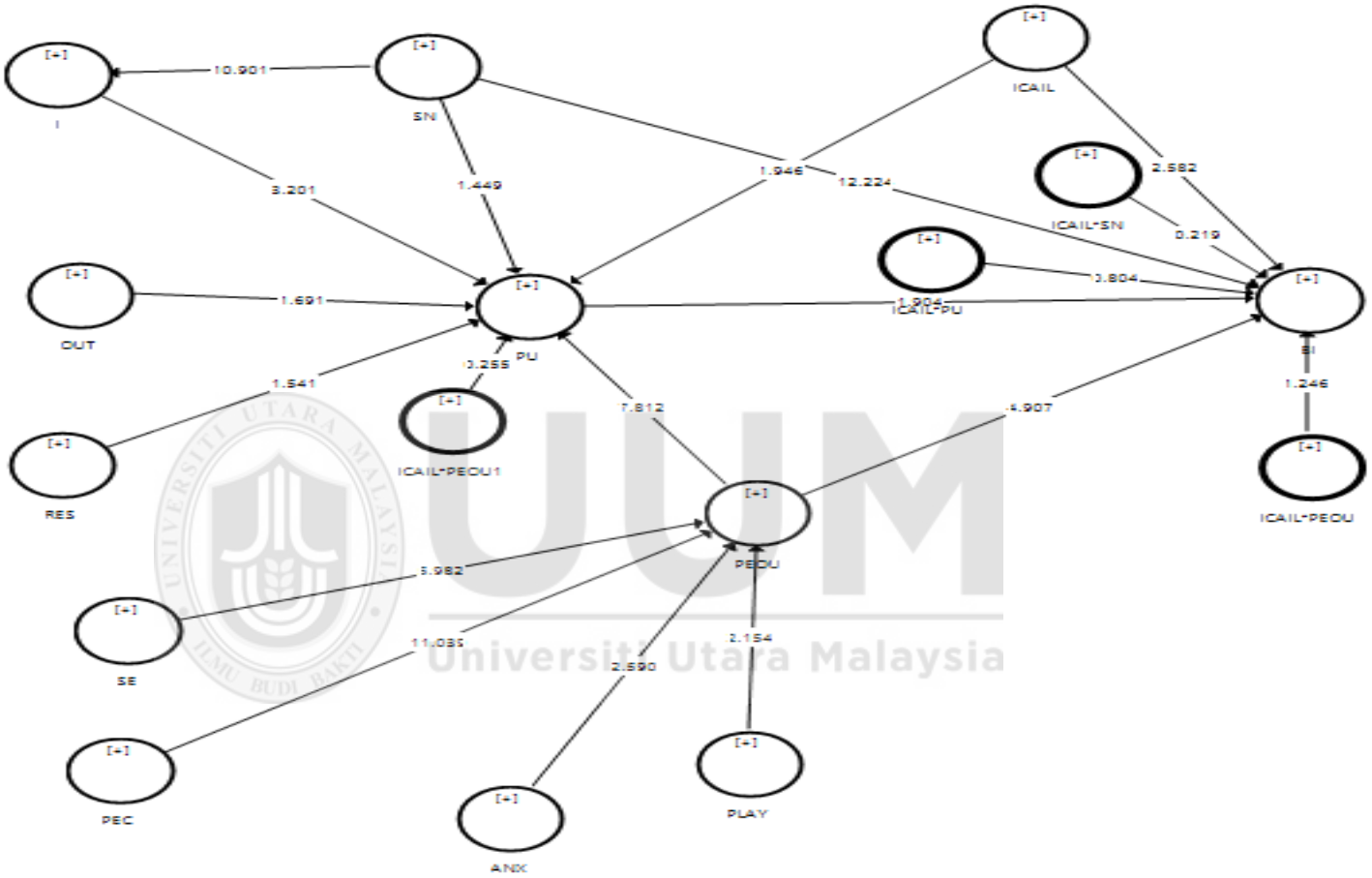


Figure 4.3
*Path Model Results*

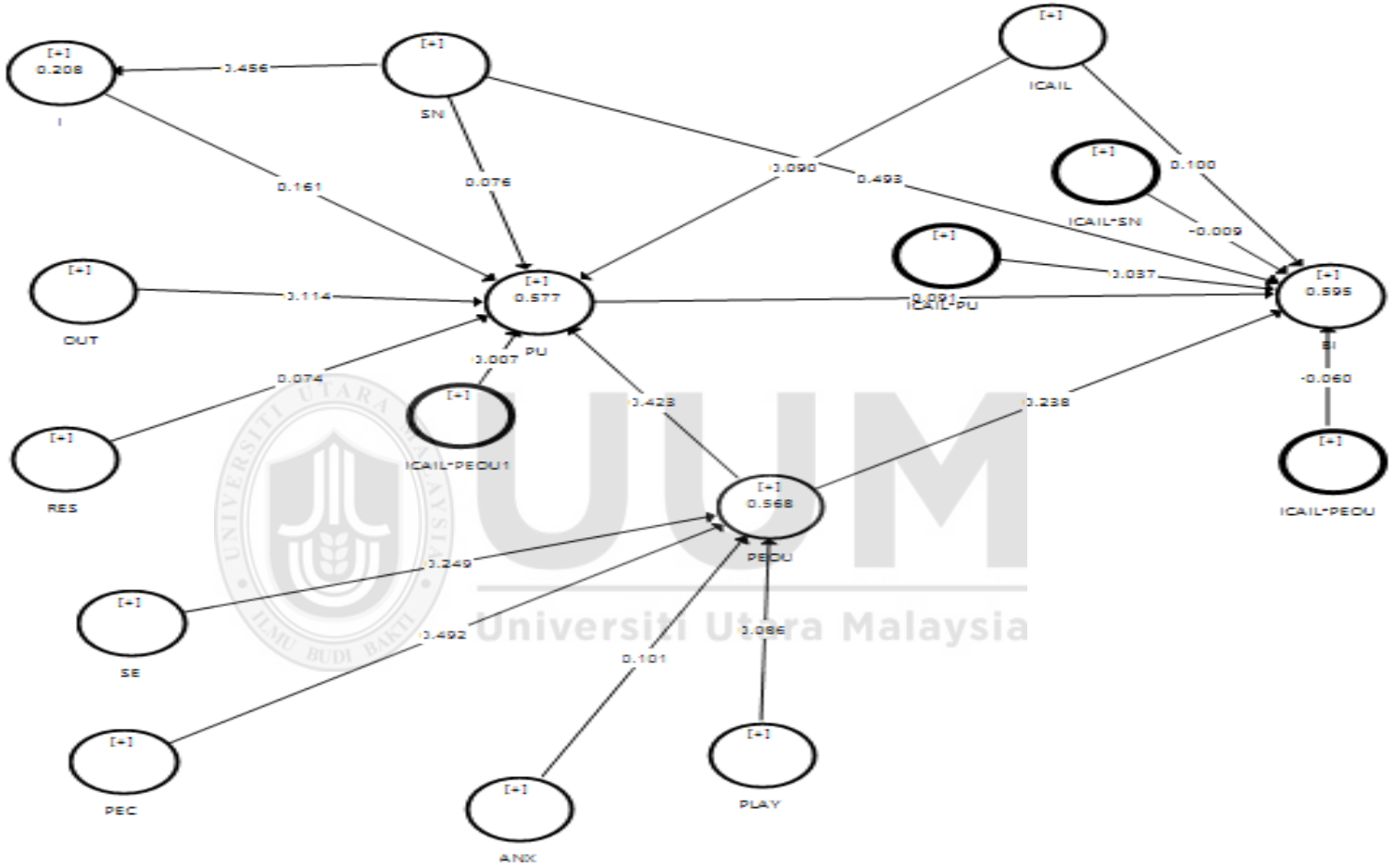


Figure 4.4
*Path Model Significance Results*

Table 4.12
*The Structural Model Assessment with Moderator (Full Model)*

| Hypothesis | Relation | Path Coefficient | T value | P Value | Decisions |
|---|---|---|---|---|---|
| **H1** | **PU -> BI** | 0.091 | 1.904 | 0.057 | Not supported |
| **H2** | **SN -> BI** | 0.493 | 12.224 | 0.000*** | Supported |
| **H3** | **SN -> PU** | 0.076 | 1.449 | 0.147 | Not Supported |
| **H4** | **SN -> I** | 0.456 | 10.901 | 0.000*** | Supported |
| **H5** | **I -> PU** | 0.161 | 3.235 | 0.001*** | Supported |
| **H6** | **OUT -> PU** | 0.114 | 1.691 | 0.091 | Not Supported |
| **H7** | **RES -> PU** | 0.074 | 1.541 | 0.123 | Not Supported |
| **H8** | **PEOU -> BI** | 0.238 | 4.907 | 0.000*** | Supported |
| **H9** | **PEOU -> PU** | 0.423 | 7.812 | 0.000*** | Supported |
| **H10** | **SE -> PEOU** | 0.249 | 5.982 | 0.000*** | Supported |
| **H11** | **ANX -> PEOU** | 0.101 | 2.590 | 0.010 | Not Supported |
| **H12** | **PEC -> PEOU** | 0.492 | 11.039 | 0.000*** | Supported |
| **H13** | **PLAY -> PEOU** | 0.086 | 2.154 | 0.031* | Supported |
| **H14** | **ICAIL*PU -> BI** | 0.037 | 0.804 | 0.421 | Not Supported |
| **H15** | **ICAIL*PEOU -> BI** | -0.060 | 1.246 | 0.213 | Not Supported |
| **H16** | **ICAIL*PEOU1 -> PU** | 0.007 | 0.255 | 0.799 | Not Supported |
| **H17** | **ICAIL*SN -> BI** | -0.009 | 0.219 | 0.826 | Not Supported |

Note: **p<0.05, **p<0.01; ***p<0.001*

Table 4.12, illustrated the final results of the structural model assessment with the moderator. The bootstrapping technique calculated the p-values for all direct relationships (H1-H17). The results reveal that perceived usefulness (PU) is reported

to be positively impacted by the subjective norm (SN) (β=0.076, t=1.449, p>0.05), output quality (OUT) (β=0.114, t=1.691, p>0.05), and result demonstrability (RES) (β=0.074, t=1.541, p>0.1). However, these results rejected the hypothesis H3, H6 and H7. Besides that, hypothesis H1 is also rejected wherein perceived usefulness (PU) is positively influenced by behavioural intention (BI) (β=0.091, t=1.904, p>0.05). On the other hand, anxiety (ANX) is positively influenced by perceived ease of use (PEOU) (β=0.101, t=2.590, p>0.05). Although the p-value for H11 is significant (less than 0.5), the result shows positive relationship which is inconsistent with the proposed hypothesis.

Besides that, hypotheses H2 and H8 are found to be accepted wherein subjective norm (β=0.493, t=12.224, p<0.001) and perceived ease of use (β=0.238, t=4.907, p<0.001) respectively possessed a positive relationship with behavioural intention. Moreover, hypothesis H4 states a significant positive relationship between subjective norm and image (β=0.456, t=10.901, p<0.001). Additionally, hypothesis H5 is also supported indicating a significant positive relationship between image and perceived usefulness (β=0.161, t=3.235, p<0.001). Furthermore, a critical assessment of the perceived ease of use (PEOU) is reported to be positively influenced by self-efficacy (SE) (β=0.249, t=5.982, p<0.001), perception external control (PEC) (β=0.492, t=11.039, p<0.001), and playfulness (PLAY) (β=0.086, t=2.154, p<0.001) respectively. These results support the hypothesized relationship as postulated in H10, H12, and H13. Additionally, hypothesis H9 is also supported showing a significant positive relationship between perceived ease of use (PEOU) and perceived usefulness (PU) (β=0.423, t=7.812, p<0.001).

