ISCTE Business School

University Institute of Lisbon

FACTORS INFLUENCING THE ADOPTION OF M-COMMERCE IN INDONESIA

A Study of TAM and TPB Integration Model

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RESUMO

A rápida transformação na tecnologia de telefones móveis/banda larga móvel e o aumento na cobertura de internet em redes sem fios, conduziu ao crescimento do comércio electrónico à escala mundial. Este fenómeno tem induzido um crescente interesse em plataformas de comércio móveis por parte de diversos sectores empresariais desejosos de entrar neste modelo de negócio. Assim, é importante saber como os consumidores se vão adaptar e adoptar estas tecnologias para expandir este mercado emergente, especialmente em mercados de elevado potencial e com elevado número de consumidores, como a Indonésia.

Este estudo fornece diversas hipóteses de identificação dos factores que contribuem para influenciar as intenções de consumo e de comportamento dos consumidores utilizando sistemas de comércio electrónico, adaptando a integração do Modelo de Aceitação de Tecnologia e a Teoria do Comportamento Planeado à análise dos dados recolhidos. Os factores analisados neste estudo foram a atitude, a utilidade percepcionada, a percepção de facilidade de uso, normas subjectivas, o controle percebido do comportamento e a confiança dos consumidores.

De acordo com os dados recolhidos a partir de 384 questionários on-line validados, os resultados demonstram que as intenções de comportamento dos consumidores são predominantemente afectadas pelas atitudes dos consumidores, seguidas de normas subjectivas e pelo controle percebido do comportamento. Não foi demonstrado qualquer efeito directo da utilidade percepcionada na intenção comportamental dos consumidores. Contudo, há um efeito indirecto via atitude do consumidor. A atitude to consumidor em si mesma é directamente influenciada pela percepção de utilidade e de confiança, e também por um efeito indirecto a partir da facilidade de utilização através da utilidade percepcionada. Desejavelmente esta tese poderá proporcionar ajuda aos negócios interessados em plataformas móveis de comércio, e estimular mais investigação para entender o comportamento dos consumidores indonésios neste tipo de negócios.

Palavras Chave : Adopcão de sistemas, Comércio electrónico, Modelo de Aceitação de Tecnologia, Teoria do Comportamento Planeado, Confiança, Comportamento dos Consumidores indonésios.

JEL classifications : C12 – Hypothesis Testing: General; M20 – General; M31 – Marketing

ABSTRACT

The rapid shift in technology regarding mobile phone and wireless internet coverage has led to the growth of mobile commerce transaction worldwide. This phenomenon is raising awareness among business players who want to jump into the mobile commerce platform. Therefore, the insight on how the consumer will adapt and move to the mobile platform is essential to expand the market, especially on colossal consumer base like Indonesia.

This study provides several hypotheses to identify the factors that contribute to influence the consumer behavior intention to use mobile commerce system by adapting the integration of Technology Acceptance Model and Theory of Planned Behavior. The researched factors consist of attitude, perceived usefulness, perceived ease of use, subjective norm, perceived behavioral control, and trust.

According to the collected data from 384 qualified respondents through an online questionnaire, the result shows that the consumer behavioral intention is dominantly affected by users' attitude and then followed by subjective norm and perceived behavioral control. There is no evidence for the direct effect from PU to BI. However, PU has an indirect effect on BI through the attitude. The attitude itself is getting direct influence from trust and perceived usefulness, also an indirect effect from the perceived ease of use through PU. Hopefully, this thesis could provide help for the mobile commerce business and stimulate further research to understand the Indonesian consumer behavior in mobile commerce market better.

Keywords : System adoption, mobile commerce, technology acceptance model, theory of planned behavior, trust, Indonesian consumer behavior

JEL classifications : C12 – Hypothesis Testing: General; M20 – General; M31 – Marketing

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GLOSSARY

BI – Behavioral Intention

E-commerce – Electronic commerce

M-commerce – Mobile commerce

PBC – Perceived Behavioral Control

PEOU – Perceived Ease of Use

PU – Perceived Usefulness

SN – Subjective Norm

SNS – Social Networking Site

TAM – Technology Acceptance Model

TPB – Theory of Planned Behavior

TRA – Theory of Reasoned Action

1. INTRODUCTION

The massive spread of the mobile phone worldwide has become a great phenomenon to change the interaction among humans. It transformed the way people communicate and connect without borders (The Economist, 2015). Distance is no longer a problem to pass on any message or information due to the rapid improvement of the technology. The use of mobile phone is predicted to keep advancing in the years ahead. Chaffey gathered data from Morgan Stanley Research through ComScore report and showed that the number of global mobile users had surpassed the desktop users around early 2014 (Chaffey, 2017). This data marks a trend of rapid growth in mobile phone end users compared to the desktop computer.

There are around seven billion people (95% of the global population) living in an area which has a mobile-cellular network (ITU, 2016). In its finding, ITU (2014, 2015, 2016) mentioned how fast the internet and mobile adoption had changed worldwide. The changes also apply in the developing countries as well, even though these are still behind the other wealthy countries (Poushter, 2016). Such a massive growth of mobile user determines the potential of the commercial use of the mobile aspect, which will lead to mobile commerce (m-commerce).

Initially, during the development of mobile phone, m-commerce had been used for a simple transaction like buying customized ringtones or display picture in the late 90's. The performed transaction was still understandable as a result of the constraint in that current technology. Although the conducted activities were not that extensive, they already planted the idea for more prominent use of mobile commerce in the future. In the late 2000's, the birth of smartphone changed the mobile industry by extending the features of a mobile phone. It was gradually enhancing its function towards a computer.

Since 2010, Ingram had predicted that mobile internet would outpace the number of fixed internet use (Ingram, 2010). In line with the forecast, the internet usage in mobile apps alone finally beats the personal computer in February 2014 (O'Toole, 2014). It is understandable since the number of mobile users also raised significantly and passed the

total of desktop users as previously mentioned (Chaffey, 2017). Accordingly, the extension of the mobile phone ability with internet support has opened a whole new function. The easiness in developing mobile applications (mobile apps) within specific mobile operating systems (OS), such as iOS and Android, gives support to boost this trend. Currently, there are millions of apps that provide services and products to the mobile phone users.

The rapid advancement in the smartphone has led the innovation in the mobile commerce sector as well. People can no longer have to be bound to the computer to deal a transaction since the mobile phone can simplify things, especially using the optimized-apps designed for mobile users. Nowadays, customers are allowed to shop via the internet through multiple devices, like a tablet or mobile phone. Therefore, many m-commerce players are creating mobile apps and optimizing its website for multiple devices (a responsive design) to provide better mobile experience (Jahanshahi *et al*., 2012).

United Nation Conference on Trade and Development defined the mobile commerce as buying and selling of goods and services using wireless handheld devices (UNCTAD, 2004). M-commerce acts as another channel through which has the potential of a broader value added compared to e-commerce processes. Many speculated that mobile commerce is going to be the next phase in technology involvement following the electronic commerce era. However, the adoption rate of the mobile transaction in Indonesia was lower compared to China, South Korea, and India as indicated in the State of Global E-commerce Report 2013 by GlobalWebIndex (eMarketer, 2013).

Indonesia is one of the highest population in Southeast Asia with around 250 million people and made Indonesia as the 4^{th} most populous country in the world (Badan Pusat Statistik, 2016; The World Bank, 2015). Data from the Internet World Stats on Table 1 stated that there are roughly around 132.7 million internet users from Indonesia. With that vast numbers, Indonesia has the potential to be a big market to gain customers.

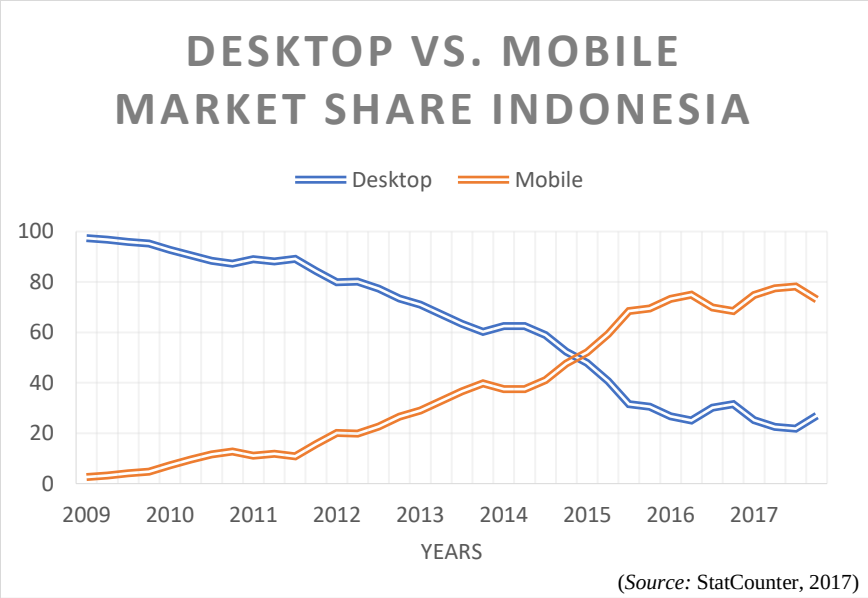
The connection of internet through mobile in Indonesia was reaching 64.1 million by fourth quarterly report 2015 GlobalWebIndex, and it showed a good number compared to the other developing countries (We Are Social, 2016). In 2020, the middle class will be rising to an astonishing number of 141 million as predicted by Boston Consulting Group (BCG)

under Syukra's article on Jakarta Globe (Syukra, 2013). The consumption level in Indonesia is also high (Rastogi *et al*. 2016). Therefore, this condition highlights Indonesia as an attractive market in the future.

According to the eMarketer (2014), the total of the transaction from e-commerce is growing worldwide around 20 percent in 2014, while the m-commerce alone succeeds in capturing significant portion as mentioned by Brohan (2015) and Criteo (2015[a]). In Indonesia, the findings from Criteo for Southeast Asia market showed a positive number (Criteo, 2015[b]; Ryza, 2015). The m-commerce trend in Indonesia started to rise significantly for the last couple of years since the progressive implementation of 3G network nationally. The total of the mobile commerce transaction is predicted to dominate the whole electronic commerce transaction soon (Harsono, 2016).

One of the unique characteristics of Indonesian consumer that has been spotted by Harsono (2016) is about the advantage of being mobile-first adopters. That unique character represents Indonesian market which embraces the use of smartphone rather than a desktop. Smartphone has contributed to more than 70 percent of internet traffic today according to the data from StatCounter (2017). The number of mobile users already passed the desktop counterpart since late 2014 as showed in Figure 1. The popular name of start-ups spreading widely, such as Gojek and Traveloka, who become a success story of venturing this benefit. Furthermore, the attention to m-commerce market in Indonesia has attracted the attention of more prominent e-commerce player like Alibaba, Amazon, and other companies (Koyanagi, 2017).

As previously explained, the recent technology development of mobile phone finally leads to the adoption of m-commerce to the users. M-commerce simplifies online purchasing by offering the new experience in a transaction to obtain services or products in the comfortable touch of fingertips. The user interface is designed to use the small screen of the smartphone better and to obtain many features like searching for information, evaluating different options, making a purchase, and multiple payment systems.



(*Source:* StatCounter, 2017)

Figure 1 Desktop vs. Mobile Market Share in Indonesia from Q1 2009 – Q4 2017

This new trend sooner or later will affect how the marketers reach their customers. Due to the massive competition among the online retailers, mobile commerce seems to be the next big thing that will become the icon of the online market. By better understanding the behavior of m-commerce users, the retailers can improve the consumer experience and attract more customers. According to that, the factors that influence the adoption of m-commerce in Indonesia need to be determined to help the retailers deliver the best m-commerce experience.

Table 1 Top 20 Countries with The Highest Number of Internet Users

Rank	Countries	Population 2017 Est.	Internet Users 30 June 2017	Internet Penetration	Growth 2000 - 2017
1	China	1,388,232,693	738,539,792	53.2 %	3,182.4 %
2	India	1,342,512,706	462,124,989	34.4 %	9,142.5 %
3	United States	326,474,013	286,942,362	87.9 %	200.9 %
4	Brazil	211,243,220	139,111,185	65.9 %	2,682.2 %
5	**Indonesia**	**263,510,146**	**132,700,000**	**50.4 %**	**6,535.0 %**
6	Japan	126,045,211	118,453,595	94.0 %	151.6 %
7	Russia	143,375,006	109,552,842	76.4 %	3,434.0 %
8	Nigeria	191,835,936	91,598,757	47.7 %	45,699.4 %
9	Mexico	130,222,815	85,000,000	65.3 %	3,033.8 %
10	Bangladesh	164,827,718	73,347,000	44.5 %	73,247.0 %

(*Source:* Internet World Stats, 2017)

2. LITERATURE REVIEW

Until now, there is only a few research that discussed mobile commerce adoption in Indonesia. However, many researchers have focused on e-commerce adaptation in various business fields. Therefore, diverse literature sources are available to understand about similar fields thoroughly. It is essential to review related previous studies and develop a theoretical background for the current research. Later on, this part of the essay will explain the evolution of mobile commerce, the studies about Technology of Acceptance Model (TAM), and Theory of Planned Behavior (TPB) for a better insight into this research.

2.1. The Evolution of Mobile Commerce

Since its development in the very beginning, the internet has shown the potential to grow hugely as a communication channel today. It was started in the early of 1960s and initially built for the military purposes (Leiner *et al*., 1997). Since the internet became public, the innovation keeps rolling in and finally contributes to its success. It attracts more users during the late 90s due to the extensive improvement on the service which opens a whole new way of interaction and functionality (Howe, 2016).

The idea of the internet is how to connect one computer to another to transfer information and establish communication. Now, the internet is a system which connects billion of computers network worldwide with total users reaching around 3.8 billion according to the available data in Table 2 (Internet World Stats, 2017). The trend for the smartphone for the last decade also pushing the adoption of the internet for mobile. Later, this mobile era is driving the movement of making everything connected and online through a mobile phone.

Some identified e-commerce as an economic activity in the form of exchange of information, goods, service, and payment, which occur through the digital platform of the internet (Pavlou, 2003; Sadi and Noordin, 2011; Suh and Han, 2003). The scope of e-commerce is utterly broad since it covers various transaction regarding advertisement, marketing, delivery, and all the way to the payment – it includes business-to-business (B2B), business-to-consumer (B2C), and consumer-to-consumer (C2C). The main

principle is about the utilization of internet and related digital technology to enhance the economic value added and commercial activities (Turban *et al*., 2015).

In many studies, researchers have recognized that mobile commerce is a further development of electronic commerce. Since m-commerce also uses the internet over mobile or tablet, the researchers categorized m-commerce as an extension of e-commerce. Both terms are pretty similar to each other and also shared fundamental business principles (Fong and Wong, 2015). In another opinion, mobile commerce is like a new element of the electronic commerce where all the transactions are connected via mobile devices and using a network in a wireless mode (Li and Dong, 2011). In a sense, mobile commerce is part of e-commerce which is specified through a mobile phone.

Table 2 World Internet Users and 2017 Population Stats

Region	**Population 2017 Est.**	**Population % of World**	**Internet Users 30 June 2017**	**Internet Penetration**	**Growth 2000 - 2017**	**Internet Users %**
Africa	1,246,504,865	16.6 %	388,376,491	31.2 %	8,503.1%	10.0 %
Asia	4,148,177,672	55.2 %	1,938,075,631	46.7 %	1,595.5%	49.7 %
Europe	822,710,362	10.9 %	659,634,487	80.2 %	527.6%	17.0 %
Latin America / Caribbean	647,604,645	8.6 %	404,269,163	62.4 %	2,137.4%	10.4 %
Middle East	250,327,574	3.3 %	146,972,123	58.7 %	4,374.3%	3.8 %
North America	363,224,006	4.8 %	320,059,368	88.1 %	196.1%	8.2 %
Oceania / Australia	40,479,846	0.5 %	28,180,356	69.6 %	269.8%	0.7 %
World	**7,519,028,970**	**100.0 %**	**3,885,567,619**	**51.7 %**	**976.4%**	**100.0 %**

(*Source:* Internet World Stats, 2017)

Although it is new, m-commerce has the potential to exceed e-commerce regarding interaction styles, usage patterns, and value chain. Further, it grants the flexibility to look for a product via handheld devices at any time and anywhere – unrestricted to a particular geographical location within a network coverage area. The data transactions are transmitted wirelessly, which allow the client to find information and purchase the product or service in a full mobility environment through mobile network (Sadi and Noordin, 2011; Nassuora,

2013). Therefore, as long as the transaction or the flow of the money is going through the online framework via mobile devices, it could be categorized as mobile commerce.

2.2. Characteristics of Mobile Commerce

On the previous description, it is noted that mobile commerce is an extension of the central system of electronic commerce. However, m-commerce posed some advantages over the general e-commerce due to its unique characteristics. There are five traits in mobile commerce to highlight in accordance with Turban *et al*. (2015); ubiquity, convenience, personalization, localization, and accessibility.

Okazaki *et al*. (2012) defined the character of ubiquity as being invisible, seamless. In a real application, it means that mobile commerce has a presence in everywhere, but at the same time, it is plain in sight. People can use mobile commerce in anywhere they go and make a purchase, look for information, ask for service, and so on. The wireless data service opens a whole new experience without the need to plug in for the internet connection. So now, mobile commerce could facilitate market transaction literally in any place that is covered by the network.

Clarke (2008) highlighted the feature of mobile commerce as providing convenience to the user. This context of convenience is related to the agility and accessibility that sticks to the wireless handheld devices. This trait of convenience provides several benefits to the user, utilizing from the technology of mobile data network that creates a seamless transaction to offer more services in any place, for instances, instant messaging to the seller, placing orders, checking the product review, and so on.

Besides the convenience, Clarke (2008) also stated about the localization aspect of mobile commerce. As of today, a smartphone has some extensive features; one of them is Global Positioning System (GPS). Localization in this context relates to the ability of mobile commerce to identify the location of the user in real-time. It becomes the distinctive attribute of m-commerce apart from the general e-commerce and elevates the service it might offer. Through GPS, the m-commerce merchant could develop geolocation-specific services to target niche markets, such as sending direct ads and locate a nearby buyer. On

the other hand, the customers could also track back the shipping items and the merchant's store location.

Wattal (2007) mentioned about the other aspect of m-commerce, personalization, in the sense of mobile commerce ability to develop a customizable and personalize experience according to user's preferences. Nowadays, the mobile phone has become a personal device. Personalization in the business approach associates to conduct profiling customer during the interaction and to analyze the data individually to match with the preferences on tailored products, customer service, and any further follow-up interaction with each specific user. In a broader sense, now it also covers for creating a familiar atmosphere by remembering the user's name, personal data, a record of the interaction history, and it allows the user to customize the product and make a custom order, to the targeted-audience advertisement.

The last identifiable character in m-commerce is accessibility and interactivity, which it relates to the easiness of access and seamless interaction between the buyer and the seller (Turban *et al*., 2015). This accessibility feature relates to the mobility of wireless internet network as a basis of mobile commerce to work. Mobile users may enter to m-commerce platform and connect to a merchant in a real-time. Therefore, the users have the ability to correspond directly, and it allows the seller to create an active interaction channel likewise for promotional purposes. The accessibility and interactivity in mobile commerce context also closely related to the convenience and localization perspective.

2.3. Technology Acceptance Model (TAM)

Technology Acceptance Model does not come from only one discipline, but it derived from several fields of knowledge namely psychology, information technology, management, and so on. During its development until now, Technology Acceptance Model is widely used to predict the behavioral intention model for IT acceptance research (Pavlou, 2003; Venkatesh *et al*., 2003; Wu and Ke, 2015). However, the potential of using Technology Acceptance Model as a predictor on measuring the consumer behavior is also on the rise. Many studies look up for the business implication and how well this contribute to the

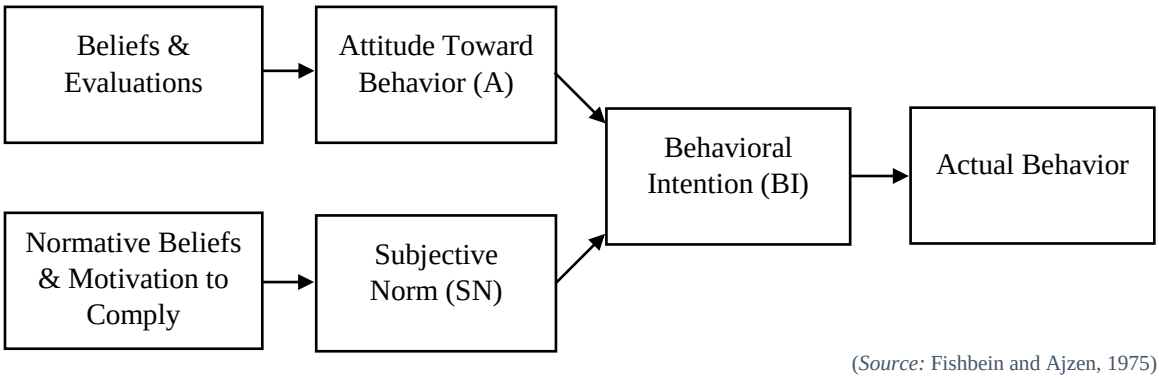
intention of the consumer to change and adapt to the new technology that has economic value.

2.3.1. The history of TAM

Technology acceptance model (TAM) was initially built from the older Theory of Reasoned Action (TRA), which drawn from social psychology (Fishbein and Ajzen, 1975; Ajzen & Fishbein, 1980). According to that finding, TRA is one of the fundamental and influential theories of human behavior. The causal relationship in TRA model, as shown in Figure 2, is comprised of six constructs: Beliefs, Attitude, Normative Beliefs, Subjective Norms, Behavioral Intention and Actual Behavior. For further study, they were adapted and modified in the development of TAM.

TRA theory believed that individual intention turned out to be a manifestation from two determinants: the attitude towards specific behavior and a personal perception over social pressure to perform the behavior (Hagger *et al*., 2002). Behavioral intention could manage to predict the action or performance if the intention measure meets the behavioral criteria; it is expected that people put an action in correlation to their intention. TRA theory's capacity to predict the outcome of the voluntary act had gained a spotlight in the research field of business and consumer behavior.

In a comparison, TAM is an information systems theory developed to make predictions about technology acceptance (Venkatesh *et al*., 2003). This particular model commends that when system users are presented with new technology, there must be some factors influence their decision about whether to adopt the new system or not. TAM model measured the two core predictors, perceived usefulness and perceived ease of use, with its relation to the dependent variable, behavioral intention. In 1985, Fred Davis proposed in his dissertation stating that the purpose of the Technology Acceptance Model (TAM) is to explain the determinants of computer acceptance that could justify the behavior of users toward a wide range of computing technology. He proposed the system adoption as a response that can be explained or predicted by user motivation, which in turn, is directly influenced by an external stimulus consisting of the features and capabilities of the actual system.

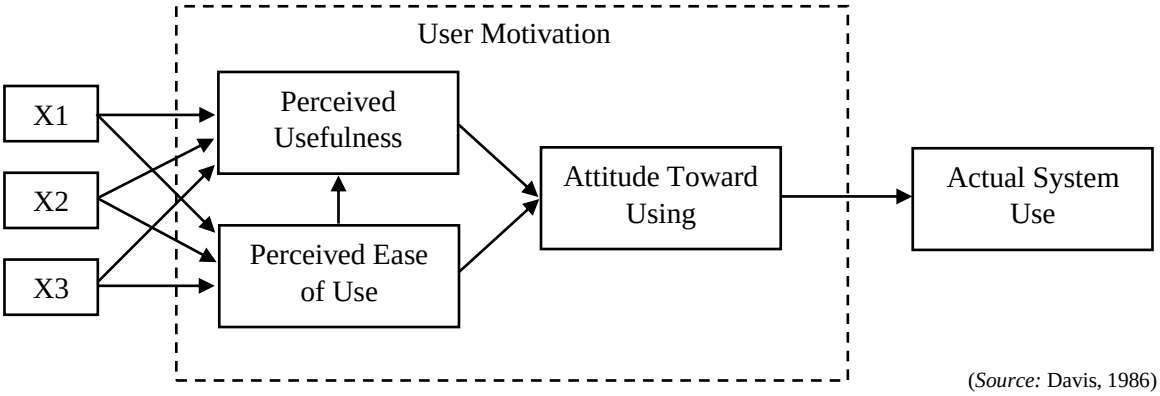


(*Source:* Fishbein and Ajzen, 1975)

Figure 2 Theory of Reasoned Action (TRA)

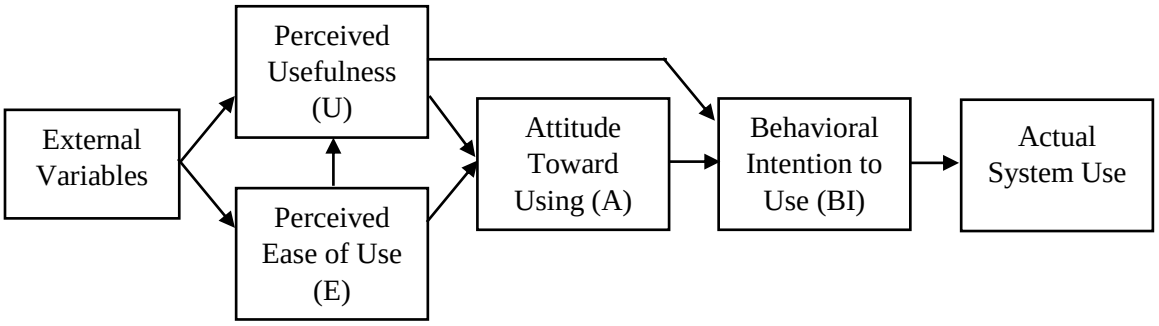
2.3.2. The evolution of TAM

The core beliefs in TAM model are focused on the Perceived Usefulness (PU) and the Perceived Ease of Use (PEOU), in which become the measurement to determine the behavioral intention of the user towards IT (Davis, 1989). Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) act as a mediator of the external variable's effect on the intention. Extensive research has contributed to support TAM in predicting consumer behavior. They used TAM as the central paradigm, and some developed a new construct along the way to overcome the limitation and adjust the model to their object. Within the last two decades, there have been numerous studies supporting TAM model (Davis *et al*., 1989; Venkatesh and Davis,1996; Venkatesh, 2000; Venkatesh *et al*., 2003; Zarmpou *et al*., 2012). Most of the research that has applied TAM as a reference paradigm emphasized the model by adding the new predictive constructs into the classic model or extended TAM.