## 4.12 Testing Moderating Effect

The present study applied an individual-level cultural values analysis approach using Smart PLS to determine the strength of the moderating effect of individualism - collectivism at the individual level on the relationship between perceived usefulness, perceived ease of use, subjective norm and behavioural intention. The individual-level cultural values analysis approach is considered applicable in this study because the culture concept in the technology adoption has been a mainstream research issue (Faqih & Jaradat, 2015).

The past literature indicates that there exist important variations in cultural values on user behaviour. However, past literature indicates that there exist important variations in cultural values on individual's behaviour (Straub *et al*., 2002; Green *et al*., 2005; Srite & Karahanna, 2006; Cleveland & Laroche, 2007; Fang, 2012; Faqih & Jaradat, 2015). Furthermore, most adoption studies have integrated the Hofstede's factor with the extended TAM model on the relationship between perceived usefulness, perceived ease of use, subjective norm and behavioural intention use (Srite & Karahanna, 2006; Hung *et al*., 2010; Zhang *et al*., 2012; Faqih & Jaradat, 2015).

Recalling the results in Table 4.12, the relationships between individualism-collectivism at the individual level (ICAIL) and behavioural intention (BI) are found not to be moderated significantly by perceived usefulness (PU) ($\beta$=-0.037, t=0.804, p>0.1) and perceived ease of use (PEOU) ($\beta$=-0.060, t=1.246, p>0.1). Hence, the hypotheses H14 and H15 are rejected respectively. Thereafter, the hypothesis H16 is also not supported which shows that individualism-collectivism at the individual

level (ICAIL) does not moderate the perceived ease of use (PEOU) and perceived usefulness (PU) relationship (β=0.007, t=0.255, p>0.1) as hypothesized in this study. Finally, relating to hypothesis H17, the individualism-collectivism at the individual level (ICAIL) does not significantly moderate the relationship between subjective norm and behavioural intention (β=-0.009, t=0.219, p>0.1).

### 4.13 Summary of Hypothesis Results

Table 4.13 summarizes the results of the hypotheses. It can be seen that the eight hypotheses are accepted which are H2, H4, H5, H8, H9, H10, H12, and H13. Whereas hypotheses H1, H3, H6, H7, H11, and H14-H17 are not accepted.

Table 4.13
*Hypotheses Summary*

| Hyp. | Statements | Findings |
|---|---|---|
| | **Direct Relationships** | |
| H1 | Perceived usefulness has a positive effect on the behavioural Intention to use M-commerce among university students in Malaysia. | Not supported |
| H2 | Subjective norm positively influences the behavioural intention to use M-commerce among university students in Malaysia. | Supported |
| H3 | Subjective norm positively influences the perceived usefulness to use M-commerce among university students in Malaysia. | Not Supported |
| H4 | Subjective norm positively influences the image to use M-commerce among university students in Malaysia. | Supported |
| H5 | Image has a positive influence on the perceived usefulness to use M-commerce among university students in Malaysia. | Supported |
| H6 | Output quality positively influences the perceived usefulness of M-commerce among university students in Malaysia. | Not Supported |
| H7 | Result demonstrability positively influences the perceived usefulness of M-commerce among university students in Malaysia. | Not Supported |

Table 4.13 (Continued)

| Hyp. | Statements | Findings |
|---|---|---|
| H8 | Perceived ease of use has a positive influence on the behavioural intention to use M-commerce among university students in Malaysia. | Supported |
| H9 | Perceived ease of use has a positive influence on the perceived usefulness to use M-commerce among university students in Malaysia. | Supported |
| H10 | Self-efficacy positively influences perceived ease of use of M-commerce among university students in Malaysia. | Supported |
| H11 | Anxiety negatively influences perceived ease of use of M-commerce among university students in Malaysia. | Not Supported |
| H12 | Perceptions of external Control positively influences perceived ease of use of M-commerce among university students in Malaysia. | Supported |
| H13 | Playfulness positively influences perceived ease of use of M-commerce among university students in Malaysia. | Supported |
| | **Moderating Effects** | |
| H14 | The relationship between perceived usefulness and behavioural intention to use M-commerce among university students in Malaysia is positively moderated by individualism-collectivism at individual-level for collectivism than for individualism. | Not Supported |
| H15 | The relationship between perceived ease of use and behavioural intention to use M-commerce among university students in Malaysia is positively moderated by individualism-collectivism at individual-level for collectivism than for individualism. | Not Supported |
| H16 | The relationship between perceived ease of use and perceived usefulness to use M-commerce among university students in Malaysia is positively moderated by the individualism-collectivism at individual-level for collectivism than for individualism for collectivism than for individualism. | Not Supported |
| H17 | The relationship between subjective norm and behavioural intention to use M-commerce among university students in Malaysia is positively moderated by individualism-collectivism at individual-level for collectivism than for individualism. | Not Supported |

### 4.14 The Final Model

The following is the final model based on the empirical study.

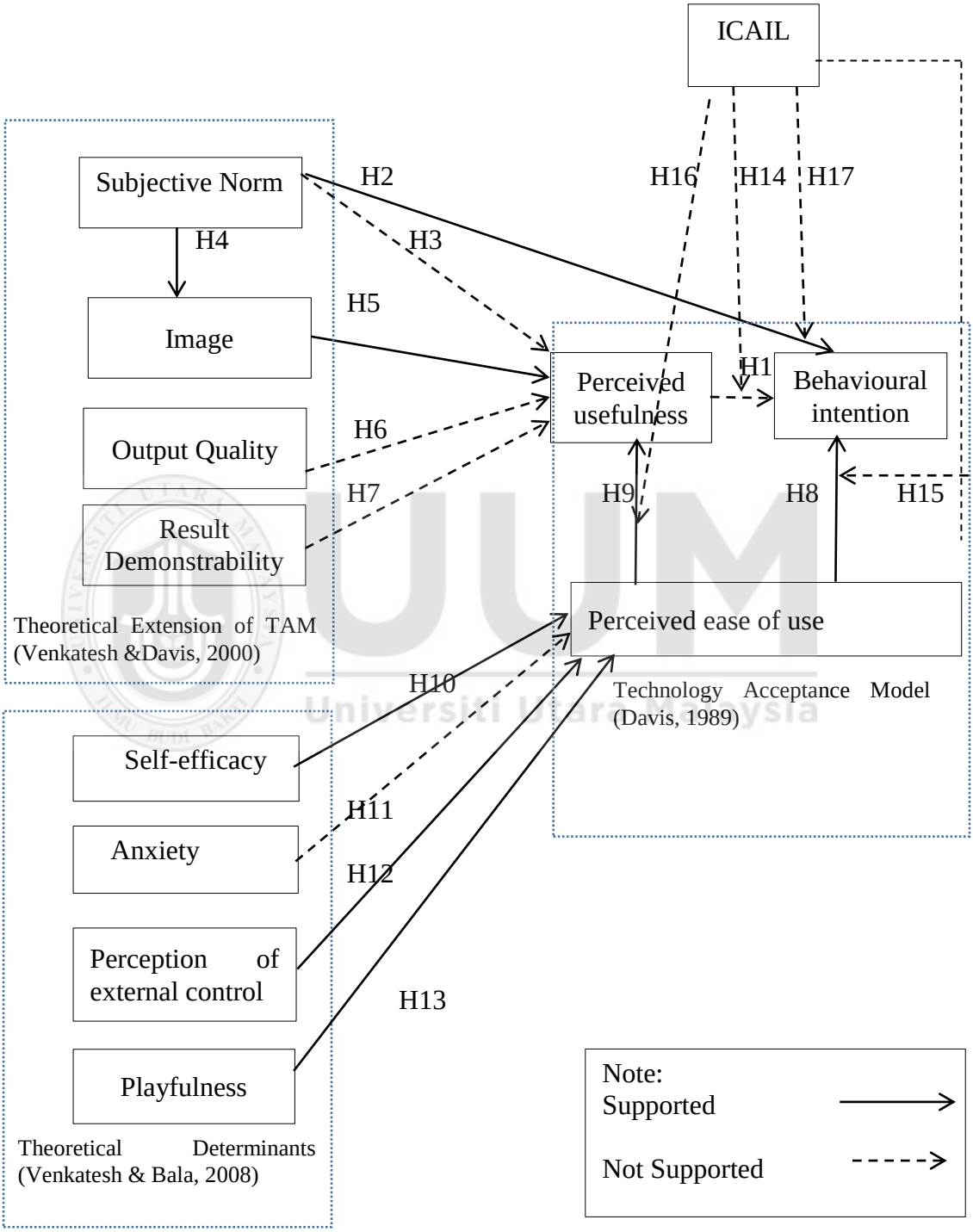


Figure 4.5
*Final Model of The Study*

## 4.15 Chapter Summary

In this chapter, the empirical investigation that has been conducted to test the research model is reports. The sources of information were gathered through a survey of the university students across Malaysia in order to achieve the research objectives. It also reports the stages of analysis subjected to the dataset in order to assess the measurement model. The construct validity of the outer model was established after confirming the content validity, convergent validity, and discriminant validity.

This chapter also discusses the assessment of the structural model in order to explain the relationship between the latent or unobserved variables, as well as testing the hypotheses. Finally, after bootstrapping path coefficient analysis was run, the hypotheses are reported. In the subsequent chapter, the implications of the study, theoretically and practically, the limitations, as well as the recommendations for further research are discussed.

# CHAPTER FIVE

# DISCUSSION AND CONCLUSION

## 5.1 Introduction

This chapter aims to discuss the findings and concludes the study. To achieve the aim, it is organised into four sections. Section 1 presents a conversation in an attempt to relate the findings to the objectives of the study. Section 2 elaborates on the practical and theoretical contribution of the study. While section 3 describes the implication of the research, its limitation, and suggestion for future research. Finally, in the last section, conclusions of the study are drawn.

## 5.2 Recapitulation of The Study's Findings

Mobile commerce has become increasingly important in offering a new platform to sell products effectively and efficiently. Despite numerous studies in the area of technology adoption, not much is known about mobile commerce adoption in Malaysia, namely the governing factors and the appropriate models that could explain the behaviours of young generations on the use of mobile commerce. Therefore, this research proposes a model of mobile commerce adoption in Malaysia by integrating the technology acceptance model (TAM3) while considering the individualism-collectivism at individual-level (ICAIL) factor as moderating variables in the context of mobile commerce.

The research findings have illuminated some key aspects that are potentially beneficial for the marketers of mobile commerce companies. In particular, various key factors that might affect the behaviour intention of mobile commerce users, have

been revealed through this study. As the technology acceptance model is precise enough to be used as tools of evaluation, the findings are hoped can help financial services to understand the behaviour and problems among youth in Malaysia to adopt m-commerce. Overall, this study has successfully contributed to the body of knowledge in understanding the main determinants of mobile commerce adoption among university students in Malaysia. In so doing, the study has provided answers to the following research objectives:

1. To measure the effect of perceived usefulness and perceived ease of use towards mobile commerce adoption among university students in Malaysia.

2. To examine the moderating role of the Individual-Collectivism at Individual Level (ICAIL) on the relationship between these variables among university students in Malaysia.
   a. perceived usefulness and behavioural intention
   b. perceived ease of use and behavioural intention
   c. subjective norm and behavioural intention
   d. perceived usefulness and perceived ease of use

Data were gathered from four public universities as mentioned in Chapter 3. A total of 799 questionnaires were distributed of which 750 were returned. However, 200 questionnaires were discarded because the respondents' do not have experience in using mobile commerce. The Structural Equations Modelling Smart PLS 2.0 was used to test this model and the hypotheses of the study.

Significantly, this study has applied integrated model of TAM3, which combined TAM and TAM2 as a basis for developing the research framework. To make the study robust, several stages of assessment with regards to measurement and construct validity, have been subjected to the data set. Apart from that, the dataset was also subjected to bootstrapping path coefficient analysis to test the structural equation modelling. In sum, this research found mixed support for research hypotheses as shown in Table 4.13.