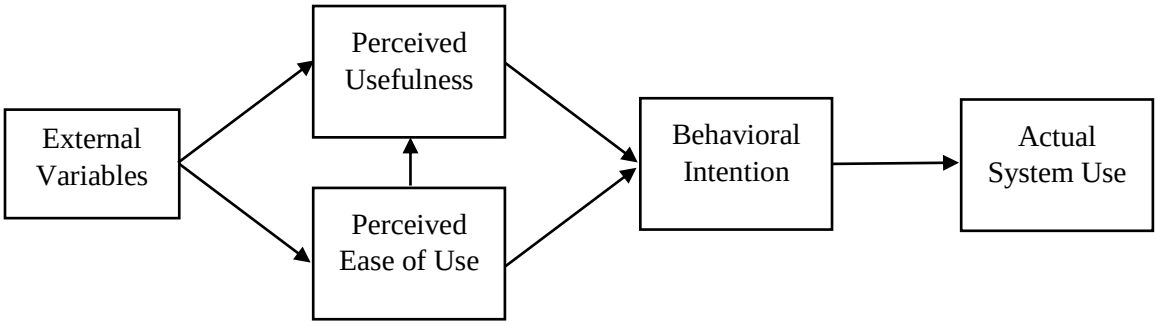
(*Source:* Davis, 1986)

Figure 3 Original TAM model according to Fred Davis (1986)



(*Source:* Davis *et al*., 1989)

Figure 4 Early development of TAM by Davis, Bagozzi and Warshaw (1989)



(*Source:* Venkatesh and Davis, 1996)

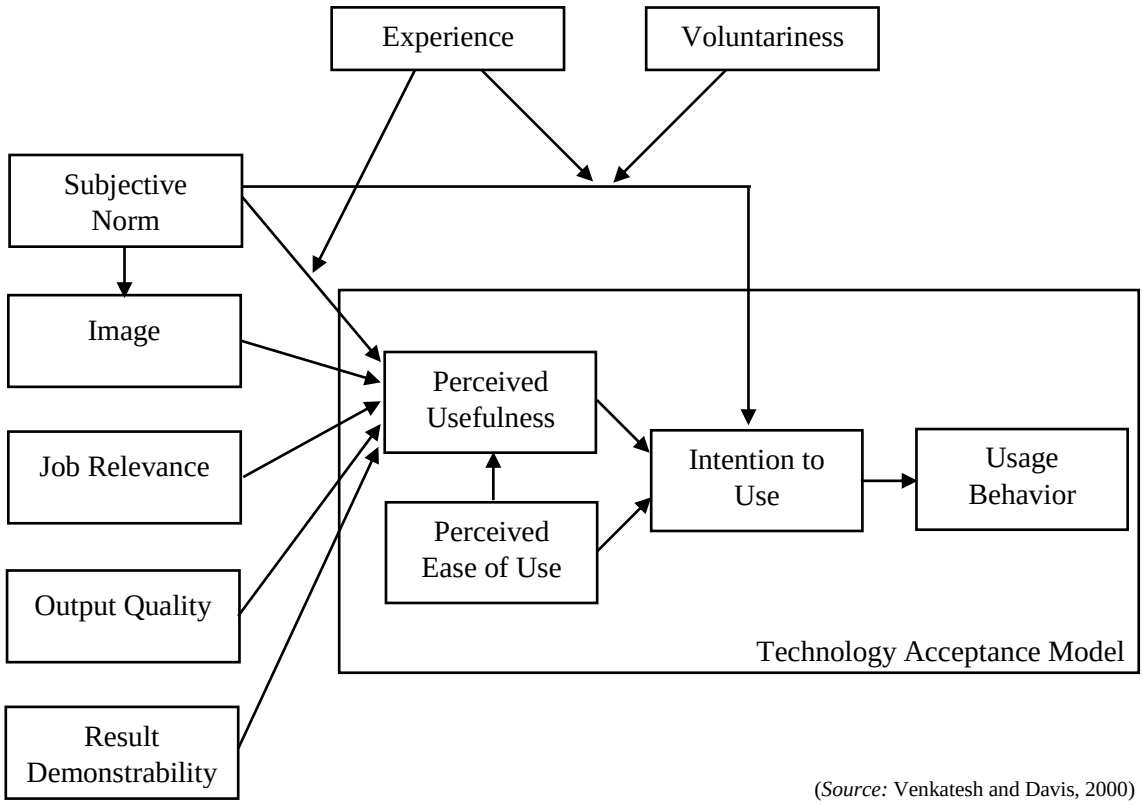
Figure 5 Final version of TAM by Venkatesh and Davis (1996)

In the original TAM proposed by Davis (1986), he suggested that three factors are contributing mainly to the users' behavior; perceived usefulness, perceived ease of use, and the attitude toward usage. The actual system use, which signified the outcome of users' behavior action, has an attitude as its major factor to determine whether the users will accept or refuse the system. Consecutively, users' attitude is hypothesized to be influenced by the two core constructs of TAM, perceived usefulness and perceived ease of use. Perceived ease of use also has an indirect effect on attitude through perceived usefulness. In the end, Davis (1986) arranged the other variables of system's characteristic into the model, as symbolized by X1, X2, and X3 in Figure 3.

In the further development of the Technology Acceptance Model by Davis, Bagozzi, and Warshaw (1989), it was the very first time they introduced behavioral intention to the model. They believed that this new construct would mediate the relationship between the attitude and the actual behavior, and also have a direct effect from the perceived usefulness.

This model chain emphasized the limitation to the previous model as shown in Figure 4. The result of their research showed a small effect of the perceived ease of use to the behavioral intention, which later changed the course in the model development to the next version.

The next evolution of the model has removed the attitude construct from the picture and began to discover the direct implication of perceived usefulness and perceived ease of use to behavioral intention. Venkatesh and Davis (1996) come up with the new model as shown in Figure 5. It marked the final modification of TAM and the start of development of the second generation of TAM. Venkatesh and Davis (2000) published their result of research and proposed an extended version of TAM as TAM 2 in Figure 6. They discovered strong support for their proposed model according to the data retrieved from four organizations in developed countries. The critical milestone in this model is how they managed to incorporate new determinants of perceived usefulness. The factors that they discovered were the subjective norm, image, job relevance, output quality, result demonstrability and perceived ease of use.



(*Source:* Venkatesh and Davis, 2000)

Figure 6 Model in TAM 2 by Venkatesh and Davis (2000)

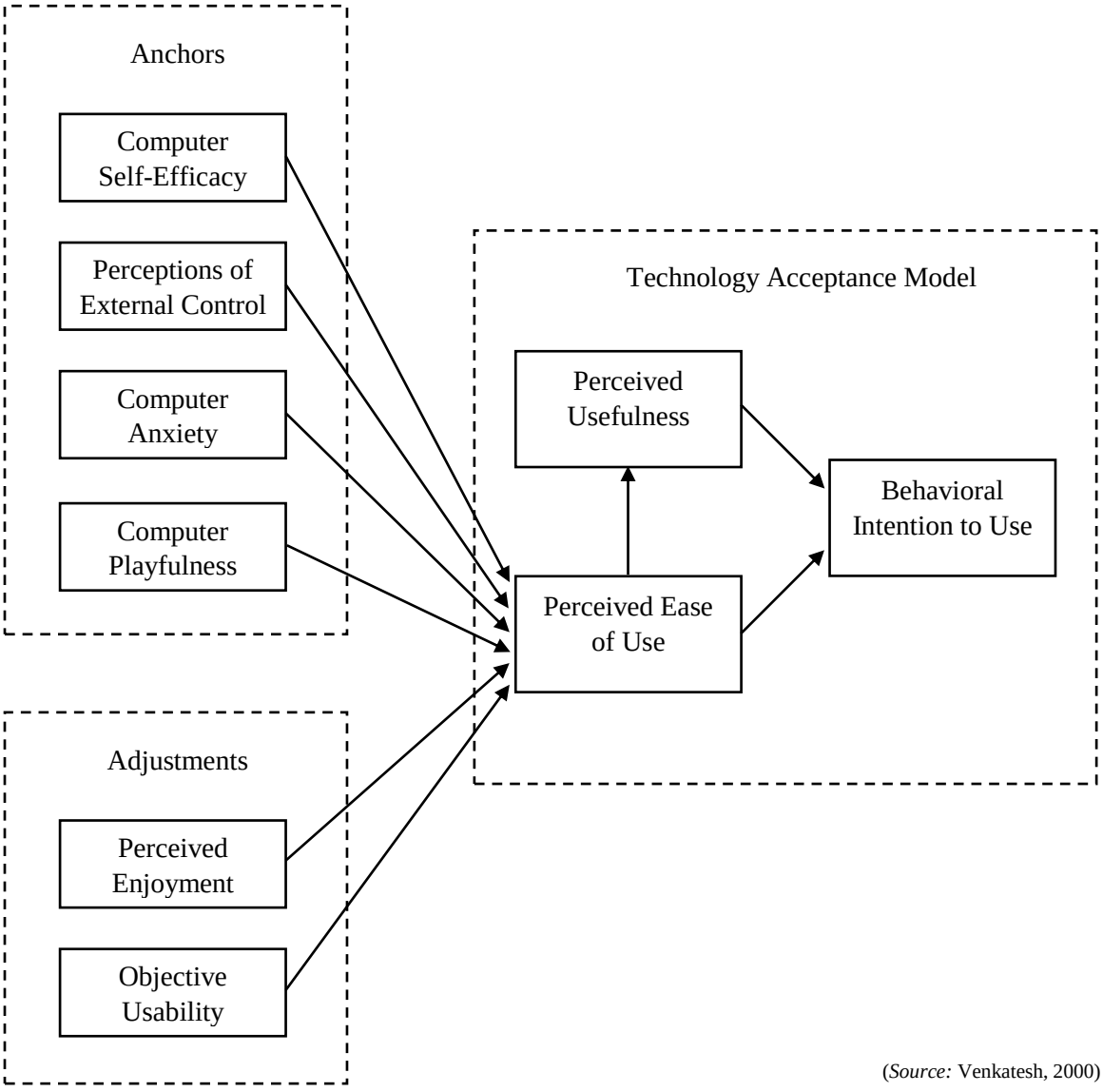


Figure 7 Model TAM 3, including determinants for perceived ease of use by Venkatesh (2000)

After successfully identified the factors that contributed to perceived usefulness, Venkatesh (2000) tried to explore deeper insight by breaking down the determinants of perceived ease of use. There are six factors included in the model; Computer Self-Efficacy, Perception of External Control, Computer Anxiety, Computer Playfulness, Perceived Enjoyment, and Objective Usability (Venkatesh, 2000). These factors expanded the scope of the prediction capability of the original TAM and TAM 2, which later is called TAM 3. This model offered a better insight and showed the relationship between the determinants of IT acceptance as a whole (Venkatesh and Bala, 2008).

Venkatesh (2000) classified the related antecedents of perceived ease of use into two major groups: expectancy and adjustments. As shown in Figure 8, these antecedents mostly are derivational from a couple of research before, which are Davis *et al*. (1992) and Venkatesh & Davis (1996). Venkatesh and Davis (2000) tried to clarify the perceived usefulness and usage intentions as an extension of the original TAM model.

2.3.3. The critics towards TAM

After so many research that reproduced the TAM model, the researchers came with several issues regarding the TAM limitation in varied topics. The main concerned about TAM in a long history of research has sparked a critic about the lack of real data involvement in capturing the actual use of the system. Until now, this model relies on the self-reported data using a questionnaire to measure the actual behavior of the user toward the system. Lee *et al*. (2003) found that 36 published studies that applied Technology Acceptance Model between 1986 and 2003 used this approach and assumed that it was adequate to reflect the actual behavior.

The other critic mentioned about the differences between mandatory versus voluntary environment. Less research used TAM in a compulsory system adoption in comparison to the voluntary system. Initially, TAM model mainly used in predicting the behavior under a voluntary situation. However, in the further development, more researchers tried to applied TAM into different stages, which spread to a different outcome in a mandatory system. Venkatesh and Davis (2000) said that the effect of subjective norm tends to be less significant toward behavioral intention in a mandatory context. Even though the outcome of behavioral intention could vary, Holden and Karsh (2010) found that in healthcare IT adaptation, the subjective norm is not always insignificant under the mandatory situation. Therefore, they believed that more factors contribute to the result.

The attitude as a construct also produced a critic to TAM model. Attitude is already widely used in many studies, and usually only generalized into one aspect. Meanwhile, Yang and Yoo (2003) tried to separate the attitude and split it into two perspectives: cognitive and affective. Their research outcome stated that the cognitive perspective is more significant

than the affective aspect (Yang and Yoo, 2003). Undoubtedly, this finding spurred a new query to the previous studies on Technology Acceptance Model.

Many researchers developed some constructs and focused on the weak theoretical relationship among them. On the one hand, these approaches would add more insight to the model as a whole. However, on the other hand, it derailed the research direction from the significant one, resulted in slow progress of better prediction model (Lee *et al*., 2003).

2.3.4. Conclusion of TAM

TAM has been introduced since a long time, and researchers have applied this model to several research streams. Some of them focused on identifying the determinants of critical predictors, namely, perceived ease of use and perceived usefulness (Davis, 1989; Taylor and Todd, 1995; Chang *et al*., 2012). Some papers extended the TAM by other theories to increase the predictive power (Venkatesh *et al*., 2003; Gefen, 2003; Cheung and Vogel, 2013). Despite the criticism on TAM, many studies still support on how TAM is widely accepted to predict the behavioral intention on different fields of technology acceptance.

2.4. Theory of Planned Behavior (TPB)

The application of Theory of Planned Behavior (TPB) is taken by adding a construct, perceived behavioral control (PBC), to the existing TRA model in Figure 2 (Ajzen, 1985, 1991). TPB holds a firm belief of how perceived behavioral control is acting as a determinant of intention and behavior. Some journals presented a revolution of TPB to better predict intention and behavior in a wide variety of settings (Pavlou, 2002; Pavlou and Fygenson, 2006; Nasri and Charfeddine, 2012). TPB is also well-known for its application to understanding the individual acceptance and usage of many technologies (Taylor and Todd, 1995). TPB has been one of the prominent theories yet in explaining and predicting the user behavior.

2.4.1. The history and development of TPB

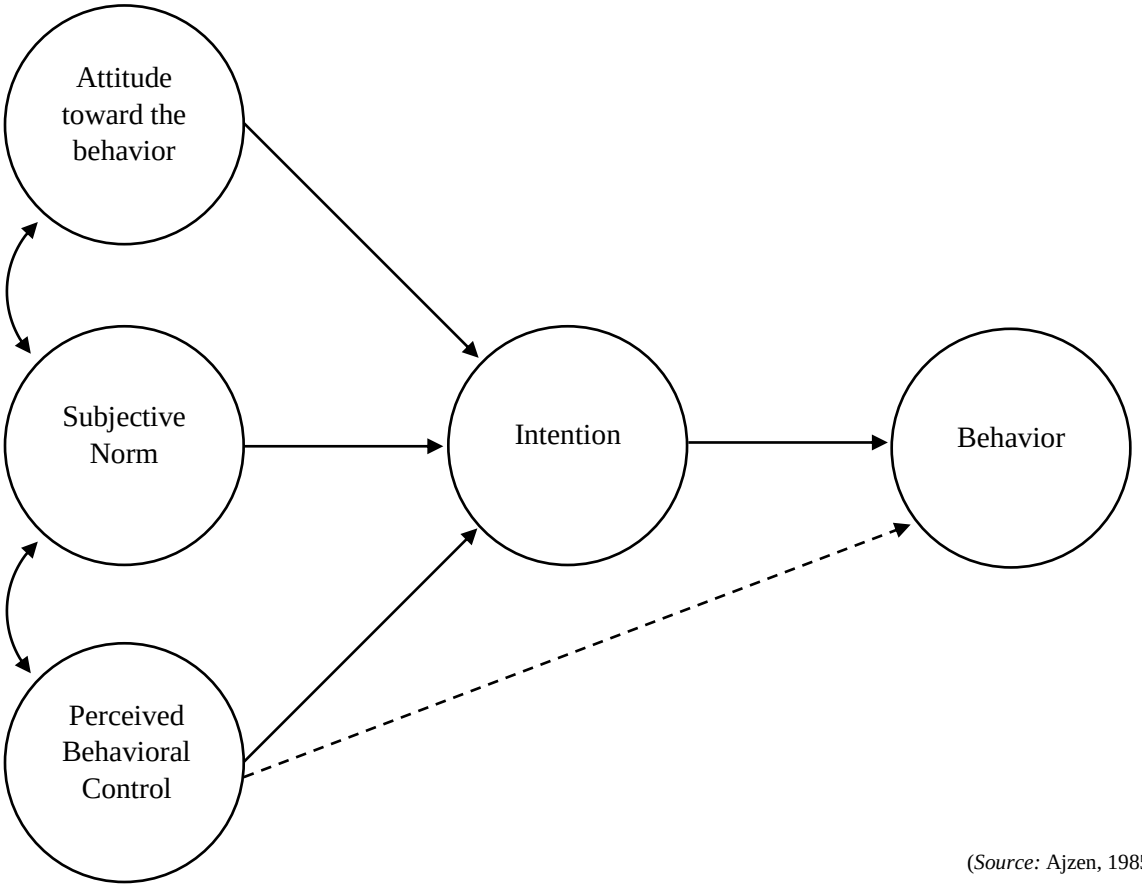
Another model that comes from TRA theory is the Theory of Planned Behavior (TPB). TPB was born due to the limitation that rises from the TRA model by integrating the

perceived behavioral control and behavioral intention altogether. The three primary constructs that contribute to TPB are attitude, subjective norm, and perceived behavioral control. Figure 8 presented the relationship among the related variables in TPB model. Attitude toward the behavior represents the awareness and evaluation of user against its behavior. Subjective norm (SN) represents the belief on how the social environment gives influence toward the behavior through the important people around a particular person. Perceived behavior control (PBC) represents the user's awareness of its capacity and capability to conduct the behavior – and it also reflects if there is any previous experience or foreseeable issue and problem ahead (Ajzen, 1991).

Since Theory of Planned Behavior was based on the development of Theory of Reasoned Action, they share the same assumption that user's behavior is a consequence stem from the decision of an attentive mind. Nevertheless, the significant distinctive improvement on TPB is related to the addition of control beliefs through perceived behavioral control. It means on this model, Ajzen (1991) also thought about variables from the external perspective, as the availability of resources, opportunity, and support to conduct a particular behavior. Mathieson (1991) in his research also adapt the model as proposed by Ajzen (1985) and develop the scheme as in Figure 9.

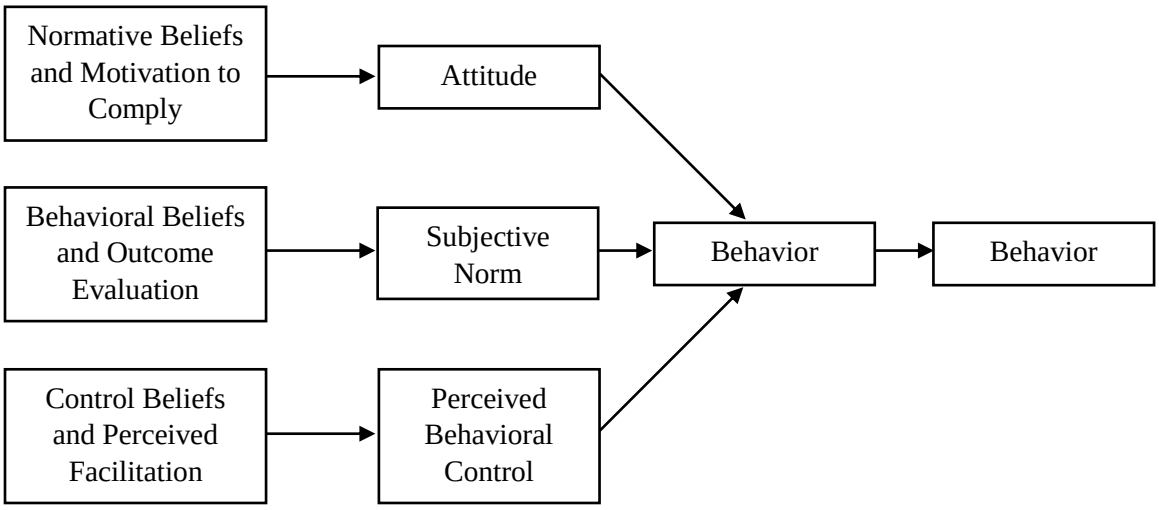
Theory of Planned Behavior is used in many social studies regarding consumer behavior prediction model. It gained popularity in health-related behavior, such as Conner *et al*. (1999), Conner *et al*. (2002), Godin and Kok (1996). However, recently Theory of Planned Behavior also has been used in the technology context (Holmes, 2008; Hsu *et al*., 2006). The comparison between behavior predicting models also exist in some studies in purpose to determine how the different model would give a more in-depth explanation on user's action toward a system (Blue, 1995; Hagger *et al*., 2002).

The Theory of Planned Behavior disregards the use of external variables, unlike Technology Acceptance Model. Ajzen and Fishbein (1980) mentioned about this in their study that having the external variables requires it to be adapted for different field and behavioral system. Therefore, the Theory of Planned Behavior has adequate supports because external variables were not included in consideration since the original proposed model by Ajzen (1991).



(*Source:* Ajzen, 1985)

Figure 8 Initial Theory of Planned Behavior by Ajzen (1985)



(*Source:* Mathieson, 1991)

Figure 9 Model adaptation of Theory of Planned Behavior by Mathieson (1991)

The simplicity in Theory of Planned Behavior attracts researchers to adopt this model in a various system. TPB is considered to be easy to understand and it produced high consistency among those published journals. Broad application of this theory has indicated its immense understandability and utility, making it acknowledged by the scientific community.

2.4.2. The critics towards TPB

Since its extensive adaptation on many studies, Theory of Planned Behavior has been criticized for some reasons. The foremost critic mainly discussed the method in gathering the data by the researchers. The decision on the research method is entirely in the hands of each individual. However, most of the studies being published relied on self-report through questionnaires, which is hard to observe the actual behavior. A user with high positive attitude potentially creates unreliable and biased data due to the tendency to escalate positive respond all through questionnaire items.

The other limitation that scientists criticize also lies about the lack of emotional factors into the model equation (Conner & Armitage, 1998; Gibbons *et al*. 1998). The researchers had brought up this issue when they talked about the affective processing models. Compared to the other models, Theory of Planned Behavior disregard the emotional variable because this theory assumes behavior has a rational foundation. Meanwhile, as a human our decision does not always come in accordance with the rational thinking. Therefore, scientists recommended also to consider this aspect to be included in the model. Ajzen (2002[b]) addressed this limitation by stating emotional variables are assumed to be an invisible influential force that affects human intentions and behavior through attitudes and personal beliefs.

2.4.3. Conclusion of TPB

In some studies, the TAM and TPB integration seemed to be natural for better understanding what factors play such vital roles to behavioral intention (Fong and Wong, 2015; Shih and Fan, 2013). The application of TAM in IT context is superior in comparison to the TPB broader variables. However, in some research, they were mentioned that extra

dimension would help in analyzing a whole new depth of reasoning (Taylor and Todd, 1995).

These past studies reflected successful applications of the theory and reinforced its utility for research involving technology adoption and distance education. Hopefully, this current study would expand upon the literature, regarding to the consumer behavior, with a new focus on how to develop the positive intention to adopt mobile commerce in Indonesia.

3. PROBLEM STATEMENT AND HYPOTHESES

3.1. Problem Statement

Mobile phone advancement regarding the capabilities of the smartphone, services, applications, standards, and network achievement indicates that the perfect environment for m-commerce business is already there. With the adoption of 4G technology, the rapidly growing number of mobile users, millions of mobile applications used every day, and also the easiness of mobile payment system, there is considerable growth in m-commerce transaction all over the world. This situation marked the next phase of rapid development. The trend of mobile commerce is quite recent in Indonesia, but the report of the tracked transaction is quite stunning nowadays. Hence, it is essential to learn how the customers accept the mobile commerce system. It may lead to a better understanding of the unique Indonesian characteristic and also the critical factors to support the adoption process. There are not so many previous studies related to this mobile commerce topic in Indonesia, while the adoption of the smartphone keeps increasing significantly.

Research Question

According to the problem statement above, the central question to be answered in this thesis is:

> *What are the influential factors that contribute to the adoption of m-commerce in Indonesia based on the integration adoption model of TAM and TPB?*

Objective

The objectives of this research are to determine the influential factors that may contribute to the adoption of m-commerce in Indonesia based on the integration adoption model of TAM and TPB.