## 5.3 Discussion

In this section, the findings from previous research and relevant theories are incorporated in order to address the objectives of the study. The discussion will be based on how the proposed model was tested. The main objective is to propose a conceptual model for mobile commerce adoption among university students in Malaysia by adapting integrated TAM3 model. In order to achieve this, the following sub objectives are formulated.



### 5.3.1 Sub Objective One: To Measure the Effect of Perceived Usefulness And Perceived Ease of Use Towards Mobile Commerce Adoption Among University Students in Malaysia.

Sub objective one is to measure the effect of perceived usefulness and perceived ease of use towards mobile commerce adoption among university students in Malaysia. To achieve this sub objective, there are seven hypotheses (H1-H7) developed namely, behavioural intention, perceived usefulness, subjective norm, image, output quality and result demonstrability. On the other hand, this sub objective also identifies the determinants that affect the perceived ease of use which are self-efficacy, anxiety,

perception of external control, playfulness and perceived ease of use. In order to achieve this sub objective, six hypotheses (H8-H13) were formulated. Therefore, the next paragraphs discuss each of the hypotheses separately.

#### 5.3.1.1 The Relationship Between Perceived Usefulness and Behavioural Intention (H1)

Theoretically, the results obtained here show that perceived usefulness (PU) is not significant in determining behavioural intention (BI). Even though the result reveals that PU has a positive effect on BI, the path coefficients is insignificant. This finding does not support or does not accept H1. The result is contrary to the evidence from previous studies which found that perceived usefulness is significant and positively influenced the behavioural intention to use m-commerce (e.g. Davis *et al*., 1989; Mathieson, 1991; Mathieson *et al*., 2001; Venkatesh & Davis 2000; Faqih & Jaradat, 2015).



The reason for the findings lies in the fact that students feel using the m-commerce system would not enhance their job performance. This happened because students usually use social media for communication and entertainment purposes. They are not engaged with the m-commerce for business transaction purposes, which is anticipated to affect the individual job performance. Moreover, students in Malaysia prefer to use a system that is user friendly, with lesser complex functions. Therefore, the student's behavioural intention was influenced by perceived ease of use, not perceived usefulness. As a result, the findings show the insignificant relationship between both variables.

#### 5.3.1.2 The Relationship Between Subjective Norm and Behavioural Intention (H2)

The result of this hypothesis reveals that the relationship between subjective norm (SN) and behavioural intention (BI) is significant and positive. Thus, hypothesis H2 is supported. Subjective norm refers to the degree to which an individual perceives that people who are important to him think he/she should or should not perform the behaviour to use the system (Fishbein & Ajzen, 1975). Furthermore, previous literature indicates that subjective norm is an important factor because it shows direct determinants of behavioural intention for TRA (Fishbein & Ajzen, 1975), TPB (Ajzen, 1991), TAM2 (Venkatesh & Davis, 2000) and UTAUT (Venkatesh *et al*., 2003). Thus, this finding is also in line with the outcomes of other studies (Taylor & Todd, 1995; Kim *et al*., 2009; Wei *et al*., 2009, Al-Louzi & Iss, 2011; Jaradat & Rababaa, 2013, Faqih & Jaradat, 2015).

Generally, users prefer to perform the behaviour, if they believe the referent think they should. Additionally, subjective norm emerged as the strongest antecedent of consumer attitude with a β value of 0.493 for this relationship. Moreover, the results from the demographic information indicated that the most person who influences them using mobile commerce is friend (58.40%) compared to others. It is noteworthy that the finding is in a pattern due to the demography of the respondents which falls in the age category between 17-28 years, and that this age category is normally influenced by mass media and peer pressure with regards to the use of m-commerce.

This is in line with the findings by Al-Gathani (2016) who also found SN exhibits the strongest influence on BI among the students in Saudi Arabia's culture. In short,

the usage of mobile commerce transaction among students in university is affected by others' opinions. Put differently, it can be said that the greater the influence of the subjective norm, the stronger will be the behavioural intention towards considering using the mobile commerce transactions. However, studies in Western culture found perceived usefulness exhibiting the strongest influence on behavioural intention.

#### 5.3.1.3 The Relationship Between Subjective Norm and Perceived Usefulness (H3)

Subjective norm (SN) has an insignificant relationship towards perceived usefulness (PU). Although the result discloses that SN has a positive effect on PU, the path coefficients are insignificant. Hence, hypothesis H3 is not supported and this in line with the findings of a number of previous studies (Faqih & Jaradat, 2015; Chen *et al*., 2016). Surprisingly, this result is contrary to many of the previous findings, which found that subjective norm is significant towards perceived usefulness (eg, Ventakesh & Bala, 2008; Al-Gathani, 2016).



According to the Ventakesh and Davis (2000), there are two additional theoretical mechanisms namely, internalization and identification by which subjective norm can influence intention indirectly through perceived usefulness. Therefore, if the students believe that the system is of no use, they may not believe and may not have the intention to adopt it.

#### 5.3.1.4 The Relationship Between Subjective Norm and Image (H4)

In this study, the relationship between subjective norm (SN) and image (I) is found to be a positive and significant. Thus, hypothesis 4 is supported. This outcome is in

line with the findings of previous studies (eg, Ventakesh & Davis, 2000; Ventakesh & Bala 2008; Al-Ghatani, 2016; Faqih & Jaradat, 2015; Chen *et al*., 2016).

Apart from this, evidence from the demographic information in this study shows that friends are the category of people who influenced students to use and adopt technology the most (58.40%). As such, a suggestion made by their friends regarding the mobile shopping can motivate users to purchase products through several websites such as Lazada. Moreover, students feel that by engaging in m-commerce, would make them distinctive from others, who do not, at the university. Furthermore, students who are engaged in m-commerce are seen more trendy than those who are not using this technology. This is in consistency with Ventakesh and Bala (2008) who claimed that if important members of a person's social group believe that he or she should perceive the technology, then performing it will tend to enhance her or his status in the social system.



#### 5.3.1.5 The Relationship Between Image and Perceived Usefulness (H5)

The empirical result of this study shows that the relationship between image (I) and perceived usefulness (PU) are positive and significant. This supports H5. The result obtained is consistent with other empirical research, which reported that image positively affects the perceived usefulness of technologies adoption (Ventakesh & Davis, 2000; Faqih & Jaradat, 2015; Al-Ghatani, 2016).

According to Moore and Benbasat (1991), an image is the degree that an individual perceives using the technology innovation can improve his or her status in a social group. The reason behind this finding may be paved to the student's belief that

engaging with m-commerce channel is useful. Hence they are willing to adopt it. This explanation also parallel with the students' decisions to adopt m-commerce as they are influenced by peer pressures, and that, they can enhance the group performance if their behaviours are consistent with their group norms.

#### 5.3.1.6 The Relationship Between Output Quality and Perceived Usefulness (H6)

Output quality (OUT) shows insignificant relationship with perceived usefulness (PU). Hence, hypothesis 6 is not supported and this in line with the findings from previous studies (eg. Chismar & Wiley-Patton, 2002). The reason behind this is due to students feel that mobile commerce system is not capable of performing and completing their job goals. Besides that, this is also due to several limitations of the mobile devices and mobile networks such as low screen resolution and limited battery life. On the other hand, students might have problems with the slow connection of their mobile networks at their universities.



Students demand that the output quality is high in order to receive service quickly, reliably and securely. The quality of the output is crucial so as to lessen the time and effort in dealing with network and device problems. Furthermore, impressive output quality makes users perceive the system as useful. Therefore, offering an adequate output mobile applications and improving the systems in mobile applications are imperative to ensure smooth adoption of m-commerce to users.

#### 5.3.1.7 The Relationship Between Result Demonstrability and Perceived Usefulness (H7)

Theoretically, it is postulated that result demonstrability (RES) is not significant in determining perceived usefulness (PU). Although the results reveal that RES has a positive effect on PU, the path coefficients show insignificant effects. Thus, hypothesis 7 is not supported. This result is consistent with the findings by Al-Ghatani (2014) and Faqih and Jaradat (2015).

Noteworthy, reasons for the finding might due to students' beliefs that using the m-commerce applications are tangible, observable and communicable. Furthermore, if the result demonstrability shows that the system is low, students will ignore to engage in m-commerce. In order to overcome this problem, mobile commerce provider should improve the quality of the system to achieve high result demonstrability and make the system easy to use. Therefore, if the result demonstrability is positive, it will motivate the users of the system to produce effective jobs.



#### 5.3.1.8 The Relationship Between Perceived Ease of Use and Behavioural Intention (H8)

In this study, the relationship between perceived ease of use (PEOU) and behavioural intention (BI) is found to be positive and significant. Hence, hypothesis 8 is accepted. The finding is in line with the previous empirical studies which showed that perceived ease of use has a positive influence in the adoption of mobile commerce (eg, Khalifa & Shen, 2008; Kim & Garrison, 2009; Wei *et al*., 2009; Faqih & Jaradat, 2015).

Moreover, evidence from the demographic information of this study indicate that the majority of the respondents in Malaysia 46.50% prefer to engage with mobile shopping (m-retailing, m-ticketing, and m-auction) compared to the mobile financial services and mobile entertainment transactions (29.10%). In this study, respondents prefer to purchase products through online application because it is more convenient and effortless. Importantly, when students perceive the system to be effortless, they are more likely to continue to adopt m-commerce in future. Therefore, the more convenient the system, the stronger will be the attitude towards m-commerce adoption.

#### 5.3.1.9 The Relationship Between Perceived Ease of Use and Perceived Usefulness (H9)

The finding of this study reveals that the relationship between perceived ease of use (PEOU) and perceived usefulness (PU) is significant which supports H9. Previous studies have found similar results (Huang *et al*., 2012; Faqih & Jaradat, 2015; Al-Ghatani, 2016).

In view of the above, Ventakesh and Bala (2008) found that when more individuals perceive m-commerce as easy to use and useful, the more positive his or her attitude towards m-commerce adoption. Moreover, students will only adopt m-commerce when they find it convenient to use.

#### 5.3.1.10 The Relationship Between Self-Efficacy and Perceived Ease of Use (H10)

The relationship between self-efficacy (SE) and perceived ease of use (PEOU) is found to be positive and significant. This supports hypothesis 10. This relationship is in line with findings in previous study in several mobile services and applications (Faqih & Jaradat, 2015), mobile banking (Luarn & Lin, 2005), mobile learning (Lu & Viehland, 2008), and mobile data service adoption (Yang, 2010).

In this study, students believe that he or she has the ability to engage with the m-commerce transaction such as mobile shopping, mobile financial services and mobile entertainment using mobile devices. In the context of m-commerce, self-efficacy is the judgment of one's ability, knowledge, or skills to use m-commerce. This is consistent with the findings of Faqih and Jaradat (2015) who claimed that self-efficacy is an important factor to consider in user adoption of information technology studies.



#### 5.3.1.11 The Relationship Between Anxiety and Perceived Ease of Use (H11)

In this study, the relationship between anxiety (ANX) and perceived ease of use (PEOU) is found to be positive and significant. Although the p-value for H11 is significant ($p < 0.5$), the hypothesis shows positive relationship that is inconsistent with the proposed hypothesis. This result rejects the H11. However, previous studies have found that the influence on anxiety tends to mix and inconsistent. For instance, Faqih and Jaradat (2015) found that anxiety is negative and not significant to perceived ease of use while other study reveals that anxiety is negative and significant

(Cheng *et al*., 2015; Al-Ghatani, 2016). On the other hand Hung *et al*., (2012) found anxiety is positive and not significant.

In this study, anxiety refers to degree of individual's fear when he or she faced with the possibility of using m-commerce. The negative association between anxiety and perceived ease of use recommends that individuals with increased anxiety towards technology perceive that m-commerce is harder to use. However, the finding in this study shows positive association between anxiety and perceived ease of use. Hence, an individual has low anxiety and assumed m-commerce is easy to use.