3.2. Hypotheses Development

This research will also discuss several factors, which are mentioned in the previous literature study, in relation to the technology adoption in the business area. They are derived from the technology acceptance model, the theory of planned behavior and the idea of trust towards the adoption of mobile commerce in Indonesia. Within this session, all of the factors will be explained with the supporting reason to be included in this research proposed model.

3.2.1. Perceived usefulness (PU)

PU is the extent to which one believes that using a system will enhance her performance (Davis 1989). In its adaptation to m-commerce consumer behavior, the researchers defined perceived usefulness as the extent to which a consumer believes that m-commerce would enhance their effectiveness in purchasing products. Perceived usefulness has been acknowledged to affect behavioral intention through attitude (Davis 1989; Taylor and Todd 1995[b]). Therefore, the proposed hypotheses are as follow:

H1a: Perceived usefulness positively influences the attitude toward adoption of m-commerce.

H1b: Perceived usefulness positively influences the behavioral intention toward adoption of m-commerce.

3.2.2. Perceived ease of use (PEOU)

PEOU is the extent to which a person believes that using the system will be effortless (Davis 1989). In application to the m-commerce context, the perceived ease of use has a role as the extent to which a user believes that purchasing products through m-commerce channel would be free of effort. Similarly to PU, the role of PEOU on intentions is mediated by attitude (Davis 1989; Taylor and Todd 1995b). Hence, the designed hypotheses are as the following:

H2a: Perceived ease of use positively influences the attitude toward the adoption of m-commerce.

H2b: Perceived ease of use positively influences the perceived usefulness of m-commerce.

3.2.3. Attitude (ATT)

Attitude has been shown to influence behavioral intentions by many research (Ajzen and Fishbein, 1980). This relationship has received substantial empirical support. Regarding the focal behaviors, attitude toward m-commerce adoption is defined as the consumer's evaluation of the desirability of using m-commerce channel to get information and purchase products from an m-commerce merchant respectively. By using deductive logic, favorable attitude is likely to encourage consumers to purchase products or services from a merchant.

H3: Attitude positively influences the behavioral intention toward the adoption of m-commerce.

3.2.4. Subjective norms (SN)

Subjective norm suggests that behavior is instigated by one's desire to act as the result of the referent people or group's way of thinking about how he should act. In this particular model, subjective norm reflects the potential effect of the social circle of the customers in shaping the perception and inducing a positive m-commerce acceptance in their behavior. Some literature proposed a positive relationship between SN and the behavioral intention. Karahanna *et al.* (1999) also mentioned that empirical work has presented that subjective norm influences behavioral intention toward system use. Accordingly, SN is expected to have a positive influence toward intentions to adopt m-commerce.

H4: Subjective norms positively influences the behavioral intention toward the adoption of m-commerce.

3.2.5. Perceived behavioral control (PBC)

Perceived Behavioral Control is defined as oneself perception about the level of easiness in performing a particular behavior. In another word, Ajzen (1991) stated as to what extent something holds a person in carrying out a behavior. The concept is different to the attitude,

Ajzen theorized that PBC "should be read as *perceived control over the performance of a behavior*" (2002[b], p. 668). Ajzen's statement indicated that PBC holds a subjective degree of control over the performance of behavior, and differentiated PBC from the similar perception regarding the actual behavior that will produce the desired outcome. Therefore, PBC is the consumer's perceived ease or difficulty of getting a product or service from m-commerce channel in the context of this model. The support for the role of PBC on intention and behavior is provided by Mathieson (1991) and Taylor and Todd (1995b). Thus, this study suggests:

> H5: Perceived behavioral control positively influences the behavioral intention toward the adoption of m-commerce.

3.2.6. Perceived trust (TRU)

Trust has long been a main prominent feature of economic and social interaction where uncertainty, a delegation of authority, and fears of opportunism are perceived (Luhmann 1979). The idea of trust came from the belief that the trustee will act accordingly to fulfill the trustor's expectations without exploiting its vulnerabilities. Several sources of research discussed the role of trust in e-commerce, such as Gefen *et al*. (2003), McKnight and Chervany (2002), and Pavlou (2003). Since e-commerce and m-commerce are related, the role of trust is also started to be applied in m-commerce as studied by Zarmpou *et al*. (2012).

Before putting it incorporated into the model, this study must define trust concerning a behavior through a well-specified target, action, context, and time frame (Ajzen 2002[a]). The target of trust is the m-commerce merchant, the action is the purchasing transaction of products or services, and the context is the online environment. Regarding the time frame, the implication of trust is only observable for a limited window, when the customers are deciding on purchase something. The statement is consistent with the trust literature where trust is concerning a specific trustor (Mayer *et al*. 1995), context (Lewicki and Bunker 1995), and time window (Tan and Thoen 2001).

Trusting beliefs and attitude

Initially, the concept of trust was given as an attitudinal belief for both getting information and purchasing in a commercial setting. Then, trust and the attitude draws the notion of perceived consequences (Hosmer, 1995). Trust empowers the positive expectations that no harmful or unfavorable outcomes will occur if a trustor undertakes a behavior (Barber 1983). In summary, trust creates favorable perceptions about the outcomes of the m-commerce transaction, thus creating favorable attitudes. Regarding transaction, trust creates positive expectations that the m-commerce merchant will fulfill its promise. Accordingly, these studies by Jarvenpaa *et al*. (2000), McKnight and Chervany (2002), and Pavlou (2003) show that trust has an impact on intentions by creating positive attitudes.

H6a: Trust indirectly influences the attitude toward the adoption of m-commerce through perceived usefulness.

H6b: Trust indirectly influences the attitude toward the adoption of m-commerce through perceived ease of use.

H6c: Trust directly influences the attitude toward the adoption of m-commerce.

In summary, Table 3 lists all hypotheses mentioned above in a concise form for all variables.

Table 3 The definitions of the research hypotheses

Hypotheses	Description	Path
H1a	Perceived usefulness positively influences the attitude toward adoption of m-commerce.	PU → ATT
H1b	Perceived usefulness positively influences the behavioral intention toward adoption of m-commerce.	PU → BI
H2a	Perceived ease of use positively influences the attitude toward the adoption of m-commerce.	PEOU → ATT
H2b	Perceived ease of use positively influences the perceived usefulness	PEOU → PU
H3	Attitude positively influences the behavioral intention toward the adoption of m-commerce	ATT → BI
H4	Subjective norms positively influences the behavioral intention toward the adoption of m-commerce	SN → BI
H5	Perceived behavioral control positively influences the behavioral intention toward the adoption of m-commerce	PBC → BI
H6a	Trust indirectly influences the attitude toward the adoption of m-commerce through perceived usefulness.	TRU → PU
H6b	Trust indirectly influences the attitude toward the adoption of m-commerce through perceived ease of use	TRU → PEOU
H6c	Trust positively influences the attitude toward the adoption of m-commerce	TRU → ATT

3.3. Proposed Model

As previously explained in hypotheses development and literature review, this study adapted the constructs taken from Technology Acceptance Model and Theory of Plan Behavior model as displayed in Figure 10 below.

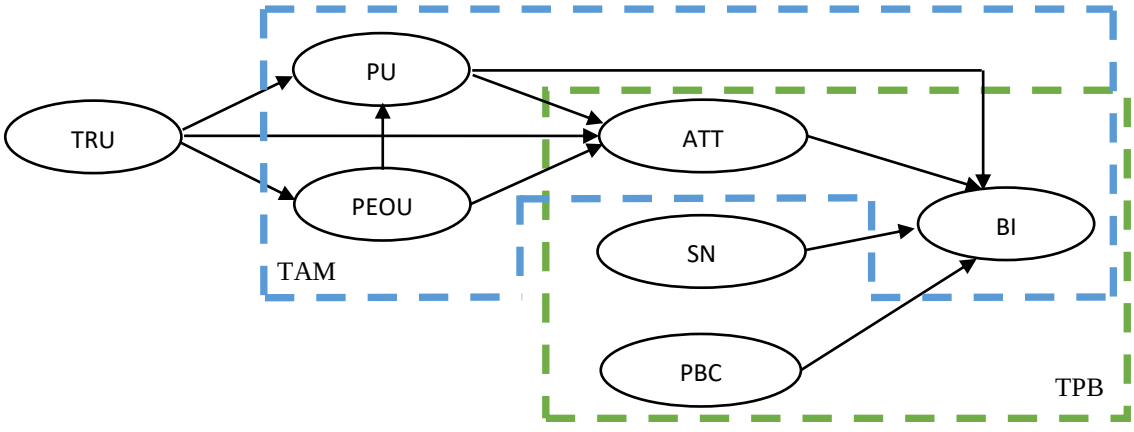


Figure 10 The proposed model

4. RESEARCH METHODOLOGY AND DATA ANALYSIS

4.1. Research Methodology

4.1.1. Research design

This study used quantitative design and categorized within the type of correlational study, in which not only explain about particular phenomena but also based on theory as the fundamental aspect to analyze the correlation between variables. This study is one of formal study in which the researcher already set up a research question and is expected to be answered by the result of the study. The researcher does not do any intervention during the research. Therefore, this study is categorized as *ex-post facto* design. The timeline that is used in the study applies *cross-sectional*.

The study used primary data where the researcher questioned and collected the respond of the subject through a questionnaire consisting of several parts. Each part would represent for each construct and be measured through multiple item questions derived from previous studies. Since the questionnaire items were based on the derivative of the previous works, the pilot study was unnecessary to conduct.

4.1.2. Operational definition

Table 4 lists the operational definitions for the study instruments. There are five options Likert-like scale, ranging from 1 (Completely Disagree) to 5 (Completely Agree), to measure each item for every variable used in this research. Behavioral intention and perceived behavioral control both consisted of five items to be measured; Trust, attitude and subjective norms have three items; Perceived of usefulness and perceived ease of use both have six items.

Table 4 The operational definitions of the research variables

Research variables	Operational definition	
Perceived Usefulness (PU)	PU1	: Using m-commerce would allow me to purchase goods and/or services more quickly
	PU2	: Using m-commerce would increase my productivity
	PU3	: Using m-commerce would enhance my effectiveness in purchasing goods and/or services
	PU4	: Using m-commerce would improve my efficiency in purchasing goods and/or services
	PU5	: Using m-commerce would make it easier to purchase goods and/or services
	PU6	: I would find m-commerce useful in purchasing goods and/or services
Perceived Ease of Use (PEOU)	PEOU1	: Learning how to use m-commerce would be easy for me
	PEOU2	: I would find it easy to navigate m-commerce doing what I want it to do (e.g., looking product info)
	PEOU3	: My interaction with m-commerce would be clear and understandable
	PEOU4	: I would find m-commerce to be flexible to interact with
	PEOU5	: It would be easy for me to become skillful at using m-commerce
	PEOU6	: I would find m-commerce easy to use
Attitude (ATT)	ATT1	: Using m-commerce to purchase goods and/or services is a good idea
	ATT2	: Using m-commerce to purchase goods and/or services is a wise idea (deleted)
	ATT3	: I like to use m-commerce to purchase goods and/or services
	ATT4	: Using m-commerce to purchase goods and/or services would be a pleasant experience
	ATT5	: I think these days; using m-commerce to purchase goods and/or services is a necessity (deleted)
	ATT6	: Using m-commerce to purchase goods and/or services is convenient (deleted)
	ATT7	: Using m-commerce to purchase goods and/or services is interesting (deleted)
Subjective Norms (SN)	SN1	: People who are important to me think that I should use the m-commerce to purchase goods and/or services
	SN2	: People whose opinion I value prefer me to use the m-commerce to purchase goods and/or services
	SN3	: People who are important to me would think that I should use the m-commerce to purchase goods and/or services
Perceived Behavioral Control (PBC)	PBC1	: I am capable of using m-commerce
	PBC2	: Nothing withholds me from using m-commerce
	PBC3	: Using m-commerce is entirely within my control
	PBC4	: I have the resources to purchase products and/or services using m-commerce
	PBC5	: I have the knowledge to use m-commerce for shopping
Behavioral Intention (BI)	BI1	: I intend to use m-commerce in the near future
	BI2	: I believe my interest towards m-commerce will increase in the future
	BI3	: I intend to use m-commerce as much as possible
	BI4	: I will recommend others to use m-commerce
	BI5	: If given a chance, I will use m-commerce to purchase goods and/or services
Trust (TRU)	TRU1	: Using mobile payment for monetary transaction in m-commerce is safe
	TRU2	: My personal data are in confidence while using m-commerce
	TRU3	: The terms of use are strictly followed while I am using m-commerce (deleted)
	TRU4	: Using m-commerce to purchase goods and/or services is trustworthy

4.1.3. Data collection and sample characteristics

Data were gathered through electronic questionnaire spread through online such as links in social media, messaging apps and email. The online approach was chosen because it is considered to suit the m-commerce characteristic well. The participants are considered as well-being who aware of the use of internet and smartphone. The collection period of the data was in March 2017 and successfully got 391 participants. However, seven of the participants were rejected due to the consideration of being outlier data according to the data analysis, leaving 384 final respondents.