In general, students in the university have used mobile devices such as mobile phones and used social media for information and entertainment. Besides that, evidence from the demographic information of this study indicated that the respondents in Malaysia prefer to engage with mobile shopping (m-retailing, m-ticketing, and m-auction) compared to the other transaction. Students feel comfortable and fearless to use this technology because m-commerce does not apply high-skilled tools that will ensue problems to them. Therefore, mobile anxiety effects the belief on using m-commerce and the job performance positively.

#### 5.3.1.12 The Relationship Between Perception of External Control and Perceived Ease of Use (H12)

With regards to relationship between perception of external control and perceived ease of use (H12), the finding supports H12. The outcome is in line with previous empirical research, which reported that perceptions of external control are related to perceived ease of use (Ventakesh & Bala, 2008; Faqih & Jaradat, 2015). For instance,

Monzavi *et al*., (2013) have suggested four categories of perception of external factors, namely, organizational, social, individual and technological factors on beliefs about perceived ease of use.

In this study, the findings indicate that students believe social factor such as friends were significant of perceived ease of use. In addition, the results suggest that support staff from mobile operators also help students to overcome any technological barriers such as downloading and implementing software on the smartphone. This is in line with the findings of Faqih and Jaradat (2015) who suggest that the accessibility of supporting resources and suitable infrastructure would help students develop positive perceptions towards m-commerce adoption.

**5.3.1.13 The Relationship Between Playfulness and Perceived Ease of Use (H13)**

The last hypothesised direct relationship is between playfulness and perceived ease of use. The result reveals that playfulness (PLAY) is significant and positive in determining perceived ease of use (PEOU). Hence, hypothesis 13 is supported. However, this result is contrary to the findings of other scholars who found that playfulness is not significant with perceived ease of use (Huang *et al*., 2012; Faqih & Jaradat, 2015; Al-Ghatani, 2016).

In this study, the majority of respondents falls within age category of 21-22 years old. The result, which is in line with Hackbarth *et al*., (2003), implies that young people have a high level of playfulness compared to other generation. As a younger generation, students feel that the system has playfulness merit by which they perceive the system is easy to use, particularly, the mobile entertainment (m-gaming, m-music,

and m-video). Therefore, the more playful an individual towards m-commerce, the more likely they will explore the mobile interactions, by having a more positive perception towards the ease of use.

### 5.3.2 Sub Objective Two: To Examine the Moderating Role of The Individual Collectivism at Individual Level (ICAIL) on The Relationship Between These Variables Among University Students In Malaysia.

Sub objective two is to examine the moderating factor which is Individual-Collectivism a nhjjmt The Individual Level (ICAIL) between four relationships which are perceived usefulness and behavioural intention, perceived ease of use and behavioural intention, perceived usefulness and perceived ease of use and subjective norm and behavioural intention. To achieve this sub objective, there are four hypotheses (H14-H17) developed. The next paragraphs discuss each hypothesis separately.



#### 5.3.2.1 The Relationship Between Perceived Usefulness and Behavioural Intention to Use M-Commerce Among University Students In Malaysia is Positively Moderated By Individualism-Collectivism at Individual-Level For Collectivism Than For Individualism (H14)

The finding of this study reveals that the relationship between perceived usefulness (PU) and behavioural intention (BI) to use M-commerce among university students in Malaysia is positively moderated by individualism-collectivism at individual-level (ICAIL) for collectivism than for individualism was not significant. Therefore, hypothesis 14 is not statistically supported.

However, this results is contrary to the previous study in Middle East Country that found the existence of moderating influence of ICAIL for collectivism than for individualism on the relationship between perceived usefulness and behavioural intention (Faqih & Jaradat, 2015). This result shows no significant moderation between perceived usefulness and behavioural intention probably because students in Malaysia with the high or low level of collectivism/ individualism tend to behave similarly towards the m-commerce adoption.

**5.3.2.2 The Relationship Between Perceived Ease of Use and Behavioural Intention to Use M-Commerce Among University Students in Malaysia is Positively Moderated by Individualism-Collectivism at Individual-Level For Collectivism Than For Individualism. (H15).**

The relationship between perceived ease of use (PEOU) and behavioural intention (BI) to use M-commerce among university students in Malaysia is positively moderated by individualism-collectivism at the individual-level (ICAIL) for collectivism than for individualism was not significant. The results shows that there are no moderation effect between the variables. This is line with findings from previous studies that found ICAIL for collectivism than for individualism has no moderation effect on the relationship between perceived ease of use and behavioural intention (Faqih & Jaradat, 2015).

Alternatively, the finding might be due to Malaysian students of who have the greater or lower level of collectivism/ individualism, tend to act similarly in the context of purchasing products through the online application. In other words, they have the

willingness to consider the convenience of the system and tend to adopt the m-commerce.

**5.3.2.3 The Relationship Between Perceived Ease of Use and Perceived Usefulness to Use M-Commerce Among University Students in Malaysia Is Positively Moderated by The Individualism-Collectivism at Individual-Level For Collectivism Than For Individualism. (H15)**

The relationship between perceived ease of use and perceived usefulness to use M-commerce among university students in Malaysia is positively moderated by the individualism-collectivism at individual-level for collectivism than for individualism is found to be not significant in this study. Hence, hypothesis 15 is not supported. However, this results is contrary with the findings of previous studies that found ICAIL moderated the correlation of perceived usefulness and the perceived ease of use (Hung *et al*., 2010; Zhang *et al*., 2012; Faqih & Jaradat, 2015).



The absence of moderating influence of individualism-collectivism because the rational and independence decision are not important when it comes to the individual intention towards m-commerce adoption. Therefore, Malaysian students possessing either high or low level of collectivism/ individualism tend to behave similarly in engaging with the m-commerce transaction such as mobile shopping, mobile financial services and mobile entertainment using mobile devices.

#### 5.3.2.4 The Relationship Between Subjective Norm and Behavioural Intention to Use M-Commerce Among University Students in Malaysia Is Positively Moderated By Individualism-Collectivism At Individual-Level For Collectivism Than For Individualism (H17)

The finding of this study reveals that individualism-collectivism at individual-level for collectivism than for individualism does not show moderation effect with the relationship between subjective norm and behavioural intention to use M-commerce among university students in Malaysia. Hence, hypothesis 17 is not supported. Previous studies have found mixed findings with regards to the moderating influence of individualism-collectivism in the relationship between subjective norm and behavioural intention.

For instance, the ICAIL showed insignificant moderation in the relationship between subjective norm and behavioural intention in the m-commerce studies (Zhang *et al*., 2012; Faqih & Jaradat, 2015). On the other hand, the collectivism positively and significantly moderates the effects of social influence on the intention toward mobile internet services and information technology (Srite & Karahanna, 2006; Zendehdel & Paim, 2015). Put differently, bearing in mind m-commerce technology is important in business environments nowadays, Malaysian students whether having a high or low level of collectivism/ individualism tend to act similarly towards developing their attitude towards m-commerce adoption.

## 5.4 Research Contributions

The findings of this study are important to test the determinants towards mobile commerce adoption among university students in Malaysia. In this study, TAM3 are

used as an underpinning theory and Individual-Collectivism at Individual Level as moderating variable which show that distinct contribution in term of m-commerce adoption in the Malaysian students' adoption. This research has made several practical and theoretical contributions to the m-commerce adoption. This is summarized in the following sections.

### 5.4.1 Practical Contributions

Based on the research findings, there are several practical contributions in the context of m-commerce adoption. The results of this research are important to the advancement of knowledge for marketers of mobile commerce companies. The outcomes of this study indicate that output quality and result demonstrability revealed insignificant effects towards m-commerce adoption among Malaysian students. The reason behind this is due to students feel that mobile commerce system not capable of performing and completing their job goals. Therefore, the results suggest that, m-commerce service providers should provide adequate output mobile applications and improve the systems to satisfy the customer quality requirements. Moreover, if the m-commerce providers improve the quality of consumer purchasing process, individuals will have positive perceptions towards the usefulness of the system and will motivate them to engage in m-commerce. The improvement is important to achieve long-term customer loyalty towards m-commerce application.

The study also indicates that most of the students in Malaysia prefer to engage with mobile shopping (m-retailing, m-ticketing, and m-auction) (46.5%) rather than with mobile financial services (m-banking, m-payment, and m-brokering) (29.1%) due to low output quality system in mobile financial services application. This study also

reveals the student's expectation to receive services quickly, securely, and effortless in dealing with network and device problems.

Hence, the outcomes of this study suggest that financial service industries improve their output quality of the system to convince users to use their mobile financial applications. Additionally, they must also cultivate their marketing communications to create awareness about the funds and financial services given by the government by using social norm factors. The findings reveal that the individual action is impacted by the important referent group to whom she/he is identified such as friends. Therefore, financial service industries and government can motivate users' through the advertisement in the mass media or through word of mouth as alternative ways to increase the level of technology adoption.

### 5.4.2 Theoretical Contributions

In this study, the conceptual framework was developed based on the previous empirical research. The present study develops the model from the combination of Technology Acceptance Model (TAM, TAM2, and TAM3). The study demonstrates the extension of TAM3 model with the combination of the cultural theory (Individual-Collectivism at Individual Level) in investigating the use of mobile commerce among university students in Malaysia. The findings have contributed to the body of knowledge and provide a better understanding of m-commerce adoption particularly on the moderating effects of ICAIL in the context of developing countries.

Besides that, this study reveals that the effects of culture and values are different from that of western and eastern, which leads the variation in adoption of information

technologies. Moreover, the findings from the present study reveal that that ICAIL does not moderate the relationship between perceived usefulness and behavioural intention, perceived ease of use and behavioural intention, perceived usefulness and perceived ease of use, subjective norm and behavioural intention. This result indicates that Malaysian students, regardless of their level of ICAIL, act similarly in developing their attitude towards m-commerce adoption. This contribution is important to understand cultural influence at an individual-level context and the effects of the consumers' behaviour adoption and acceptance of varying types of information technologies.

Furthermore, this study also measures the effects of perceived usefulness and perceived ease of use determinants because there are several questionable findings relating to the relationships among these determinants. The results of the current study confirm the significant relationship that exist between self-efficacy and perceived ease of use in m-commerce adoption process. Therefore, the results are consistent with the TAM3 model that advocates, the factors for perceived usefulness will not influence the factors for perceived ease of use with the presence of other important social and cognitive constructs. This study contributes in the sense that TAM3 model is suitable to determine consumer behaviour on individual-level patterns of m-commerce.

Finally, the final model show that eight hypotheses are accepted which are H2, H4, H5, H8, H9, H10, H12, and H13. For example, subjective norm emerged as the strongest antecedent of consumer attitude. Usually, the users prefer to perform the behaviour, if they believe the referent think they should.The result of this study

indicated that TAM3 model can be applied in developing country like Malaysia and other countries. Last but not least, the current study adds insight to our understanding of student perception to the mobile commerce adoption in the university.

## 5.5 Limitation and Future Research Directions

There are several limitation and the present study offers perspectives for future studies. Firstly, the present study used only questionnaire to collect data. Therefore, future studies can use qualitative approach such as interview to get some insights on the suitable factors that impact the m-commerce, in order to have a better understanding of individual perceptions towards the technology adoption.

Secondly, the respondents of this study were only undergraduate students in several chosen universities in Malaysia which act as the limitation of this study. Thus, further research may consider broadening the scope of the respondents by involving business enterprises and government organizations in order to generalize the findings and determine the impact of m-commerce adoption in other environments.

Thirdly, the integrated TAM3 model used in the present study can be extended by adding prospective factors such as security-privacy, perceived risk, and trust. Future studies can also extend the model by incorporating other theories and investigating how culture influence the m-commerce adoption in Malaysia.

Finally, this study found no significant moderating effect of individual collectivism at the individual level (ICAIL) on behavioural intention and behavioural to use, perceived usefulness and behavioural intention, perceived ease of use and

behavioural intention, perceived usefulness and perceived ease of use in m-commerce adoption. Thus, future research could apply integrated TAM3 model with other moderating variables which are more suitable in order to strengthen the relationships.