Table 5 Demographic characteristics

Characteristic		Frequency	Percent (%)
Gender	Male	144	37.5
	Female	240	62.5
Age	18 – 24	125	32.6
	25 – 30	178	46.4
	31 – 35	42	10.9
	>35	39	10.2
M-commerce experience	I have used m-commerce once	324	84.4
	I never used m-commerce, but I used e-commerce	52	13.5
	I never purchased online	8	2.1
Internet experience	Less than 1 year	7	1.8
	1 to less than 5 years	41	10.7
	5 to less than 10 years	175	45.6
	10 years or more	161	41.9
Having experience with mobile phone	Less than 1 year	4	1.0
	1 to less than 5 years	19	4.9
	5 to less than 10 years	134	34.9
	10 years or more	227	59.1

Table 5 portrayed the profile of participants in this study. Among the respondents, 240 feedbacks came from female (62.5%), and the rest of them (144; 37.5%) came from male counterparts. Regarding age, the majority is the age group 25-30 years old by 46.4%, followed by 18-24 years old (32.6%), 31-35 years old (10.9%), and for the last is the age

group >35 years old (10.2%). Almost all participants (84.4%) already had experience of using m-commerce before, then 13.5% claimed to be familiar with e-commerce but never tries m-commerce, and only 2.1% said never use any form of e-commerce. The majority of respondents are already familiar with mobile phone and internet.

4.2. Data Analysis and results

4.2.1. Measurement model

The measurement model used a pooled Confirmatory Factor Analysis (CFA) to determine the variables logically and systematically able to represent the construct involved in the hypothesized model. There are 31 items to determine seven latent constructs: Trust (TRU), Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude (ATT), Subjective Norms (SN), Perceived Behavioral Control (PBC) and Behavioral Intention (BI).

In SEM, there is the need to evaluate the fitness indexes of a measurement model. The purpose is to determine how the model matched to the acquired data. Nonetheless, there are no exact rules to follow because the researchers have several opinions. The suggestion said that at least fulfilling one index from each model fit category would be considered enough (Hair *et al*.,1995; Holmes-Smith, 2006). Table 6 showed a list of the recommended model fit index according to Awang (2012). The available model fit categories are Parsimonious Fit, Incremental Fit, and Absolute Fit.

Table 7 showed the goodness-of-fit calculation of the model from the pooled CFA measurement. According to the result, the model managed to reach or close to the recommended score, so it is acceptable. Next, the model must follow the evaluation process in terms of reliability and validity.

The validity of measurement models requires three aspects: convergent validity, construct validity, and discriminant validity (Awang, 2012). According to Table 8, the AVE scores of each construct exceed 0.50, and the numbers passed the convergent validity. The construct validity is achieved when the goodness-of-fit indexes show an acceptable number. The discriminant validity could be seen in Table 8 by the square root of AVE for

each construct, which must be higher than the correlation between the corresponding constructs.

Similarly, the reliability test consists of two crucial notes: average variance extracted and composite reliability (Awang, 2012). As mentioned previously, the AVE scores passed 0.50 recommended value. The numbers indicated that the measurement model is reliable in determining the construct. The composite reliability could be seen in CR values in Table 8. The higher than 0.60 value means that it meets the requirement of composite reliability.

Table 6 The three categories of model fit and the recommended level of acceptance

Name of category	Name of index	Level of acceptance
1. Absolute fit	Chi-Square	P-Value > 0.05
	RMSEA*	RMSEA < 0.08
	GFI*	GFI > 0.90
2. Incremental fit	AGFI	AGFI > 0.90
	CFI*	CFI > 0.90
	TLI	TLI > 0.90
	NFI	NFI > 0.90
3. Parsimonious fit	Chisq/df*	Chi-Square/df < 3.00

*The recommended index frequently reported in literature (*Source:* Awang, 2012)

Table 7 The model fit indices

Fit indices	Recommended value	Measurement model	Structural model
CMIN/DF	≤ 3.00	2.090	2.998
NFI	≥ 0.90	0.898	0.849
CFI	≥ 0.90	0.944	0.894
GFI	≥ 0.90	0.877	0.835
AGFI	≥ 0.80	0.850	0.805
RMSEA	≤ 0.08	0.053	0.072

Table 8 Model validity and reliability measures

	CR	AVE	MSV	MaxR(H)	PU	PEOU	TRU	ATT	SN	BI	PBC
PU	0.885	0.565	0.410	0.896	**0.751**						
PEOU	0.901	0.604	0.581	0.921	0.612***	**0.777**					
TRU	0.855	0.666	0.426	0.906	0.499***	0.568***	**0.816**				
ATT	0.836	0.629	0.619	0.840	0.640***	0.548***	0.653***	**0.793**			
SN	0.871	0.693	0.362	0.878	0.395***	0.271***	0.309***	0.542***	**0.833**		
BI	0.902	0.648	0.619	0.905	0.594***	0.489***	0.490***	0.787***	0.602***	**0.805**	
PBC	0.887	0.613	0.581	0.906	0.601***	0.762***	0.484***	0.599***	0.357***	0.636***	**0.783**

Significance of Correlations:
† $p < 0.100$
* $p < 0.050$
** $p < 0.010$
*** $p < 0.001$

Table 9 displayed the scores for the standardized factor loadings. Five items were deleted during the unidimensionality to achieve the acceptable goodness-of-fit indexes based on the modification indices: ATT2, ATT5, ATT6, ATT7, and TRU3. The recommendation stated that the R-squared per item should be more than 0.50. However, due to the constraint in a limited number of item per construct and the goodness-of-fit indexes were already met, then the five deleted items were considered enough. The rest of the items have passed the minimum allowance 0.50, and even they showed an excellent characteristic which is close to or more significant than 0.7.

Table 9 Standardized factor loadings and R-squared per item

Item	Factor Loading	R^2 (>0.5)
PU1	0.686	0.470
PU2	0.652	0.425
PU3	0.831	0.691
PU4	0.832	0.692
PU5	0.724	0.524
PU6	0.765	0.585
PEOU1	0.738	0.545
PEOU2	0.708	0.501
PEOU3	0.713	0.509
PEOU4	0.705	0.498
PEOU5	0.877	0.770
PEOU6	0.896	0.803
ATT1	0.753	0.567
ATT2 (deleted)	-	-
ATT3	0.795	0.632
ATT4	0.814	0.689
ATT5 (deleted)	-	-
ATT6 (deleted)	-	-
ATT7 (deleted)	-	-
SN1	0.792	0.627
SN2	0.880	0.775
SN3	0.824	0.679
PBC1	0.771	0.594
PBC2	0.674	0.455
PBC3	0.720	0.519
PBC4	0.840	0.705
PBC5	0.891	0.794
BI1	0.801	0.642
BI2	0.823	0.678
BI3	0.816	0.666
BI4	0.845	0.714
BI5	0.735	0.540
TRU1	0.934	0.872
TRU2	0.681	0.464
TRU3 (deleted)	-	-
TRU4	0.814	0.663

4.2.2. Structural model

According to the previous calculation on measurement model, the number showed an acceptable result from the recommendation value. Next, the data entered the process of structural model analysis to test the hypotheses and the association between the research variables or constructs. During the analysis, a similar set of model fit indexes was used to examine the structural model (Hair *et al*.,1995; Holmes-Smith, 2006). This value also helped to determine whether the structural model qualified for the model fit. As shown in Table 7, the model fit for the structural model pointed an acceptable score as well as in the measurement model. This calculation implied that the hypothesized structural model was qualified for the data. There was no significant change from the measurement model to the structural model. According to Hair *et al*. (1995) and Holmes-Smith (2006) recommendation regarding the goodness-of-fit indicator, it does not always need to fulfill all of the scores; one index per category would be acceptable.

The path diagram of the structural model could be seen in Figure 11, with the calculation of standardized structural parameter estimation in accordance with Table 10. Based on the result, almost all hypotheses were supported, except H1b and H2a. The H1b represented the effect of perceived usefulness to behavioral intention (H1b; $\gamma = 0.065$, $t = 1.062$, $p>0.05$) which means the direct effect of PU to BI was not supported. The other hypothesis is H2a about the relationship from the perceived ease of use to the attitude (H2a; $\gamma = 0.067$, $t = 1.051$, $p>0.05$) meaning the direct effect of PEOU to ATT was also not supported. It is also crucial to underline that even though perceived ease of use did not influence attitude directly, it was supported that PEOU can influence ATT through PU which made it entirely mediated (H2b; $\gamma = 0.484$, $t = 7.755$, $p<0.001$).

As suspected, trust contributed positively to PU, PEOU, and ATT variables as showed in H6a, H6b, and H6c (H6a; $\gamma = 0.223$, $t = 3.797$, $p<0.001$, H6b; $\gamma = 0.566$, $t = 8.938$, $p<0.001$, H6c; $\gamma = 0.407$, $t = 5.857$, $p<0.001$). However, the influence of trust was quite significant to PEOU compare to the other variables, PU and ATT. The other findings also mentioned about the positive correlation between subjective norms and perceived behavioral control to behavioral intention; both of the direct effects were supported (H4; $\gamma = 0.332$, $t = 6.852$, $p<0.001$, H5; $\gamma = 0.299$, $t = 6.475$, $p<0.001$). Since both coefficients and t-values were

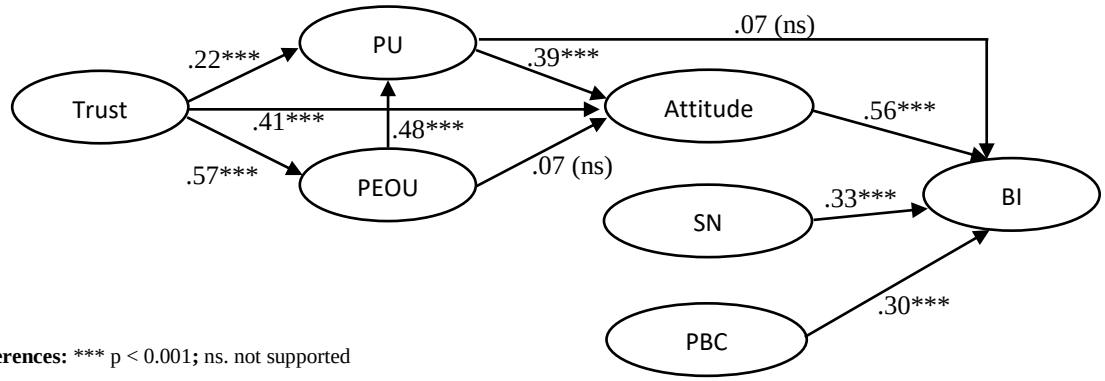
close, we can safely assume that they had relatively same leverage toward behavior intention.

The attitude variable had the highest dominance to behavior intention in comparison to the subjective norms and perceived behavioral control (H3; $\gamma = 0.564$, $t = 7.504$, $p<0.001$). Therefore, Attitude becomes one of the critical aspects to explore. Apart from the trust, perceived usefulness was also believed to affect attitude (H1a; $\gamma = 0.394$, $t = 6.027$, $p<0.001$), which is on the same line to the previous research.

In general, among the ten proposed hypotheses, the outcomes supported eight theoretical models and left the other two paths being rejected. Also, there was only a small difference of the model fit calculation between the structural and measurement model. This number referred to the positive traits of the structural model (SEM) since it could explain the data equally the same as adequate as the measurement model (CFA).

Table 10 Path coefficients and hypotheses testing

Hypotheses	Path	Coefficient	t-value	Result
H1a	PU → ATT	0.394	6.027	Supported
H1b	PU → BI	0.065	1.062	Not supported
H2a	PEOU → ATT	0.067	1.051	Not supported
H2b	PEOU → PU	0.484	7.755	Supported
H3	ATT → BI	0.564	7.504	Supported
H4	SN → BI	0.332	6.852	Supported
H5	PBC → BI	0.299	6.475	Supported
H6a	TRU → PU	0.223	3.797	Supported
H6b	TRU → PEOU	0.566	8.938	Supported
H6c	TRU → ATT	0.407	5.857	Supported



References: *** p < 0.001**;** ns. not supported

Figure 11 Path structural model

5. FINDINGS AND DISCUSSION

This study tried to determine several factors, which is adapted from TAM and TPB model, to predict the consumer behavioral intention to use the mobile commerce system. The results of this study showed proper support of the proposed research model and backed up some previous findings. The research outcome has implications based on the theoretical perspective and the managerial view; benefiting the scholars who have interest to the technology acceptance model and theory of planned behavior, plus the business players or companies who are related to the mobile commerce framework.

5.1. Theoretical implications

There are some extensive studies related to the mobile commerce topic. This research was built from the comprehensive literature to determine the main constructs to support the behavioral intention in adopting new technology and test the hypotheses using the statistical tools. This result was also expected to extend the insight about acceptance model and theory of planned behavior in mobile commerce environment.

The factors were derived from the TAM and TPB model, and in this study, the model was simplified due to certain limitations. Therefore, the study only extracted the essential factors to which stimulate further research for the Indonesian market. The critical factors from Technology Acceptance Model are perceived usefulness, perceived ease of use, and attitude. Meanwhile, the Theory of Planned Behavior donates subjective norms, perceived behavioral control, and the shared attitude construct. This study also added another contributing variable of trust, due to the importance of trust in the developing country as mentioned by Ashraf *et al*. (2014). Indonesian culture also emphasizes on trust and security issue in conducting transaction according to Priyambodo *et al*. (2012). The purpose of this current research is to identify which proposed factors contribute to the intention of using mobile commerce. According to the statistic output, two proposed hypotheses was rejected leaving the remaining eight in support (Table 10).

As being displayed in Figure 11, all of the hypotheses were not fully supported according to the statistical measurement. There were two relationships in which are not significantly

supported by the data. Firstly, perceived usefulness did not influence the behavioral intention as expected. According to the previous findings, perceived usefulness and perceived ease of use were found to have influential power towards behavioral intention (Leng *et al*., 2011; Pavlou, 2003). However, some researchers revealed different findings, for instance, perceived ease of use does not influence behavioral intention directly, and PEOU only has an indirect effect through perceived usefulness (Hsiao *et al*., 2015; Lee, 2009; Venkatesh and Davis, 1996). The current study has found the peculiar outcome, no evidence to support the effect of PU toward BI, which comparable to the results of Wu and Chen (2005) and Zheng *et al*. (2012). This result suggested that the effect of both PU and PEOU to behavioral intention were entirely mediated through the attitude variable.

The other unsupported hypothesis is about the direct effect of perceived ease of use to the attitude. According to the calculation result, PEOU only influenced ATT through PU as the mediator. Leng (2011) also discovered similar result in his research on Malaysian students about the adoption of Social Networking Sites (SNS). Wu and Ke (2015) managed to observe more studies to support the causal relationship of PU to ATT rather than PEOU to ATT on meta-analysis research. Both studies implied that PEOU indirect effect to ATT through PU is more common in comparison to the direct effect.

Apart from the two rejected hypotheses, the other results affirmed the causal relationships between constructs, suggesting that the TAM and TPB combined are suitable for this model under mobile commerce context. Perceived usefulness influenced the attitude significantly as being supported by literature (Hou, 2014; Pavlou and Fygenson, 2006; Li, 2013). That literature also highlighted the effect of perceived ease of use to attitude. However, as being discussed earlier, this study found that respondents' attitude was not related directly to their perception toward the easiness of mobile commerce system.

Both perceived ease of use and perceived usefulness are part of the classic technology acceptance model iconic constructs. In its early form according to Davis, PEOU and PU were not associated with the behavioral intention (Davis, 1986). However, in the later development of the TAM model, PEOU and PU had incorporated attitude (ATT) and behavioral intention (BI) which implemented the idea of ATT as a mediator of PEOU and

PU indirect effect to BI (Davis *et al*., 1989). Many studies supported this model even though the newer modification, which eliminates attitude, comes along (Park *et al*., 2012; Cheung and Vogel, 2013; Nasri and Charfeddine, 2012). The function of attitude as a bridge before behavioral intention is considered as necessary by many researchers, especially to those who conducted the study in Asian countries (Hsiao *et al*., 2015; Lee, 2009). The additional finding of PU which did not influence BI directly sums that this model suits the data entirely.

Apart from the perceived usefulness and perceived ease of use, the research outcome stated that all three constructs derived from Theory of Planned Behavior model had a significant impact on behavioral intention. Attitude, subjective norms, and perceived behavioral control were proven to have a significant effect at $P < 0.001$ level. The attitude had a dominant contribution towards behavioral intention with the coefficient value 0.56 compare to SN and PBC. This finding is interesting knowing that attitude also part of Technology Acceptance Model. As previously discussed, the attitude was a mediator of the relationship of perceived usefulness and perceived ease of use to influence behavioral intention according to TAM model.

Another research, which also integrates TAM and TPB model, published similar result regarding attitude as the dominating effect to behavioral intention compared to the subjective norm and perceived behavioral control (Nasri and Charfeddine, 2012; Lee, 2009). Nasri and Charfeddine (2012) identify PBC as the second influential factor after ATT since there was a significant difference to SN as the third factor. Separately, Lee's study (2009) found only a slight difference between SN and PBC coefficient, 0.13 and 0.12 respectively. Thus, the difference was not significant as well as in the current research, 0.33 for SN and 0.30 for PBC.

Both Lee (2009) and Nasri & Charfeddine (2009) studies insinuated the findings on this current study and emphasized the use of TAM and TPB integration. Attitude's significance in this study also accentuated the importance of ATT variable to predict the user's behavioral intention. Attitude is still considered to be less critical (Venkatesh and Davis, 1996) and finally, it was removed from the model on a further TAM development by

Venkatesh (2000). Nonetheless, according to Wu and Ke (2015), the attitude was crucial as a variable to affect behavioral intention in the context of online shopping.

The attitude's strong influence showed that most of the aspect that leads to the behavior intention primarily come from the internal individual aspect. The internal individual aspect of this model referred to the supporting variables that affect the users' attitude: perception of users regarding the usefulness, easiness, and trust of the system. Another striking finding came from the trust construct as it contributed a significant effect on attitude directly, even it surpassed the perceived usefulness. It meant that the trust variable mainly influenced the user's attitude. The better they trust the mobile commerce system, the higher their attitude towards it. Accordingly, this result also supports the previous research of Agag and Al-Masry (2016), Wu and Chen (2005), which said trust played a role in the adoption of the new system in Egypt and Taiwan respectively.

In Indonesia market, the consumers are driven by the fear of fraudulent activity in every aspect, making security and safety issues come first before performing a transaction (Priyambodo *et al*., 2012). As mostly suggested in the research on developing country, trust became one of the many issues that rooted in the society (Zarmpou *et al*., 2012; Wu and Chen, 2004). The customers are still reluctant to adopt online commerce due to the assumption that the merchant will not comply with the transaction obligation (Kim *et al*., 2008). This phenomenon is part of the reason which caused the hesitation to adopt new technology for commercial use (Fadhilla and Farmania, 2017).

The support findings of the past research also become a significant contribution to the literature about consumer behavior. This application on mobile commerce adoption commends new perspective, especially for the developing countries like Indonesia. This research outcome indicates that mobile commerce is similar to the other development of technology which used TAM and TPB model. This research is essential as an approach to predict how the user will react to respond to the change and advancement in the economic transaction. Finally, the model suggested the influence of the attitude as a significant highlight thus the business player could take advantage as will later explain in the managerial implication part.

5.2. Managerial implications

A business professional could use the outcome of this study to evaluate and develop better strategy focusing on which factors that will motivate the adoption of mobile commerce transaction. Merchants, companies and the involved parties to the mobile service providers, investment, and the mobile marketing may get benefit by apprehending this research. It is also crucial for those who are interested in building a reputation on the mobile commerce platform in Indonesia as they may get an insight from the study and expand their plan to achieve the optimum result.

Budget allocation is a vital part of the business and challenging corporate environment. A marketing campaign to promote mobile commerce services is not cheap. Therefore, it is necessary for the company to plan on their strategy to gain more users to their platform. The mobile commerce players need to know the most effective and the possible low-cost idea to match the available budget.

In this high competition era, the company needs to set the right proportion of investment to be spent. Getting to this stage, the management and the marketers need to recognize the leading factors that promote the behavior intention of the mobile commerce system. A better grasp of insight in this matter might benefit the company to allocate their capital means and resources to convey the factors which users prefer most. The goal is to leverage the management investment as high as possible.

There are four notably results from the research to influence how people adopt the mobile commerce in Indonesia: users' attitude to the mobile commerce system, perception about trust in users' mind, the subjective norm as the intensity of how social or peer groups dictate a behavior, and lastly perceived behavioral control to use the mobile commerce.

The first one is about the relationship between the attitude to the behavioral intention. Compared to the other direct influential factors to the behavioral intention, the attitude by the measure found to give a substantial contribution. Therefore, it is suggested that the marketers should invest more in the strategy on changing the attitude of prospective mobile commerce users. The most common way to boost this positive attitude of the users is by

working on an advertisement. Advertisement method is acknowledged to be effective in influencing attitude toward the specific product, in this case, to promote the mobile commerce system. By actively pointing out the negative aspect of the traditional commerce system, the marketers could push comparison ads to change the users' perception. The immediate benefits are also favorable in shaping the positive attitude of the users, for instances: rebates, cashback, or exclusive items that the users may gain only through the mobile application.

Another aspect of advancing the users' attitude is to escalate the perceived usefulness and perceived ease of use matter. Both variables have become the standard service that needs to be fulfilled in the mobile commerce world. Improving the perceived ease of use means that, in developing the mobile apps, it must be natural and focus on the user-oriented system. It is important to adopt the easy-to-use approach rather than investing in a beautiful but rather hard to use and slow system. Perceived usefulness might be improved by exploring new features that may be beneficial to the users' perception.

In the digital era, the feature development regarding the mobile commerce system is updating incredibly fast. Developers are racing to maintain the security, improve the utility, and build a more natural user interface. The platform providers, like Apple with its iOS or Google with its Android, even provide a wide range of support including open its feature to the application developers. In related to the previous suggestion, marketing ads campaign helps incepting people's mind about how useful the new feature is. A regular update could also act to remind the users about the new feature or system. A huge commitment to have a continuous improvement is better to gain the highest place in customer's mind.

Worth to keep that if there is a budget constraint, the investment should not be focused solely on apps development process. Talent sourcing from developing countries could also be an option for a competitive price. Too much investment also would not give any additional benefit due to the bottleneck effect of the advancement of current possible technology. The capability of expansion to a new feature for mobile commerce relies heavily on the update of the operating system itself. Always keep in mind that there is also

the potential of copycat in the digital startup environment. However, since the innovation towards the apps will improve the PU and PEOU directly, it is highly recommended to manage this issue wisely.

Several sources of research have avoided to put the attitude variable inside their model and prefer to skip right away to the behavioral intention. Mostly their arguments related to the minor effect of the attitude to the model on the previous findings (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989; Venkatesh & Davis, 2000). Nonetheless, the result of this research found otherwise. The attitude of the users could be determined as an essential variable to influence the users' intention in adopting mobile commerce transaction.

The second aspect that is worth to consider next is the trust variable. In the developing countries especially within the scope of Southeast Asia, trust becomes one of the crucial aspects to acknowledge due to the many online frauds happening in the region and also the lack of certainty in not having face-to-face contact with the buyer and the product. In making an online transaction, it is a matter of confidence in both ways between the seller and the buyer. So far, the mobile commerce in Indonesia already developed a system to minimize the fraud activity in mobile commerce transaction. Therefore, it relies on the marketer strategy to emphasize the key safety feature in doing mobile commerce transaction.

Since trust significantly affects the behavioral intention through the attitude, the investment toward the trust promotion should be a favorable strategy to gain more users to the existing mobile commerce market. Positive reviews on a merchant act as a useful tool to build a reputation and gain trust from the customers. Therefore, having a simple reward to leave a quick comment regarding the user buying experience is an excellent example to attract more reviews for a merchant. Additional services in related to warranty and easier claim to return or refund a product also contribute positively to gain trust from the user. Currently, the digital payment system is on the rise with an expanding option to choose. A safer payment method will support the adoption of mobile commerce in Indonesia.

Another factor that proven to promote behavioral intention is the subjective norms. This finding means the company marketer could potentially gain advantage from the social

group or peer pressure as a promotional way of their product. They should impose a stake to push advertisement in peer group reviews or opinions, for instances: inducing the thread discussion in the related online forum, contributing in a summit or conference about the mobile commerce, emphasizing article reviews, and so on. Having endorsers from an expert or famous artist is also beneficial, especially in the form of testimony. It is also related to building the reputation and amplify the word-of-mouth effect since it is a powerful tool in social networking sites today (Lovett *et al*., 2013; Trusov *et al*., 2009). Social media use by using 'hashtag' promotion also found to be useful for marketing strategy. Social networking sites also target the powerful influence effect of the close family and friends. Review from the real people is what matter. The promotion that uses participation from the user (user-generated content competition) is also suitable for the Indonesian market.

Perceived behavioral control gives the influence pretty much at the same level to the subjective norms. The marketing plan to address this user behavioral control is mainly to eliminate the potential obstacle in customer's mind, for example, a proper introduction to the new system, providing a clear and accessible tutorial, having various multipayment supports, full availability in different mobile operating systems for broader market reach, and so on. The continuous improvement is needed as well as the high customer support to channel the doubts and questions from the users.