## 5.6 Conclusion

In this study, the main objective is to propose a conceptual model by adapting integrated TAM3 model for mobile commerce adoption among university students in Malaysia. In order to achieve this, the following sub objectives are formulated. The first sub objective is to measure the effect of perceived usefulness and perceived ease of use towards mobile commerce adoption among university students in Malaysia. Whereas, the second sub objective is to examine the individual-collectivism at individual level (ICAIL) as moderating variable between these variables among university students in Malaysia (perceived usefulness and behavioural intention, perceived ease of use and behavioural intention, perceived usefulness and perceived ease of use, subjective norm and behavioural intention).

The present study examines the determinants that influence university students' (known as generation Y) perceptions, towards mobile commerce adoption in Malaysia. The study adapted TAM3 as the theoretical framework for identifying the determinants of perceived ease of use and perceived usefulness. In addition, this research also examines the moderating influence of culture on the relationship between behavioural intention and behavioural to use, perceived usefulness and behavioural intention, perceived ease of use and behavioural intention, perceived usefulness and perceived ease of use in m-commerce adoption.

Throughout the analysis, attempts have been made to answer the research questions hence, addressing the research objectives. The findings of this study found eight direct significant relationships, while nine hypotheses are found not accepted. Firstly, in term of perceived usefulness variable, image show significant relationship, while subjective norm, output quality and result demonstrability show insignificant relationship. Secondly, in perceived ease of use variable, self efficacy, perception of external control and playfulness show significant relationship, while anxiety show insignificant relationship. Thirdly, subjective norm have significant relationship with image, however, perceived usefulness show insignificant relationship with behavioural intention. Fourthly, perceived ease of use have significant relationship between perceived usefulness and behavioural intention. Finally, the perceived ease of use, perceived usefulness, subjective norm and behavioural intention show insignificant relationship with the moderating variable, ICAIL.

In particular, the present study shows that subjective norm, by which the use of mobile commerce is affected by others' opinion, emerged as the strongest antecedent of consumer attitude. However, students feel mobile commerce system not capable of performing and completing their job goals due to several limitations of the mobile devices and mobile networks. Hence, the mobile service provider should offer adequate output mobile applications and improve the quality of the system to achieve high result demonstrability to make the system easy to use. Besides that, this study shows that individual collectivism at individual level (ICAIL) does not moderate the relationships between the exogenous and endogenous variables in this study. The findings suggest that students in Malaysia with a high or low level of collectivism/ individualism tend to behave similarly towards the m-commerce adoption. This

indicate that student behaviour in Malaysia is different with the eastern and western culture.Thus, the variation in the adoption process have an important influence on consumer perception and intention to adopt m-commerce.

Finally, this study provides theoretical contribution and some practical contribution to the advancement of knowledge for m-commerce service provider, government, and financial services industries in Malaysia. In conclusion, the present study has added valuable theoretical and practical contribution by addressing the limitations and recommending several forthcoming research in the field of MC technology in Malaysia.

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# APPENDIXES

# APPENDIX A

# A QUESTIONNAIRE SURVEY ON THE DETERMINANTS OF MOBILE COMMERCE ADOPTION



**(English and Malay Version)**

**A QUESTIONNAIRE SURVEY ON THE DETERMINANTS OF MOBILE COMMERCE ADOPTION**

Dear Participant,

I am a doctoral student at the Othman Yeop Abdullah Graduate School of Business (OYA), University Utara Malaysia (UUM) under the supervision of Professor Dr. Shahizan Hassan. I am currently working on a doctoral thesis on "The Determinants of Mobile Commerce adoption among University Students in Malaysia".

The main objective of my thesis is to propose a conceptual model for mobile commerce adoption among university students in Malaysia. Consequently, the sub-objectives are 1) to measure the effect of perceived usefulness and perceived ease of use towards mobile commerce adoption and 2) to examine the moderating role of the individual-collectivism at individual level (ICAIL) between these variables among university students in Malaysia.

**a)** perceived usefulness and behavioural intention
**b)** perceived ease of use and behavioural intention
**c)** subjective norm and behavioural intention
**d)** perceived usefulness and perceived ease of use

The questionnaire consists of TWO (2) major parts:
Section A: Student background information
Section B: Determinants of mobile commerce adoption

**Short description of mobile commerce (M-commerce)**
M-commerce can be defined as the use of mobile devices such as smartphones and tablets in dealing with various transactions such as buying and selling products or services to clients anytime and anywhere through wireless network. The types of M-commerce transaction, include mobile financial services (m-banking, m-payment, and m-brokering), mobile shopping (m-retailing, m-ticketing, and m-auction) and mobile entertainment (m-gaming, m-music, m-video, and m-betting).

This study targets university students in Malaysian Universities. This survey will take approximately 10-15 minutes. We sincerely hope that you could complete this questionnaire and return it back as soon as possible. It is very important that you personally complete the questionnaire and select the answer that best reflects your view. Answer all questions as honestly as possible. There is no correct or best answers. All information provided is confidential and would only be used for academic purposes.

If you have any questions and comments concerning this study, please do not hesitate to contact me Nurul Labanihuda Bt Abdull Rahman at 013-5364262 or send your email to labanihuda@gmail.com.Thank you for taking your time and making the effort to complete the questionnaire. Your cooperation is very much appreciated.

**TINJAUAN SOAL SELIDIK TENTANG PENENTU PENGGUNAAN PERDAGANGAN MUDAH ALIH**

Responden yang dihormati,

Saya merupakan pelajar Ijazah Doktor Falsafah di Othman Yeop Abdullah Graduate School of Business (OYA), Universiti Utara Malaysia, di bawah penyeliaan Profesor Dr. Shahizan Hassan. Saya sedang menjalankan penyelidikan PhD tentang Penentu Penggunaan Perdagangan Mudah Alih dalam kalangan pelajar universiti di Malaysia.

Matlamat utama tesis saya ialah untuk mengusulkan satu model konsep untuk penggunaan perdagangan mudah alih dalam kalangan pelajar universiti di Malaysia. Terdapat dua sub-objektif untuk kajian saya, khususnya 1) untuk mengukur kesan kebergunaan anggapan dan mudah guna anggapan bagi penggunaan perdagangan mudah alih dan 2) untuk menyelidik pemboleh ubah penyederhana faham kolektif individu pada tahap individu (*individual-collectivism at individual level*) (ICAIL) antara pemboleh ubah berikut dalam kalangan pelajar universiti di Malaysia.

**a)** kebergunaan anggapan dan hasrat tingkah laku
**b)** mudah guna anggapan dan hasrat tingkah laku
**c)** norma subjektif dan hasrat tingkah laku
**d)** kebergunaan anggapan dan mudah guna anggapan

Soal selidik ini mengandungi DUA (2) bahagian penting, iaitu:
Bahagian A: Maklumat latar belakang pelajar
Bahagian B: Penentu penggunaan perdagangan mudah alih

**Huraian ringkas tentang dagang mudah alih (*mobile commerce*) (M-dagang)**
M-dagang boleh ditakrif sebagai penggunaan peranti mudah alih seperti telefon pintar dan tablet semasa mengendalikan pelbagai urusan seperti pembelian dan penjualan produk atau perkhidmatan kepada pelangguan bila-bila mana dan di mana-mana sahaja dengan menggunakan jaringan tanpa wayar. Antara bentuk-bentuk urusan m-dagang, termasuklah perkhidmatan kewangan mudah alih (m-perbankan, m-bayaran, dan m-broker), beli-belah mudah alih (m-runcit, m-tiket, dan m-lelong) dan hiburan mudah alih (m-permainan digital, m-muzik, m-video, dan m-pertaruhan).

Kajian ini menyasarkan pelajar universiti di Malaysia. Tinjauan ini mengambil masa lebih kurang 10 ke 15 minit. Saya amat berharap yang anda dapat melengkapkan soal selidik ini dan memulangkannya kepada saya dengan secepat mungkin. Penting untuk anda melengkapkan jawapan yang terkandung dalam soal selidik ini sendiri dan memilih jawapan terbaik yang menggambarkan pandangan anda. Anda diminta untuk menjawab sejujur yang mungkin. Tiada jawapan yang betul mahupun jawapan yang terbaik dalam kajian ini. Semua maklumat yang diberikan akan dirahsiakan dan hanya digunakan untuk tujuan akademik.

Anda dialu-alukan untuk menghubungi saya, Nurul Labanihuda Bt Abdull Rahman, menerusi telefon di 013-5364262 atau mengirim emel kepada labanihuda@gmail.com sekiranya anda mempunyai sebarang persoalan atau ingin mengemukakan komen.Terima kasih kerana meluangkan masa anda dan tenaga anda untuk menyempurnakan soal selidik ini. Kerjasama anda amat saya hargai.

**SECTION A: STUDENT BACKGROUND INFORMATION**
**BAHAGIAN A: MAKLUMAT LATAR BELAKANG PELAJAR**

**Instruction: Please fill in the blanks and put a tick (✓ ) in the space given to answer related questions, where applicable.**
***Arahan: Sila isi ruang kosong berikut dan tandakan (✓) dalam ruang yang berikan untuk menjawab soalan yang berkaitan.***

1. Gender/*Jantina*
   Male/*Lelaki* ☐
   Female/*Perempuan* ☐

2. Ethnic*/Etnik*

   Malay/*Melayu* ☐
   Chinese/*Cina* ☐
   Indian/*India* ☐
   Others/*Lain-lain* ☐

3. Age/*Umur*: _____

4. Level of semester/*Tahap Semester:* _____

5. Have you ever used mobile commerce?
   *Pernahkah anda menggunakan perdagangan mudah alih?*

   *Yes/Ya* ☐ (Answer next question/*Jawab soalan seterusnya*)
   *No/Tidak* ☐ (Reason/*Sebab*: _____)

6. What types of mobile devices do you currently use? (You may tick more than one answer.)
   *Apakah jenis peranti mudah alih yang anda gunakan sekarang? (Anda boleh menanda lebih daripada satu jawapan.)*
   Smartphones/*Te*lefon pintar ☐
   Tablets/*Tablet* ☐

7. Who influenced you in using mobile commerce? (You may tick more than one answer.)
   Siapakah yang mempengaruhi anda untuk menggunakan *perdagangan* mudah alih? (Anda boleh menanda lebih daripada satu jawapan.)
   *Family/Keluarga* ☐
   Friends*/Rakan-rakan* ☐
   Lecturers*/Pensyarah* ☐
   Spouse*/Pasangan* ☐
   *Others/Lain-lain:* ☐

   _____

*8.* Which type of mobile commerce transaction(s) are you currently engaged in?
*Apakah bentuk transaksi perdagangan mudah alih yang anda gunakan pada hari ini?*

| | | |
|---|---|---|
| a. | Mobile financial services (m-banking, m-payment, and m-brokering)<br>*Perkhidmatan kewangan mudah alih (m-perbankan, m-bayaran, dan m-broker)* | |
| b. | Mobile shopping (m-retailing, m-ticketing, and m-auction)<br>*Beli-belah mudah alih (m-runcit, m-tiket, dan m-lelong)* | |
| c. | Mobile entertainment (m-gaming, m-music, m-video, and m-betting)<br>*Hiburan mudah alih (m-permainan digital, m-muzik, m-video, dan m-pertaruhan).* | |

9. How frequent are you engaged in mobile commerce transactions?
*Berapa kerapkah anda melakukan transaksi perdagangan mudah alih?*

| | |
|---|---|
| Rarely (1-2 times/weeks)/ *Jarang sekali (1-2 kali/minggu)* | |
| Occasionally (3-4 times/weeks)/ *Sekali-sekala (3-4 kali /minggu)* | |
| Frequently (5-6 times/weeks)/ *Kerap kali (5-6 kali/minggu)* | |
| Very frequently (every day/weeks)/ *Sangat kerap (setiap hari/minggu)* | |