6. CONCLUSION AND LIMITATIONS

6.1. Conclusion

The primary purpose of this research was to determine the factors affecting the behavioral intention to adopt m-commerce. The research model was based on a combination of TAM and TPB model and incorporate trust as an additional factor. Empirical data were collected from the participants via questionnaire survey and used SEM to test the relationships among the constructs hypothesized in the research model.

After a broad and extensive study of the Technological Acceptance Model and Theory of Planned Behavior, this research found that the behavioral intention is influenced by attitude dominantly, and then followed by subjective norm and perceived behavioral control. Trust and the perceived usefulness supported the attitude variable directly, meanwhile perceived ease of use has the indirect effect to attitude through perceived usefulness. Thus, the three variables of trust, perceived usefulness, and perceived ease of use have the indirect effect on behavior intention through the attitude. The findings may provide useful guidelines for developing strategies to acquire new mobile commerce customers and encourage future expansion and frequent usage.

6.2. Limitations

Even though this research has tried its best in getting the better insight about factors contributing to building customer's intention-behavior in Indonesia, it has some notable limitations. First, the data gathering method used a cross-sectional approach. A longitudinal study would be better to analyze the further implication over time. The sample size is quite enough by gaining 384 respondents. However, it is a convenient sampling which in this study relied on social media to promote the online questionnaire. Therefore, most of the respondent cannot represent the vast Indonesian population indeed. Suggestion to the next research should address better sampling method to describe substantial Indonesian mobile user. The next research should also consider having the better way to measure the actual behavior of the user since it turns out some people relied on mobile commerce already.

For the further research ideas, this study can be improved by several important strategies to put in consideration. To elaborate better finding, identified other potential variables from previous research to be included. This study limits the factors available and tests the underlying constructs first to focus on the most common thing and is hoping to stimulate more in-depth research. Technology Acceptance Model and Theory of Planned Behavior both are suitable in this context of mobile commerce. There is no actual behavior being incorporated since many limitations on Technology Acceptance Model stated that the self-report questionnaire has more bias tendency, and it needs the proper tool to observe this variable. Therefore, this study just focuses on how the user behavior intention to adopt mobile commerce system.

Competing behavior prediction model also available to try on. A comprehensive comparison analysis is also interesting to discover. Every model has its limitation, therefore by having a wide array of perspective from the other models, might provide the insight into the consumer behavior fields of study and benefit the business player. The other model also might be more suitable for the mind structure of how Indonesian market behavior will react.

The second ideas for further research are conduct a cross-cultural study with another country to identify the strategies for each specific country. Since every country has its unique characteristic, the comparison will open a more comprehensive knowledge and insight, especially looking at the success country that already applied an excellent governance system and already had high traffic on mobile commerce transaction.

The data collection was using online questionnaire which is distributed through social media platform. It means the respondents mostly already familiar with the internet and mobile phone. This method is beneficial if the study wants to target the people who already aware of the mobile commerce system. However, it could not be generalized to the whole Indonesian population. It is suggested to make more significant sample size and grasp a wide range of consumer to gain better information.

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8. ANNEXES

8.1. Questionnaire Development

8.1.1. Perceived Usefulness (PU)

"The degree to which a person believes that using a particular system would enhance his or her job performance." This follows from the definition of useful: "Capable of being used advantageously." (Davis, 1989)

Original Item	Decomposition	
	General Behavioral Action	Implication
Davis (1989)		
Using CHART-MASTER in my job would enable me to accomplish tasks more quickly	using CHART-MASTER in my job	accomplish tasks more quickly
Using CHART-MASTER would improve my job performance	using CHART-MASTER	improve my job performance
Using CHART-MASTER in my job would increase my productivity	using CHART-MASTER in my job	increase my productivity
Using CHART-MASTER would enhance my effectiveness on the job	using CHART-MASTER	enhance my effectiveness on the job
Using CHART-MASTER would make it easier to do my job	using CHART-MASTER	make it easier to do my job
I would find CHART-MASTER useful in my job	I	find CHART-MASTER useful in my job
Zarmpou, *et al*. (2012)		
I think using m-services would make it easier for me to conduct transactions	using m-services	make it easier for me to conduct transactions
I think using m-services would make it easier for me to follow up my transactions	using m-services	make it easier for me to follow up my transactions
I think using m-services would increase my productivity	using m-services	increase my productivity
I think using m-services would increase my effectiveness	using m-services	increase my effectiveness
I think using m-services would increase my efficiency	using m-services	increase my efficiency

The proposed questions

- Using m-commerce would allow me to purchase goods and/or services more quickly
- Using m-commerce would increase my productivity
- Using m-commerce would enhance my effectiveness in purchasing goods and/or services
- Using m-commerce would improve my efficiency in purchasing goods and/or services
- Using m-commerce would make it easier to purchase goods and/or services
- I would find m-commerce useful in purchasing goods and/or services

8.1.2. Perceived Ease of Use (PEOU)

"The degree to which a person believes that using a particular system would be free of effort." This follows from the definition of ease: Freedom from difficulty or great effort. (Davis, 1989)

Original Item	Decomposition	
	Objective	Concept to be tested
Davis (1989)		
Learning to operate CHART-MASTER would be easy for me	learning to operate CHART-MASTER	ease of learning
I would find it easy to get CHART-MASTER to do what I want it to do	I would find it easy to get CHART-MASTER	ease of control
My interaction with CHART-MASTER would be clear and understandable	my interaction with CHART-MASTER	ease of interaction
I would find CHART-MASTER to be flexible to interact with	I would find CHART-MASTER	ease of flexibility
It would be easy for me to become skillful at using CHART-MASTER	it would be easy for me	ease of skill expert
I would find CHART-MASTER easy to use	I would find CHART-MASTER	ease of overall use

The proposed questions

1. Learning how to use m-commerce would be easy for me
2. I would find it easy to navigate m-commerce doing what I want it to do (e.g., looking product info)
3. My interaction with m-commerce would be clear and understandable
4. I would find m-commerce to be flexible to interact with
5. It would be easy for me to become skillful at using m-commerce
6. I would find m-commerce easy to use

8.1.3. Trust

Pavlou (2003) said "trust in E-commerce is the belief that allows consumers to willingly become vulnerable to the online retailers after having considered the retailers' characteristics including goodwill trust (benevolence) and credibility (honesty, reliability, and integrity)."

Original Item	Decomposition	
	Objective	Trust issues to be measured
Zarmpou, *et al*. (2012)		
I feel using m-services in monetary transactions is safe	using m-services in monetary transactions	security in mobile payment
I feel my personal data are in confidence while using m-services	my personal data are in confidence	privacy
I feel the terms of use are strictly followed while using m-services	terms of use are strictly followed	integrity of the term of use
I feel using m-services for my transactions is trustworthy	using m-services for my transactions	trustworthiness

The proposed questions

1. Using mobile payment for monetary transaction in m-commerce is safe
2. My personal data are in confidence while using m-commerce
3. The terms of use are strictly followed while I am using m-commerce
4. Using m-commerce to purchase goods and/or services is trustworthy

8.1.4. Attitude

Attitude toward m-commerce adoption is defined as the consumer's evaluation of the desirability of using m-commerce to get information and purchase products and/or services from a m-commerce merchant respectively (Ajzen & Fishbein, 1980).

Original Item	Decomposition	
	Objective	**Attitude attribute to be measured**
Taylor & Todd (1995)		
Using the CRC is a (bad/good) idea	Using the CRC	(bad/good)
Using the CRC is a (foolish/wise) idea	Using the CRC	(foolish/wise)
I (dislike/like) the idea of using the CRC	The idea of using the CRC	(dislike/like)
Using the CRC would be (unpleasant/pleasant)	Using the CRC	(unpleasant/pleasant)
Abroud, *et al*. (2015)		
Using Internet for stock trading would be a wise idea	Using Internet for stock trading	Wise idea
I like to use Internet stock trading in Iran Stock Market	use Internet stock trading in Iran Stock Market	I like
I think these days; using Internet for stock trading is a necessity	using Internet for stock trading	Necessity
Using online trading for Stock transactions would be a good idea	Using online trading for Stock transactions	Good idea
Using online trading for stock exchange would be a pleasant experience	Using online trading for stock exchange	Pleasant experience
Ashraf, *et al*. (2014)		
Using a website for shopping is convenient	Using a website for shopping	Convenient
I don't like shopping over the website (reverse coded)	shopping over the website	I like
Using a website for shopping is interesting.	Using a website for shopping	Interest

The proposed questions

1. Using m-commerce to purchase goods and/or services is a good idea
2. Using m-commerce to purchase goods and/or services is a wise idea
3. I like to use m-commerce to purchase goods and/or services
4. Using m-commerce to purchase goods and/or services would be a pleasant experience
5. I think these days; using m-commerce to purchase goods and/or services is a necessity
6. Using m-commerce to purchase goods and/or services is convenient
7. Using m-commerce to purchase goods and/or services is interesting

8.1.5. Subjective Norm (SN)

Subjective norm suggests that behavior is instigated by one's desire to act as important referent others act or think one should act (Karahanna, *et al*., 1999)

Original Item	Decomposition	
	Subjective influence	**Intended behavioral action**
Zhang & Gutierrez (2007)		
People who are important to me think that I should use the HMIS	People who are important to me	I should use the HMIS
People whose opinion I value prefer me to use the HMIS	People whose opinion I value	Prefer me to use the HMIS
Taylor & Todd (1995)		
People who influence my behaviour would think that I should use the CRC.	People who influence my behaviour	I should use the CRC.
People who are important to me would think that I should use the CRC.	People who are important to me	I should use the CRC.

The proposed questions

1. People who are important to me think that I should use the m-commerce to purchase goods and/or services
2. People whose opinion I value prefer me to use the m-commerce to purchase goods and/or services
3. People who are important to me would think that I should use the m-commerce to purchase goods and/or services

8.1.6. Perceived Behavioral Control (PBC)

Ajzen suggested that PBC "should be read as perceived control over the performance of a behavior" (Ajzen, 2002). In other word, Perceived Behavioral Control is defined as a person's perception of how easy or difficult it would be to carry out a behavior.

Original Item	Decomposition	
	Perceived control	**Behavioral action**
Zhang & Gutierrez (2007)		
Overall, I am capable of using the HMIS	I am capable of	Using HMIS
Nothing withholds me from using the HMIS	Nothing withholds me	Using HMIS
Taylor & Todd (1995)		
I would be able to use the CRC.	I would be able to	Use the CRC
Using the CRC is entirely within my control.	Entirely within my control	Using the CRC
I have the resources and the knowledge and the ability to make use of the CRC.	I have the resources and the knowledge and the ability	To make use of the CRC
Ashraf, *et al*. (2014)		
I would be able to buy from a website	I would be able to	Buy from a website
I have the resources to purchase product or services from a website (e.g., credit card)	I have the resources to	Purchase product or services from website
I have the knowledge to use the website for shopping	I have the knowledge to	Use the website for shopping

The proposed questions

1. I am capable of using m-commerce
2. Nothing withholds me from using m-commerce
3. Using m-commerce is entirely within my control
4. I have the resources to purchase products and/or services using m-commerce
5. I have the knowledge to use m-commerce for shopping

8.1.7. Behavioral Intention (BI)

Behavioral intention is defined as probability and willingness for a person to implement m-commerce, in this case, to purchase goods or services subjectively (Ajzen, 1991)

Original Item	Decomposition	
	BI to be measured	**Behavioral action**
Zarmpou, *et al.* (2012)		
I intend to use m-services in the near future	High likely to use	Use m-services
I believe my interest towards m-services will increase in the future	Increasing interest	My interest towards m-services will increase
I intend to use m-services as much as possible	Potential of high usage	Use m-services as much as possible
I recommend others to use m-services	Willingness to give recommendation	Recommend others
Ashraf, *et al.* (2014)		
I intend to use the HMIS as much as possible	Potential of high usage	Use the HMIS as much as possible
I try my best to use the HMIS	High likely to use	Try my best to use the HMIS
I take every opportunity to use the HMIS	High likely to use	Take every opportunity to use the HMIS

The proposed questions

1. I intend to use m-commerce in the near future
2. I believe my interest towards m-commerce will increase in the future
3. I intend to use m-commerce as much as possible
4. I will recommend others to use m-commerce
5. If given a chance, I will use m-commerce to purchase goods and/or services

8.1.8. Demographic questions

1. **Gender**
   Male
   Female

2. **Age (Years)**
   18–24
   25–30
   31–35
   >35

3. **Mobile commerce experience**
   I have used m-commerce once
   I never used m-commerce, but I used e-commerce
   I never purchased online

4. **Internet experience**
   Less than 1 year
   1 to less than 5 years
   5 to less than 10 years
   10 years or more

5. **Having experience with mobile phone**
   Less than 1 year
   1 to less than 5 years
   5 to less than 10 years
   10 years or more

(adapted from Ashraf, *et al*., 2014)