**SECTION B: DETERMINANTS OF MOBILE COMMERCE ADOPTION**
***BAHAGIAN B: PENENTU PENGGUNAAN PERDAGANGAN MUDAH ALIH***

**Direction: The following set of statements relate to your feelings about adoption of mobile commerce. For each statement, please show the extent to which you believe mobile commerce has the feature described by the statement. Do this by picking one of the seven numbers next to each statement. Circling a 7 means that you strongly agree that mobile commerce has that feature, and circling a 1 means that you strongly disagree. You may circle any of the numbers in the middle that show how strong your feelings are. There are no right or wrong answers and all we are interested in is a number that best shows your perception about mobile commerce adoption.**
***Arahan: Penyataan berikut berkait dengan perasaan anda tentang penggunaan perkhidmatan perdagangan mudah alih. Nyatakan tahap kepercayaan anda bahawa perkhidmatan dagang mudah alih mempunyai ciri-ciri yang dinyatakan dalam setiap penyataan. Anda dikehendaki memilih satu daripada tujuh nombor yang tertera untuk setiap penyataan. Apabila anda membulatkan nombor 7, ini bererti anda sangat bersetuju bahawa perkhidmatan dagang mudah alih memiliki ciri-ciri yang disebut dalam penyataan tersebut. Apabila anda membulatkan nombor 1, ini bererti anda sangat tidak bersetuju dengan penyataan tersebut. Anda boleh membulatkan mana-mana satu nombor di tengah-tengah yang menggambarkan tahap persetujuan anda dengan setiap penyataan. Tiada jawapan yang betul mahupun jawapan yang salah untuk setiap penyataan. Kami hanya berminat dengan nombor yang paling tepat memperlihatkan pandangan anda tentang penerimagunaan perkhidmatan dagang mudah alih.***

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| **Scale** ***Skala*** | **Strongly disagree** ***Sangat tidak bersetuju*** | **Disagree** ***Tidak bersetuju*** | **Slightly disagree** ***Agak tidak bersetuju*** | **Neither agree or disagree** ***Setuju pun bukan dan tidak setuju juga bukan*** | **Slightly agree** ***Agak bersetuju*** | **Agree** ***Bersetuju*** | **Strongly agree** ***Sangat bersetuju*** |

**1.0 This section is aimed at understanding the *Behavioural Intention* of mobile commerce adoption.**
***Bahagian ini bermatlamat untuk memahami Hasrat Tingkah Laku berhubung penggunaan perdagangan mudah alih.***

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| BI1 | Assuming I had access to M-commerce, I intend to use it.<br>*Saya berhasrat untuk menggunakan M-dagang, sekiranya saya mempunyai akses terhadap perkhidmatan ini.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| BI2 | I intend to use M-commerce frequently during my studies.<br>*Saya berhasrat untuk menggunakan M-dagang dengan kerap sepanjang pengajian saya.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| BI3 | Given that I had access to M-commerce, I predict I would use it.<br>*Saya meramalkan yang saya akan menggunakan M-dagang memandangkan saya mempunyai akses terhadap M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| BI4 | I plan to use M-commerce in the next few months.<br>*Saya merancang untuk menggunakan M-dagang pada bulan-bulan yang akan datang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2.0 **This section is aimed at understanding the *Subjective Norm* of mobile commerce (m-commerce).**<br>***Bahagian ini bermatlamat untuk memahami Norma Subjektif berhubung penggunaan perdagangan mudah alih.*** | | | | | | | | |
| SN1 | People who influence my behaviour think that I should use M-commerce.<br>*Mereka yang mempengaruhi tingkah laku saya berpandangan yang saya patut menggunakan perkhidmatan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| SN2 | People who are important to me think that I should use M-commerce.<br>*Mereka yang penting kepada saya berpandangan yang saya patut menggunakan perkhidmatan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| SN3 | I think that university senior management will support the use of M-commerce.<br>*Saya berpandangan yang pihak pengurusan atasan universiti akan menyokong penggunaan perkhidmatan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| SN4 | In general, the university has supported the use of M-commerce.<br>*Secara umumnya, pihak universiti menyokong penggunaan perkhidmatan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 3.0 **This section is aimed at understanding the *Image* of mobile commerce (m-commerce) adoption**<br>***Bahagian ini bermatlamat untuk memahami Imej berhubung penggunaan perdagangan mudah alih.*** | | | | | | | | |
| I1 | Students in my university who are engaged in M-commerce have more prestige than those who do not.<br>*Pelajar di universiti saya yang menggunakan perkhidmatan M-dagang lebih berprestij berbanding pelajar yang tidak menggunakan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I2 | Students in my university who are engaged in M-commerce have a high profile.<br>*Pelajar di universiti saya yang menggunakan perkhidmatan M-dagang mempunyai profail yang lebih tinggi.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| I3 | Engaging in M-commerce makes me distinctive from others at the university.<br>*Penggunaan perkhidmatan M-dagang menyerlahkan diri saya berbanding orang lain di universiti.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I4 | Students in my university who are engaged in M-commerce are IT savvy.<br>*Pelajar di universiti saya yang menggunakan perkhidmatan M-dagang kelihatan lebih mahir dan pandai IT.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I5 | Students in my university who are engaged in M-commerce are trendy.<br>*Pelajar di universiti saya yang menggunakan perkhidmatan M-dagang kelihatan lebih bergaya.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **4.0 This section is aimed at understanding the *Result Demonstrability* of mobile commerce (m-commerce) adoption**<br>***Bahagian ini bermatlamat untuk memahami Kebolehpaparan Hasil berhubung penggunaan perdagangan mudah alih.*** | | | | | | | | |
| RES1 | I have no difficulty telling others about the results of engaging in M-commerce.<br>*Saya tidak mempunyai sebarang masalah untuk memberitahu orang lain tentang hasil penggunaan perkhidmatan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| RES2 | I believe I could communicate to others the consequences of engaging in M-commerce.<br>*Saya yakin saya berupaya untuk memaklumkan kepada orang lain tentang hasil penggunaan perkhidmatan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| RES3 | The results of engaging in M-commerce are apparent to me.<br>*Hasil penggunaan perkhidmatan M-dagang jelas kepada saya.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| RES4 | I would have difficulty explaining why engaging in the M-commerce may or may not be beneficial.<br>*Saya mungkin bermasalah untuk menerangkan sama ada penggunaan perkhidmatan M-dagang mungkin berfaedah ataupun tidak berfaedah.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 5.0 **This section is aimed at understanding the *Output Quality* of mobile commerce (m-commerce) adoption**<br>***Bahagian ini bermatlamat untuk memahami Kualiti Output berhubung penggunaan perdagangan mudah alih.*** | | | | | | | | |
| OUT1 | The quality of the output I get from M-commerce is high.<br>*Kualiti output yang saya terima daripada perkhidmatan M-dagang agak baik.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| OUT2 | I have no problem with the quality of M-commerce output.<br>*Saya tidak mempunyai masalah dengan kualiti output perkhidmatan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| OUT3 | I rate the results from M-commerce to be excellent.<br>*Saya menilai hasil daripada perkhidmatan M-dagang sebagai yang terbaik.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| OUT4 | Engaging in m-commerce enables me to perform related transaction quickly.<br>*Penggunaan perkhidmatan M-dagang membolehkan saya melakukan transaksi dengan cepat.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| OUT5 | M-commerce can be adapted to meet a variety of needs.<br>*Perkhidmatan M-dagang boleh disesuaikan untuk memenuhi pelbagai keperluan.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |



| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6.0 **This section is aimed at understanding the *Self Efficacy* of mobile commerce (m-commerce) adoption**<br>***Bahagian ini bermatlamat untuk memahami Efikasi Kendiri berhubung penggunaan perdagangan mudah alih.*** | | | | | | | | |
| SE1 | I would complete the job by employing M-commerce if there were no one around to tell me what to do as I go.<br>*Saya boleh menyempurnakan kerja dengan menggunakan perkhidmatan M-dagang sekiranya tidak sesiapa di sekeliling saya memberitahu saya apa-apa yang perlu saya lakukan semasa saya melakukan kerja.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| SE2 | I would complete the job by employing M-commerce if I had just the built-in-help facility for assistance.<br>*Saya boleh menyempurnakan kerja dengan menggunakan perkhidmatan M-dagang sekiranya terdapat kemudahan bantuan tersedia yang boleh menolong saya.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SE3 | I would complete the job by employing M-commerce if someone showed me how to do it first.<br>*Saya boleh menyempurnakan kerja dengan menggunakan perkhidmatan M-dagang sekiranya ada orang menunjukkan saya terlebih dahulu cara menggunakan perkhidmatan ini.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| SE4 | I would complete the job by employing M-commerce if I had used similar packages before this to do the same job.<br>*Saya boleh menyempurnakan kerja dengan menggunakan perkhidmatan M-dagang sekiranya saya pernah menggunakan pakej yang sama sebelum ini untuk melakukan kerja yang sama.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 7.0 **This section is aimed at understanding the *Playfulness* of adoption mobile commerce (m-commerce) adoption**<br>***Bahagian ini bermatlamat untuk memahami Sifat Main-main (Playfulness) berhubung penggunaan perdagangan mudah alih.*** | | | | | | | | |
| PLAY1 | I am spontaneous when engaging in M-commerce.<br>*Saya bertindak spontan apabila menggunakan perkhidmatan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| PLAY2 | I am creative when engaging in M-commerce.<br>*Saya kreatif apabila menggunakan perkhidmatan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| PLAY3 | I am playful when engaging in M-commerce.<br>*Saya suka main-main apabila menggunakan perkhidmatan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| PLAY4 | I am unoriginal when engaging in M-commerce.<br>*Saya bertindak luar daripada kebiasaan apabila menggunakan perkhidmatan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **8.0 This section is aimed at understanding the *Anxiety* of mobile commerce (m-commerce) adoption**<br>***Bahagian ini bermatlamat untuk memahami Kegusaran berhubung penggunaan perdagangan mudah alih.*** | | | | | | | | |
| ANX1 | M-commerce does not scare me at all.<br>*Perkhidmatan M-dagang tidak menakutkan saya sama sekali.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ANX2 | Working with M-commerce makes me nervous.<br>*Penggunaan perkhidmatan M-dagang membuatkan saya berasa gemuruh.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ANX3 | M-commerce makes me feel uncomfortable.<br>*Perkhidmatan M-dagang membuatkan saya berasa tidak selesa.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ANX4 | M-commerce makes me feel uneasy.<br>*Perkhidmatan M-dagang membuatkan saya berasa kurang senang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

9.0 **This section is aimed at understanding the *Perception Of External Control* of mobile commerce (m-commerce) adoption.**
***Bahagian ini bermatlamat untuk memahami Persepsi Kawalan Luaran berhubung penggunaan perdagangan mudah alih.***

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PEC1 | I have control over my engagement in the activity of M-commerce.<br>*Saya boleh mengawal aktiviti penggunaan M-dagang saya.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| PEC2 | I have resources necessary to use M-commerce.<br>*Saya mempunyai sumber yang diperlukan untuk menggunakan perkhidmatan M-dagang.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| PEC3 | Given the resources, opportunities and knowledge it takes to use the system, it would be easy for me to engage in M-commerce.<br>*Mudah untuk saya menggunakan perkhidmatan M-dagang dengan adanya sumber, peluang dan pengetahuan yang diperlukan untuk menggunakan sistem ini.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| PEC4 | M-commerce is not compatible with other systems I use.<br>*Perkhidmatan M-dagang tidak serasi dengan sistem lain yang saya gunakan.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10.0 **This section is aimed at understanding the *Perceived Usefulness* of mobile commerce (m-commerce) adoption.**<br>***Bahagian ini bermatlamat untuk memahami Kebergunaan Anggapan berhubung penggunaan perdagangan mudah alih.*** | | | | | | | | |
| PU1 | Engaging in M-commerce improves my performance in my job.<br>*Penggunaan perkhidmatan M-dagang meningkatkan prestasi saya semasa melakukan kerja.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| PU2 | Engaging in M-commerce in my job increases my productivity.<br>*Penggunaan perkhidmatan M-dagang dalam kerja meningkatkan produktiviti saya.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| PU3 | Engaging in M-commerce enhances my effectiveness in my job.<br>*Penggunaan perkhidmatan M-dagang meningkatkan keberkesanan kerja saya.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| PU4 | I find M-commerce to be useful in my job.<br>*Saya dapati perkhidmatan M-dagang berguna untuk kerja saya.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11.0 **This section is aimed at understanding the *Perceived Ease Of Use* of mobile commerce (m-commerce) adoption.**<br>***Bahagian ini bermatlamat untuk memahami Mudah Guna Anggapan berhubung penggunaan perdagangan mudah alih.*** | | | | | | | | |
| PEOU1 | My interaction with M-commerce is clear and understandable.<br>*Interaksi saya dengan perkhidmatan M-dagang jelas dan boleh difahami.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| PEOU2 | Interacting with M-commerce does not require a lot of my mental effort.<br>*Berinteraksi dengan perkhidmatan M-dagang tidak memerlukan saya untuk berfikir dengan banyak.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| PEOU3 | I find M-commerce easy to use.<br>*Saya dapati perkhidmatan M-dagang mudah digunakan.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| PEOU4 | I find it easy to get the M-commerce in dealing any transactions.<br>*Mudah untuk saya mendapatkan perkhidmatan M-dagang untuk melakukan sebarang transaksi.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 12.0 | **This section is aimed at understanding the *Individualism-Collectivism At Individual Level* of mobile commerce (m-commerce) adoption.**<br>***Bahagian ini bermatlamat untuk memahami Faham Kolektif Individu pada Tahap Individu berhubung penggunaan perdagangan mudah alih.*** | | | | | | | |
| ICAIL1 | Individual rewards are not as important as group welfare.<br>*Ganjaran individu tidak sepenting kebajikan kumpulan.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ICAIL2 | Group success is more important than individual success.<br>*Kejayaan kumpulan lebih penting berbanding kejayaan individu.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ICAIL3 | Being accepted as a member of a group is more important than having autonomy and independence on the job.<br>*Penerimaan seseorang sebagai ahli sesuatu kumpulan lebih penting daripada mempunyai kuasa autonomi dan kebebasan melakukan kerja.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ICAIL4 | It is more important for a group to encourage loyalty and a sense of duty as member than it is to encourage individual initiative.<br>*Penting untuk sesuatu kumpulang merangsang kesetiaan ahli dan rasa tanggungjawab ahli berbanding merangsang inisiatif individu.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ICAIL5 | Being loyal to a group is more important than individual gain.<br>*Setia kepada kumpulan lebih penting daripada keuntungan yang diperoleh oleh seseorang individu.* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

NOTE : Thank you for your cooperation . All information provided is confidential.

*NOTA : Terima kasih atas kerjasama yang diberikan. Semua maklumat yang diberikan akan dirahsiakan.*

# APPENDIX B

# RESULT DATA ANALYSIS

**NORMALITY TEST**

**Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | | Kurtosis | |
|---|---|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error | Statistic | Std. Error |
| MEANBI | 550 | 2.00 | 7.00 | 4.9709 | 1.05228 | -.062 | .104 | -.130 | .208 |
| MEANSN | 550 | 2.50 | 7.00 | 4.8685 | .92833 | .251 | .104 | -.073 | .208 |
| MEANI | 550 | 2.20 | 7.00 | 4.6021 | 1.01158 | .191 | .104 | -.148 | .208 |
| MEANRES | 550 | 2.75 | 6.75 | 4.7982 | .76412 | -.014 | .104 | -.159 | .208 |
| MEANOUT | 550 | 2.80 | 7.00 | 5.0413 | .88079 | .046 | .104 | -.215 | .208 |
| MEANSE | 550 | 2.75 | 7.00 | 5.0507 | .91290 | .152 | .104 | -.160 | .208 |
| MEANPLAY | 550 | 1.25 | 7.00 | 4.2390 | 1.04084 | .075 | .104 | .240 | .208 |
| MEANANX | 550 | 1.00 | 7.00 | 4.0194 | 1.11640 | .054 | .104 | .260 | .208 |
| MEANPEC | 550 | 2.75 | 6.75 | 4.7866 | .74323 | -.108 | .104 | .184 | .208 |
| MEANPU | 550 | 2.00 | 7.00 | 4.9295 | .96209 | .198 | .104 | -.169 | .208 |
| MEANPEOU | 550 | 2.50 | 7.00 | 4.9645 | .91865 | .119 | .104 | -.210 | .208 |
| MEANICAIL | 550 | 3.00 | 7.00 | 5.0072 | .92657 | .312 | .104 | -.296 | .208 |
| Valid N (listwise) | 550 | | | | | | | | |

| | | MEANBI | MEANSN | MEANI | MEANRES | MEANOUT | MEANSE | MEANPLAY | MEANANX | MEANPEC | MEANPU | MEANPEOU | MEANICAIL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | Valid | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 550 |
| | Missing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Skewness | | -.062 | .251 | .191 | -.014 | .046 | .152 | .075 | .054 | -.108 | .198 | .119 | .312 |
| Std. Error of Skewness | | .104 | .104 | .104 | .104 | .104 | .104 | .104 | .104 | .104 | .104 | .104 | .104 |
| Kurtosis | | -.130 | -.073 | -.148 | -.159 | -.215 | -.160 | .240 | .260 | .184 | -.169 | -.210 | -.296 |
| Std. Error of Kurtosis | | .208 | .208 | .208 | .208 | .208 | .208 | .208 | .208 | .208 | .208 | .208 | .208 |

## DEMOGRAPHIC SECTION

**Jantina**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | lelaki | 191 | 34.7 | 34.7 | 34.7 |
| | perempuan | 359 | 65.3 | 65.3 | 100.0 |
| | Total | 550 | 100.0 | 100.0 | |

**Etnik**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | melayu | 458 | 83.3 | 83.3 | 83.3 |
| | cina | 49 | 8.9 | 8.9 | 92.2 |
| | india | 21 | 3.8 | 3.8 | 96.0 |
| | lain-lain | 22 | 4.0 | 4.0 | 100.0 |
| | Total | 550 | 100.0 | 100.0 | |

**Umur**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 17-18 | 2 | .4 | .4 | .4 |
| | 19-20 | 148 | 26.9 | 26.9 | 27.3 |
| | 21-22 | 302 | 54.9 | 54.9 | 82.2 |
| | 23-24 | 90 | 16.4 | 16.4 | 98.5 |
| | 25-26 | 7 | 1.3 | 1.3 | 99.8 |
| | 27-28 | 1 | .2 | .2 | 100.0 |
| | Total | 550 | 100.0 | 100.0 | |

**Tahap semester**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | sem 1-2 | 115 | 20.9 | 20.9 | 20.9 |
| | sem 3-4 | 150 | 27.3 | 27.3 | 48.2 |
| | sem 5-6 | 183 | 33.3 | 33.3 | 81.5 |
| | sem 7-8 | 102 | 18.5 | 18.5 | 100.0 |
| | Total | 550 | 100.0 | 100.0 | |

**Pernah menggunakan m-dagang**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | ya | 550 | 100.0 | 100.0 | 100.0 |

**Jenis mudah alih**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Telefon pintar | 480 | 87.3 | 87.3 | 87.3 |
| | tablet | 70 | 12.7 | 12.7 | 100.0 |
| | Total | 550 | 100.0 | 100.0 | |

**Siapa mempengaruhi**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | keluarga | 35 | 6.4 | 6.4 | 6.4 |
| | rakan-rakan | 376 | 68.4 | 68.4 | 74.7 |
| | pensyarah | 32 | 5.8 | 5.8 | 80.5 |
| | pasangan | 39 | 7.1 | 7.1 | 87.6 |
| | lain-lain | 68 | 12.4 | 12.4 | 100.0 |
| | Total | 550 | 100.0 | 100.0 | |

**Bentuk transaksi**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | perkhidmatan kewangan mudah alih | 160 | 29.1 | 29.1 | 29.1 |
| | beli-belah mudah alih | 256 | 46.5 | 46.5 | 75.6 |
| | hiburan mudah alih | 134 | 24.4 | 24.4 | 100.0 |
| | Total | 550 | 100.0 | 100.0 | |

**Kekerapan**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | jarang sekali | 400 | 72.7 | 72.7 | 72.7 |
| | sekali-sekala | 101 | 18.4 | 18.4 | 91.1 |
| | kerap kali | 23 | 4.2 | 4.2 | 95.3 |
| | sangat kerap | 26 | 4.7 | 4.7 | 100.0 |
| | Total | 550 | 100.0 | 100.0 | |

## FACTOR ANALYSIS

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .761 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 658.432 |
| | df | 91 |
| | Sig. | .000 |

**Rotated Component Matrix[a]**

| | Component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| I1 | .876 | | |
| I5 | .868 | | |
| I3 | .849 | | |
| I2 | .726 | | .409 |
| I4 | .530 | .387 | .309 |
| OUT2 | | .810 | |
| OUT1 | | .762 | .378 |
| OUT3 | | .731 | .333 |
| OUT5 | .388 | .652 | |
| BI3 | | | .842 |
| BI1 | | | .833 |
| BI2 | .301 | | .519 |
| OUT4 | | .471 | .499 |
| BI4 | .420 | | .429 |

**LOADINGS OF THE ITEMS**

| Constructs | Item | ANX | BI | I | ICAIL | OUT | PEC | PEOU | PLAY | PU | RES | SE | SN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anxiety | **ANX1** | **0.948** | 0.269 | 0.272 | 0.273 | 0.346 | 0.298 | 0.374 | 0.417 | 0.371 | 0.282 | 0.274 | 0.296 |
| | **ANX2** | **0.555** | 0.021 | 0.235 | 0.166 | 0.067 | 0.095 | 0.101 | 0.270 | 0.191 | 0.043 | 0.158 | 0.127 |
| | **ANX3** | **0.539** | -0.025 | 0.188 | 0.095 | 0.031 | 0.048 | 0.054 | 0.291 | 0.148 | -0.007 | 0.097 | 0.079 |
| Behavioural Intention | **BI1** | 0.091 | **0.810** | 0.255 | 0.401 | 0.506 | 0.474 | 0.513 | 0.219 | 0.431 | 0.517 | 0.484 | 0.553 |
| | **BI2** | 0.252 | **0.838** | 0.405 | 0.402 | 0.520 | 0.422 | 0.500 | 0.275 | 0.504 | 0.471 | 0.463 | 0.598 |
| | **BI3** | 0.194 | **0.886** | 0.308 | 0.469 | 0.548 | 0.554 | 0.586 | 0.279 | 0.491 | 0.566 | 0.538 | 0.615 |
| | **BI4** | 0.244 | **0.883** | 0.357 | 0.398 | 0.550 | 0.513 | 0.546 | 0.283 | 0.514 | 0.542 | 0.474 | 0.645 |
| Image | **I1** | 0.253 | 0.342 | **0.875** | 0.285 | 0.362 | 0.266 | 0.344 | 0.268 | 0.410 | 0.298 | 0.352 | 0.402 |
| | **I2** | 0.267 | 0.365 | **0.893** | 0.328 | 0.384 | 0.313 | 0.392 | 0.260 | 0.421 | 0.314 | 0.373 | 0.414 |
| | **I3** | 0.360 | 0.345 | **0.887** | 0.287 | 0.365 | 0.280 | 0.377 | 0.301 | 0.475 | 0.349 | 0.359 | 0.412 |
| | **I4** | 0.186 | 0.352 | **0.836** | 0.345 | 0.433 | 0.282 | 0.378 | 0.236 | 0.414 | 0.373 | 0.436 | 0.418 |
| | **I5** | 0.262 | 0.262 | **0.832** | 0.319 | 0.332 | 0.204 | 0.347 | 0.260 | 0.380 | 0.319 | 0.330 | 0.314 |
| Individualism-Collectivism at individual level | **ICAIL1** | 0.334 | 0.321 | 0.346 | **0.696** | 0.296 | 0.364 | 0.454 | 0.234 | 0.416 | 0.260 | 0.385 | 0.340 |
| | **ICAIL2** | 0.230 | 0.442 | 0.308 | **0.826** | 0.414 | 0.439 | 0.496 | 0.205 | 0.439 | 0.368 | 0.392 | 0.346 |
| | **ICAIL3** | 0.239 | 0.409 | 0.321 | **0.850** | 0.387 | 0.465 | 0.512 | 0.230 | 0.448 | 0.365 | 0.444 | 0.323 |
| | **ICAIL4** | 0.135 | 0.381 | 0.230 | **0.816** | 0.412 | 0.460 | 0.511 | 0.201 | 0.404 | 0.376 | 0.428 | 0.313 |
| | **ICAIL5** | 0.203 | 0.402 | 0.248 | **0.824** | 0.443 | 0.456 | 0.476 | 0.235 | 0.413 | 0.419 | 0.478 | 0.337 |
| Output Quality | **OUT1** | 0.288 | 0.530 | 0.355 | 0.371 | **0.844** | 0.468 | 0.536 | 0.368 | 0.497 | 0.551 | 0.478 | 0.482 |
| | **OUT2** | 0.323 | 0.521 | 0.366 | 0.419 | **0.845** | 0.436 | 0.516 | 0.373 | 0.504 | 0.535 | 0.455 | 0.492 |
| | **OUT3** | 0.331 | 0.492 | 0.426 | 0.391 | **0.824** | 0.419 | 0.517 | 0.352 | 0.512 | 0.525 | 0.460 | 0.493 |
| | **OUT4** | 0.159 | 0.507 | 0.260 | 0.429 | **0.773** | 0.495 | 0.559 | 0.316 | 0.453 | 0.549 | 0.545 | 0.451 |
| | **OUT5** | 0.133 | 0.447 | 0.334 | 0.354 | **0.733** | 0.379 | 0.476 | 0.286 | 0.419 | 0.456 | 0.435 | 0.389 |
| Perception of external control | **PEC1** | 0.267 | 0.398 | 0.227 | 0.329 | 0.389 | **0.766** | 0.510 | 0.313 | 0.380 | 0.426 | 0.453 | 0.371 |
| | **PEC2** | 0.270 | 0.528 | 0.287 | 0.494 | 0.486 | **0.893** | 0.640 | 0.343 | 0.495 | 0.510 | 0.526 | 0.403 |
| | **PEC3** | 0.190 | 0.532 | 0.283 | 0.547 | 0.510 | **0.889** | 0.637 | 0.309 | 0.535 | 0.506 | 0.568 | 0.425 |
| Perceived ease | **PEOU1** | 0.314 | 0.562 | 0.368 | 0.515 | 0.526 | 0.663 | **0.874** | 0.377 | 0.652 | 0.534 | 0.555 | 0.467 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| of use | **PEOU2** | 0.367 | 0.357 | 0.415 | 0.430 | 0.461 | 0.397 | **0.674** | 0.420 | 0.453 | 0.421 | 0.329 | 0.354 |
| | **PEOU3** | 0.271 | 0.554 | 0.328 | 0.527 | 0.587 | 0.628 | **0.891** | 0.296 | 0.635 | 0.553 | 0.560 | 0.490 |
| | **PEOU4** | 0.238 | 0.580 | 0.335 | 0.550 | 0.572 | 0.612 | **0.867** | 0.309 | 0.597 | 0.593 | 0.542 | 0.490 |
| Playfulness | **PLAY1** | 0.399 | 0.336 | 0.279 | 0.267 | 0.378 | 0.384 | 0.399 | **0.896** | 0.416 | 0.428 | 0.408 | 0.330 |
| | **PLAY2** | 0.367 | 0.242 | 0.248 | 0.245 | 0.408 | 0.314 | 0.362 | **0.890** | 0.357 | 0.383 | 0.302 | 0.246 |
| | **PLAY3** | 0.352 | -0.063 | 0.221 | -0.035 | 0.014 | -0.013 | 0.002 | **0.444** | 0.085 | -0.018 | -0.032 | 0.050 |
| | **PLAY4** | 0.401 | 0.032 | 0.232 | 0.042 | 0.089 | 0.070 | 0.088 | **0.495** | 0.182 | 0.018 | 0.023 | 0.121 |
| Perceived Usefulness | **PU1** | 0.381 | 0.486 | 0.438 | 0.470 | 0.521 | 0.516 | 0.633 | 0.417 | **0.891** | 0.489 | 0.533 | 0.469 |
| | **PU2** | 0.350 | 0.547 | 0.441 | 0.455 | 0.568 | 0.545 | 0.672 | 0.377 | **0.905** | 0.542 | 0.570 | 0.503 |
| | **PU3** | 0.305 | 0.503 | 0.415 | 0.480 | 0.507 | 0.464 | 0.613 | 0.389 | **0.914** | 0.484 | 0.515 | 0.446 |
| | **PU4** | 0.321 | 0.508 | 0.460 | 0.495 | 0.540 | 0.477 | 0.634 | 0.367 | **0.889** | 0.506 | 0.527 | 0.472 |
| Result Demonstrability | **RES1** | 0.238 | 0.535 | 0.344 | 0.399 | 0.555 | 0.469 | 0.558 | 0.357 | 0.488 | **0.906** | 0.546 | 0.510 |
| | **RES2** | 0.193 | 0.545 | 0.374 | 0.423 | 0.591 | 0.532 | 0.581 | 0.391 | 0.528 | **0.929** | 0.566 | 0.503 |
| | **RES3** | 0.245 | 0.581 | 0.316 | 0.386 | 0.613 | 0.531 | 0.582 | 0.413 | 0.503 | **0.871** | 0.491 | 0.494 |
| Self-efficacy | **SE1** | 0.290 | 0.489 | 0.392 | 0.370 | 0.492 | 0.463 | 0.523 | 0.363 | 0.533 | 0.509 | **0.795** | 0.429 |
| | **SE2** | 0.227 | 0.507 | 0.330 | 0.444 | 0.523 | 0.547 | 0.536 | 0.338 | 0.501 | 0.538 | **0.872** | 0.439 |
| | **SE3** | 0.173 | 0.445 | 0.351 | 0.476 | 0.434 | 0.486 | 0.449 | 0.235 | 0.421 | 0.406 | **0.816** | 0.390 |
| | **SE4** | 0.242 | 0.468 | 0.361 | 0.483 | 0.508 | 0.532 | 0.517 | 0.317 | 0.529 | 0.513 | **0.855** | 0.445 |
| Subjective Norm | **SN1** | 0.274 | 0.585 | 0.361 | 0.366 | 0.452 | 0.416 | 0.476 | 0.284 | 0.483 | 0.445 | 0.418 | **0.798** |
| | **SN2** | 0.259 | 0.620 | 0.358 | 0.363 | 0.484 | 0.441 | 0.495 | 0.285 | 0.466 | 0.501 | 0.426 | **0.828** |
| | **SN3** | 0.200 | 0.545 | 0.356 | 0.323 | 0.494 | 0.340 | 0.412 | 0.233 | 0.381 | 0.445 | 0.396 | **0.832** |
| | **SN4** | 0.212 | 0.553 | 0.418 | 0.293 | 0.454 | 0.330 | 0.397 | 0.239 | 0.382 | 0.426 | 0.430 | **0.814** |

## SIGNIFICANCE LEVEL OF FACTOR LOADINGS

| Constructs | Item | Loading | Standard Error (STERR) | T Value | P Value |
|---|---|---|---|---|---|
| Anxiety | ANX1 | 0.948 | 0.041 | 23.356 | 0.000 |
| | ANX2 | 0.555 | 0.156 | 3.551 | 0.000 |
| | ANX3 | 0.539 | 0.158 | 3.419 | 0.001 |
| Behavioural Intention | BI1 | 0.810 | 0.018 | 44.447 | 0.000 |
| | BI2 | 0.838 | 0.019 | 44.503 | 0.000 |
| | BI3 | 0.886 | 0.012 | 75.080 | 0.000 |
| | BI4 | 0.883 | 0.011 | 78.773 | 0.000 |
| Image | I1 | 0.875 | 0.015 | 57.295 | 0.000 |
| | I2 | 0.893 | 0.013 | 67.211 | 0.000 |
| | I3 | 0.887 | 0.012 | 75.564 | 0.000 |
| | I4 | 0.836 | 0.017 | 50.149 | 0.000 |
| | I5 | 0.832 | 0.024 | 34.873 | 0.000 |
| Individualism-Collectivism at individual level | ICAIL1 | 0.696 | 0.033 | 21.013 | 0.000 |
| | ICAIL2 | 0.826 | 0.021 | 39.393 | 0.000 |
| | ICAIL3 | 0.850 | 0.018 | 47.257 | 0.000 |
| | ICAIL4 | 0.816 | 0.022 | 36.678 | 0.000 |
| | ICAIL5 | 0.824 | 0.019 | 43.320 | 0.000 |
| Output Quality | OUT1 | 0.844 | 0.018 | 46.851 | 0.000 |
| | OUT2 | 0.845 | 0.020 | 42.416 | 0.000 |
| | OUT3 | 0.824 | 0.019 | 44.174 | 0.000 |
| | OUT4 | 0.773 | 0.032 | 24.011 | 0.000 |
| | OUT5 | 0.733 | 0.033 | 21.972 | 0.000 |
| Perception of external control | PEC1 | 0.766 | 0.034 | 22.517 | 0.000 |
| | PEC2 | 0.893 | 0.010 | 90.232 | 0.000 |
| | PEC3 | 0.889 | 0.013 | 69.497 | 0.000 |

| | | | | | |
|---|---|---|---|---|---|
| Perceived ease of use | PEOU1 | 0.874 | 0.012 | 72.890 | 0.000 |
| | PEOU2 | 0.674 | 0.050 | 13.376 | 0.000 |
| | PEOU3 | 0.891 | 0.010 | 85.767 | 0.000 |
| | PEOU4 | 0.867 | 0.015 | 58.506 | 0.000 |
| Playfulness | PLAY1 | 0.896 | 0.019 | 47.184 | 0.000 |
| | PLAY2 | 0.890 | 0.025 | 36.258 | 0.000 |
| | PLAY3 | 0.444 | 0.118 | 3.762 | 0.000 |
| | PLAY4 | 0.495 | 0.115 | 4.321 | 0.000 |
| Perceived Usefulness | PU1 | 0.891 | 0.012 | 71.634 | 0.000 |
| | PU2 | 0.905 | 0.011 | 81.375 | 0.000 |
| | PU3 | 0.914 | 0.010 | 95.395 | 0.000 |
| | PU4 | 0.889 | 0.013 | 67.791 | 0.000 |
| Result Demonstrability | RES1 | 0.906 | 0.011 | 82.945 | 0.000 |
| | RES2 | 0.929 | 0.008 | 119.672 | 0.000 |
| | RES3 | 0.871 | 0.019 | 45.786 | 0.000 |
| Self-efficacy | SE1 | 0.795 | 0.023 | 35.117 | 0.000 |
| | SE2 | 0.872 | 0.014 | 62.066 | 0.000 |
| | SE3 | 0.816 | 0.026 | 31.594 | 0.000 |
| | SE4 | 0.855 | 0.017 | 50.304 | 0.000 |
| Subjective Norm | SN1 | 0.798 | 0.023 | 34.306 | 0.000 |
| | SN2 | 0.828 | 0.018 | 46.976 | 0.000 |
| | SN3 | 0.832 | 0.023 | 36.897 | 0.000 |
| | SN4 | 0.814 | 0.022 | 36.639 | 0.000 |